

Suggested Experiments
with Agnihotra and Homa Therapy

What has been done and what can be done

Dr. Ulrich Berk



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*Suggested Experiments with Agnihotra and Homa Therapy:
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Suggested Experiments with Agnihotra and Homa Therapy

1 Introduction

The ancient practice of Yajnya or Homa - fires done according to specific rules in order to obtain desired results - is still well known in India.

Actually these practices are much older even than Indian tradition: they are based on Vedic Knowledge, the ancientmost knowledge of mankind.

Nowadays, these practices are mostly seen as part of the Indian tradition or religion, less so as part of science. Only recently there were attempts to examine how these ancient Yajnyas can help to counteract the worldwide pollution of our planet, probably the biggest problem mankind is facing today. Homa Therapy is the expression coined by Vasant Paranjpe, the teacher who spread knowledge of Agnihotra on all continents from 1972 to 2008, referring to using Agnihotra, Agnihotra Ash and other Vedic Yajnyas to undo pollution on all the levels. A lot of reports about personal experiences support this possibility.

This manual shows how to check whether a scientific background of Yajnya can be established. Why is this an important subject of studies?

Global climate changes indicate that Nature is out of balance, and pollution of all our environment seems to be one important cause for that. Can this ancient knowledge of Agnihotra and Homa Therapy help us to set things right?

Many reports and some preliminary studies on how Agnihotra and Homa Therapy help establish that these methods really help to bring Nature back to harmony. But how do these effects come about? This is still a mostly unanswered question.

More indepth studies are needed to better understand the underlying mechanisms, and many of them can be done on College level, some even on school level.

For more fundamental research, more sophisticated methods and equipment are necessary, available in research institutions and universities.

These studies, carried out seriously, can give hope to the younger generation.

1.1 Experiences and studies so far

The practice of Agnihotra has been revived in the second half of last century by Shree Gajanan Maharaj from Akkalkot as a resuscitation of Vedic Knowledge. Forty years ago Shree Vasant Paranjpe introduced the method to Western countries and then later all over the planet. Mostly people performed Agnihotra in their homes for stress reduction and spiritual

upliftment. Agnihotra Ash was used to prepare number of medicines and many healings were reported. (A collection of healing reports you find on: www.homahealth.com.)

Agnihotra and Homa got more public attention when it was applied in agriculture and horticulture as Homa Organic Farming. Homa Farming on a larger scale started in South America end of last century. One first breakthrough happened when a fungus disease called Black Sigatoka hit banana plantations and no other known method was able to control this disease. With Homa Farming this Black Sigatoka could be eradicated, and the production even increased with Homa methods. (Now Black Sigatoka has come to India also, causing a lot of damage in banana plantations.)

Besides Black Sigatoka many other diseases could also be cured by Homa Farming methods. Pests could be controlled, yields increased, production cycles reduced, harvesting losses reduced, diseased plants could be rejuvenated and soil improved.

These positive experiences then led to some scientific studies e.g. showing that

- germination in Agnihotra Atmosphere or by adding Agnihotra Ash was improved as compared to control (*Heisnam/Swamy/Nagendra 2004; Sharma 2012; Limaye 2014*)
- Agnihotra Ash was superior to other organic treatments (*Atul/Punam/Rameshwar 2009*)
- Agnihotra fire and Agnihotra Ash could reduce pathogenic bacteria considerably (*Mondkar 1982, Pathade/Abhang 2014, Abhang et al. 2015*).

These first studies then led to the decision of Planning Commission, Government of India, to support and sponsor a first International Scientific Conference on Homa Organic Farming which was held in Tapovan, a Homa Farm near Dhule, Maharashtra, India, in 2009. Scientists from different Universities and Government institutions came, shared their results, and discussed how to proceed further. This gave a push for more scientific studies, and in the meantime a number of M.Sc. theses on this subject have been successfully completed. (For more detailed information see *Berk/Johnson 2009* and Chapter 6 of this paper on Agriculture - Horticulture.) Also since then several articles have been published in scientific journals (see annexures).

Thus the fact that Homa Organic Farming works has been well established. It gives good production, deals with all different kinds of pests and diseases, and also also increases the profits of farmers as input costs are low and production is more.

Still the question is there - how do these positive effects come about, what are the underlying mechanisms which can help understand how Agnihotra and Homa work?

One step in this direction of understanding the process of Agnihotra better was taken when reports showed that Agnihotra and Agnihotra Ash are reducing or neutralizing pollution of our environment, of atmosphere, soil and water resources. It was shown e.g. that pathogenic bacteria in air and water were drastically reduced if you perform Agnihotra and/or put Agnihotra Ash into the water (see *Pathade/Abhang 2014, Abhang et al. 2015*). Even the water quality of a river improved next to a Homa place (see *Sharma 2011*).

If there are less pathogenic bacteria, there will be less disease, and therefore better production in agriculture and horticulture. This seems obvious.

Still - how does this effect of reducing pathogenic bacteria come about? There is still a wide scope for research in the topics of Biology, Biotechnology, Chemistry, and Physics. First, the experiments already done should be replicated in a systematic way. Then we can go further -

especially trying to identify the underlying mechanisms for the effects we have seen. An example: Magnetic properties of water are changed in Agnihotra Atmosphere (see chapter 9.2.2.1). As magnetic and electric properties of water are decisive for the passing of water through the cells of plants, a change of these properties could e.g. accelerate the transport of nutrients within plants. Till now this is just a hypothesis which needs more work both in the field of physics as in the field of plant physiology - but if this hypothesis would be confirmed this would give us one of the underlying mechanisms explaining why plants grow better, get stronger and are more disease resistant in Agnihotra Atmosphere.

Although personal health and well-being were the main reasons why people started the practice of Agnihotra in the beginning, thirty or forty years ago, and although there are numberless reports of people getting healed of all kinds of physical and mental problems, till now there is not much scientific research done in this field. Exceptions are a very early study on the effect of Agnihotra to heal drug addiction (*Golechha/Deshpande/Sethi/Singh 1987*) and a recent study on the effect of Agnihotra reducing stress (*Yudin/Berk 2013*).

A lot of work still needs to be done in this area; see the suggestions in Chapter 7, Human Health and Psychotherapy.

Mantras, a special sound combination, are said to have specific effects on matter. By just chanting the mantra OM, sand which was distributed on a flat plate was rearranged in such a way that the Sri Yantra (a geometrical design said to have healing properties) could be clearly seen - just by the vibration of the mantra! (This report is from Switzerland - I did not find any reports of others who succeeded in replicating this effect though.) Scientific research is still at the very beginning though. One first step was done by Heisnam 2003.

Which role does the specific shape of the Agnihotra pyramid play? Does the Agnihotra mantra resonate in the copper pyramid and the flames? Which role is played by the exact time of sunrise and sunset?

A lot of questions and interesting topics in the field of physics! In the end we should be able to understand how Agnihotra and Agnihotra Ash can neutralize radioactive pollution.

1.2 Vedic Knowledge - hypotheses for modern science

There are a lot of statements from Vedic Knowledge about the effects of Agnihotra and Agnihotra Ash. Main reference here is from the writings of Shree Vasant Paranjpe, especially *Paranjpe 1989*. But although "vid" means knowledge and therefore some take the truth of statements from the Vedas unquestionably, we will instead treat Vedic statements as hypotheses in terms of modern science which then will be tested.

Before this testing can be done, we have to try to understand Vedic statements in terms of modern science. This is more than just a translation as sometimes modern science does not have the technical terms yet corresponding to Vedic terms (like „Prana“ or „subtle energies“).

Sometimes there seems to be a direct translation – but it does not make sense (like „fire in water“). Also it may be necessary to widen the scope of modern science so that it will be possible to understand and then validate (or refute) Vedic statements.

We have to avoid two possible forms of dogmatism which are actually widespread when dealing with any form of traditional knowledge:

1) "This statement is confirmed by different quotations from the Vedas - and therefore it must be true."

2) "These statements from Vedic Knowledge do not make sense in terms of modern science and therefore have to be refuted."

Dogmatism no. 1 would lead to an endless discussion about how it can be established that because of the sacred origin of the Vedas all statements must be true.

Better to treat such statements as hypotheses and then try to test with methods of modern sciences.

Dogmatism no. 2 is one of the big stumbling blocks for the development of sciences: Quite often ideas which cannot easily be integrated in the present body of knowledge are refuted just because of this reason. But any fundamental progress in science was always done by transcending borders from the present body of knowledge into the realm of the yet unknown or even previously unthinkable.

Therefore it is advisable to be neutral and just examine such statements even if they sound fantastic. And in case we cannot understand right away in terms of modern sciences, just be patient and wait till we can e.g. put some meaning to "Prana" or "subtle energy". (Some steps in this direction you will find in Chapter 10.)

2 Methodology

2.1 Description of Agnihotra

Agnihotra is the basic healing fire of Homa Therapy. It is a gift to humanity from ancientmost Vedic sciences of bioenergy, medicine, agriculture and climate engineering.

For clarity especially for any scientific study we have to specify to which version we are referring.

Whenever I use "Agnihotra" it refers to the Agnihotra as introduced by Shree Gajanan Maharaj from Shivapuri/Akkalkot. His main disciple, Shree Vasant Paranjpe, has taught this method on all the continents and has described it in detail (see *Paranjpe 1989*).

2.1.1 Ingredients

For Agnihotra we need:

- A copper pyramid of specified size and shape
- Dried cow dung (pure COW dung - not mixed with any other dung)
- Pure cow's ghee (clarified unsalted butter from pure cow's milk)
- Unbroken pieces of rice, preferable less polished rice.

Best if all the ingredients can be from organic sources only.

2.1.2 Timings

Agnihotra is performed exactly at sunrise and sunset in a copper pyramid with the materials cow dung, cow ghee and rice. The exact timings are crucial. A software has been developed in Germany to get the exact sunrise and sunset timings for every place on the planet (see: www.homatherapie.de).

This software uses a specific definition of sunrise/sunset as given in the Vedic knowledge for Agnihotra (middle of sun's disk at the horizon, no refraction taken into account).

2.1.3 Agnihotra Mantras

SUNRISE AGNIHOTRA MANTRAS

Sooryáya swáhá sooryáya idam na mama

(Add the first portion of rice after swáhá)

Prajápataye swáhá prajápataye idam na mama

(Add the second portion of rice after swáhá)

SUNSET AGNIHOTRA MANTRAS

Agnaye swáhá agnaye idam na mama

(add the first portion of rice after swáhá)

Prajápataye swáhá prajāpataye idam na mama

(Add the second portion of rice after swáhá)

(*á* is pronounced like the „a“ in „father“)

An audio file of these mantras can be downloaded from:

www.homatherapie.de/en/mantras.html

A more detailed description of how to perform Agnihotra is given in *Paranjpe 1989* and in *Berk/Johnson 2009*.

Homa Therapy is based on regular performance of Agnihotra, and in addition to that some more disciplines are introduced especially in the field of Homa Farming. For details see *Berk/Johnson 2009*.

2.2 Agnihotra Atmosphere

If Agnihotra is performed regularly in a room this room is said to have Agnihotra Atmosphere. Agnihotra Atmosphere is likely to work stronger than just one Agnihotra but that has to be tested of course.

We talk of an Agnihotra Shala when Agnihotra is performed regularly in a room (means there is Agnihotra Atmosphere) plus this room is kept just for Agnihotra, no other activities going on there and especially no other words spoken in this room except for the Agnihotra mantras.

2.3 Agnihotra Ash

The resulting ash of the Agnihotra fire has shown healing properties both in medicine and for treating plants and environment.

We collect the ash after it has cooled down totally (no more ember there), sieve it and keep it in containers made from natural materials like clay or glass.

Agnihotra Ash should not be kept in metal containers (copper containers would be o.k. though) or in plastic containers or plastic bags.

Only when Agnihotra was done in proper way - correct time for the exact location, watch exact, already a good flame when the offerings are made so that the rice can be consumed by the fire right away, correct pronunciation of the mantras - the resulting ash can be used for experiments.

2.4 Control Ash

Any ash has some good effect on plants and was traditionally often used in the gardens.

In order to find out what is the effect of Agnihotra we always suggest to use Control Ash for comparison whenever you do experiments with Agnihotra Ash.

Control Ash is produced from exactly the same ingredients as Agnihotra Ash in same proportions, but the fire done without mantras, not at time of sunrise/sunset, and not in an

Agnihotra pyramid (instead in a copper vessel of any other shape).

2.5 Control Fire

For certain experiments one might think that just burning of the materials used in the Agnihotra Fire could lead to the observed effects (like reduction of pathogenic bacteria in the air). In these cases it makes sense to do the respective experiments also with a "Control Fire" instead of Agnihotra Fire: The same substances are burnt (cow dung, ghee, rice - in same proportions as in Agnihotra), the vessel for the fire is from copper - but no mantras, no sunrise/sunset timing, and the copper vessel does not have the pyramid shape.

The control fire should be at least three km away from the Agnihotra place.

If this is difficult (like if you do an experiment in a laboratory), then first do the experiment using the Control Fire, and after that do the experiment with proper Agnihotra.

2.6 Agnihotra Ash Water

Take a large pot and add five litres of water. Boil the water and keep it boiling for 10 minutes. Then add three tablespoons of Agnihotra Ash, stir thoroughly and then take the pot from the stove, cover it and keep it untouched for 24 hours.

After that you sieve the water through a fine strainer or cloth to obtain Agnihotra Ash Water. It can be stored in a vessel from natural materials (like glass or clay) for long time.

2.7 Control Ash Water

Take a large pot and add five litres of water. Boil the water and keep it boiling for 10 minutes. Then add three tablespoons of Control Ash, stir thoroughly and then take the pot from the stove, cover it and keep it untouched for 24 hours.

After that you sieve the water through a fine strainer or cloth to obtain Control Ash Water.

2.8 Methodology - Advanced

After we have identified one or two areas in which there are clear differences between Agnihotra and non-Agnihotra application (like in germination or in microbiology), then we can see what happens if we make changes to the described practice of Agnihotra, like changing the ingredients, changing material, size or shape of the vessel used, using a different time or different (or no) mantras. Also we could compare Agnihotra with mantras done by a human being with Agnihotra with mantras only done by voice recording.

Also normally women in period are advised not to perform Agnihotra - will there be a difference e.g. in the ash if they do?

Also it can be tested whether stricter disciplines (like taking shower before Agnihotra, wearing clothes made from natural fibres like wool or cotton) will improve the effect.

But we have to be very careful of which conclusions we can draw from such results: If for example taking shower does not make a difference in germination experiments, it may well be that it does if we use the resulting Agnihotra Ash for medicines.

So best to do such experiments with changing the disciplines of Agnihotra only after we already have come to some solid understanding how Agnihotra - properly performed - works.

2.9 Essential guideline

In order to get the effects of Agnihotra and Homa Therapy it is crucial to perform the methods exactly as stated above.

Especially the exact timings are of utmost importance - therefore a time table (prepared according to the definition of sunrise and sunset given for Agnihotra, see 2.1.2) exact to the second for each location where Agnihotra is being performed is necessary as well as a watch which is adjusted regularly with seconds' accuracy. The copper pyramid has to be of the exact size and shape, no other materials must be used than those mentioned above, and exactly the mantras given above have to be used (without any changes like adding "Om" etc.), and the resulting ash (if used) has to be treated in proper way.

Agnihotra is a simple process but it has to be done exactly - therefore it is highly recommended that experienced Homa Therapy practitioners perform these fires or train the students and scientists properly.

3 Microbiology: Effect of Agnihotra and Agnihotra Ash on reducing pathogenic bacteria in air, soil and water

Microbiological experiments probably were the first experiments done about Agnihotra: They are relatively easy to do and the results are quantifiable and thus leaving less room for interpretations than tests on humans and animals. The first set of experiments known to us is described in *Mondkar 1982*. Later such tests were repeated, see *Sharma 2011* and *Pathade/Abhang 2014*. Also similar experiments have been done for other types of Homa (see *Nautiyal et. al. 2007, Saxena 2010*).

Good to do a replication in a systematic manner, always examining the effect of Agnihotra Atmosphere and Agnihotra Ash separately, when using Agnihotra Ash also using Control Ash for comparison. Effects of Agnihotra and Agnihotra Ash on Water

3.1 Effects of Agnihotra and Agnihotra Ash on Water

Introduction

At the beginning of the eighties of last century a Polish school teacher did a simple test - not really experiment - on purification of water:

She took water from a vase in which cut flowers had been kept. This water was already putrid.

She divided the water and put into two glass jars, added Agnihotra Ash to one jar and the second jar was kept with just the putrid water. (She did not use Control Ash.)

After one week she saw a big difference: The water without ash got worse and had a very bad smell, the water with Agnihotra Ash showed some sediment at the bottom, otherwise it was clear, and no smell (see *Gerlecka 1985*). This is a very simple test which can easily be done at school level.

Mondkar 1982 reports about the beneficial effect of Agnihotra Atmosphere on reduction of pathogenic bacteria in air. *Matlander n.d.* took water heavily contaminated with bacteria (Klebsiella, Escherichia Coli, Entero Bacter sp.) from his clinic and got it tested. Then he added Agnihotra Ash to one of the samples. There was a high reduction in these bacteria. Also placing the water sample next to an Agnihotra pyramid had this effect.

3.1.1 Effects of Agnihotra Ash on bacteria in water

Take water which contains pathogenic bacteria, e.g. E.coli.

Measure bacterial count.

Put this water in three glass bottles.

Add Agnihotra Ash to the first bottle,

Control Ash* to the second,
and keep the third bottle as total control.
Measure bacterial count again after one day / three days / after five days.

3.1.2 Effect of Agnihotra Atmosphere on bacteria in water

Take water which contains pathogenic bacteria, e.g. E.coli.
Measure bacterial count.
Put this water in two sets of petri dishes (say three petri dishes each).
Put one set of these petri dishes in Agnihotra Atmosphere (a room in which Agnihotra is done regularly).
Put the second set of petri dishes in a room in which Agnihotra is not done and which is at some distance from the Agnihotra room.
Measure bacterial count again after one day / three days / after five days.

3.1.3 Effect of Agnihotra Ash plus Agnihotra Atmosphere on bacteria in water

Take water which contains pathogenic bacteria, e.g. E.coli.
Measure bacterial count.
Put this water in a glass bottle and add Agnihotra Ash.
Keep the glass bottle in Agnihotra Atmosphere (a room in which Agnihotra is done regularly).
Measure bacterial count again after one day / three days / after five days.
Compare with the results you got in 3.1.1 and 3.1.2

Hypothesis

The combination of both adding Agnihotra Ash and keeping the water sample in Agnihotra atmosphere is the best treatment for reduction of pathogenic bacteria.

3.1.4 Effect of Agnihotra Ash Water on bacteria

Take Agnihotra Ash Water (see Methodology, chapter 2.6, check it for bacteria (it should be free of bacteria). Add different strains of pathogenic bacteria and measure the bacterial count after 24 hours.
Do the same with Control Ash Water (see chapter 2.7) and compare.

3.1.5 Effects of Agnihotra energy field on bacteria in water

Hypothesis

* Control Ash: See Methodology, 2.4

Even if chemical reactions are ruled out there will be a positive effect of the Agnihotra energy field on contaminated water.

Method

Experiment done like in 3.1.2, only the petri dishes are kept closed in Agnihotra Atmosphere so that no smoke can enter and whatever effect is there can only be due to some energy field of Agnihotra but not because of some chemical reaction between the water and ash or smoke of Agnihotra.

3.2 Effects of Agnihotra and Agnihotra Ash on Soil

3.2.1 Effects of Agnihotra Ash on bacteria and fungi in soil

Take soil which is contaminated with harmful bacteria and/or fungi.

Measure the bacteria and/or fungi.

Put this soil in three different containers.

Add Agnihotra Ash to the first container.

Add Control Ash to the second container.

Keep the third container for total control.

Measure bacteria and fungi again after one day / three days / after five days.

3.2.2 Effects of Agnihotra Atmosphere on bacteria and fungi in soil

Take soil which is contaminated with harmful bacteria and/or fungi.

Measure the bacteria and/or fungi.

Put this soil in two different containers.

Keep the first container in Agnihotra Atmosphere (a room in which Agnihotra is done regularly).

Keep the second container in a room in which Agnihotra is not done and which is at some distance from the Agnihotra room.

Measure bacteria and fungi again after one day / three days / after five days.

3.2.3 Effects of Agnihotra Atmosphere plus Agnihotra Ash on bacteria and fungi in soil

Take one container of soil contaminated with harmful bacteria and/or fungi like in 3.2.1, but additionally keep this container in Agnihotra Atmosphere for five days.

Then do the measurements and compare with 3.2.1 and with 3.2.2.

Hypothesis

The combination of both adding Agnihotra Ash and keeping the soil sample in Agnihotra atmosphere is the best treatment for reduction of pathogenic bacteria and fungi.

3.3 Effects of Agnihotra and Agnihotra Ash on Air

The effect of Agnihotra on bacteria in the air has been studied - see *Mondkar 1982* and *Pathade/Abhang 2014*.

3.3.1 Repetition of experiments done

It would be good to repeat these experiments with air samples taken before
and then

1 hour / 3 hours / 6 hours / 12 hours / 24 hours after Agnihotra.

Also good to use a microbial air sampler with high sampling rate as it sucks in larger quantities of air (bacteria are kept in some filter paper) - therefore the results will become more reliable than experiments done with petri dishes kept in the room. (Depending on where exactly you place these petri dishes and on the air circulation there can be a big variation in the results.)

3.3.2 Effect of Agnihotra in the long run

Do as 3.3.1, but continue the practice of Agnihotra for say one week

Measure the level of bacteria

Hypothesis

The concentration of pathogenic bacteria will continuously go down and will asymptotically approach zero.

3.3.3 Effect of Agnihotra - or only effect of substances burnt?

Repeat the experiment like in 3.3.1 - but instead of performing proper Agnihotra a kind of "control fire" is being done: Same substances burnt, also in a copper vessel (but no pyramid shape), no mantra, not at time of sunrise or sunset.

Hypothesis

The reduction of pathogenic bacteria in the air will be less with such a "control fire" - and that means that the effect of bacterial purification is mainly based on the specific disciplines of Agnihotra, using the exact copper pyramid, exact timings, and the mantras.

3.3.4 Effect of Agnihotra on bacteria brought into the room

Some pollutants could also be brought to the room before the experiments to see how Agnihotra helps to reduce them. In this way you can see the effect of Agnihotra on specified bacteria.

Pass pathogenic bacteria into the room.

Measure the level.

Perform Agnihotra and then measure again.

Methods:

- a) petri dishes
- b) air sampler (preferable)

3.3.5 Further Studies 1: Hospital germs

Resistant hospital bacteria bugs are getting more and more virulent. A recent study of the CDC (Centers for Disease Control and Prevention) states that one out of 25 patients gets infected in the hospitals and this leads to approx. 75000 deaths per year in U.S. alone.

These hospital germs are difficult to treat as they are resistant against common antibiotics. Therefore it would be a great help if we could show that Agnihotra Atmosphere helps to reduce these germs in number and toxicity.

An experiment could be done in a hospital itself (similar to 3.3.2) or such hospital germs if isolated could be examined in petri dishes both in Agnihotra Atmosphere and with Agnihotra Ash.

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash help to control hospital germs.

3.3.6 Further Studies 2: How does the reduction of bacteria come about?

After the previous studies showing that Agnihotra Atmosphere reduces harmful bacteria in the air have been confirmed we can ask whether this effect is because of the substances burnt or because of the other disciplines of Agnihotra (copper pyramid of specific size and shape; mantras; exact timings of sunrise and sunset).

Hypothesis

Agnihotra properly performed gives best results in controlling bacteria (although the materials burnt without the disciplines of Agnihotra can show some effect)

Method

Make a "Control Fire" (same as what we do when we prepare Control Ash): Same materials burnt, in some vessel made from copper, but no pyramid shape, not at sunrise or sunset, no mantras) and otherwise proceed like in 3.2.1.

Compare the results of 3.2.1.

3.4 Advanced Studies

"Agnihotra has the ability to neutralize pathogenic bacteria." (*Paranjpe 1989*, p. 19)

A confirmation in terms of modern science we have seen in number of experiments mentioned in the previous paragraphs.

Still the question remains: How is this result achieved, what are the underlying mechanisms?

Are bacteria actually killed or do Agnihotra Atmosphere and Agnihotra Ash reduce their ability to reproduce?

For example: It has been shown that pathogenic bacteria in water are reduced in Agnihotra Atmosphere (see: *Berk/Sharma 2015*). This cannot be due to a chemical interaction (as it also works when the water is kept in closed bottles, so no ash or fumes of Agnihotra come into contact with the water).

One possibility is that some beneficial microbes in water are activated by Agnihotra Atmosphere to bring about these beneficial changes. This will be discussed below (see 3.5.4).

3.4.1 Reduction of pathogenic bacteria in Agnihotra Atmosphere - what is the mechanism?

What is the underlying mechanism for these effects?

It must be different from the way antibiotics work: Antibiotics kill all kinds of bacteria, whether beneficial or pathogenic.

Agnihotra Atmosphere on the contrary makes a distinction whether bacteria are harmful or beneficial, neutralizes the pathogenic bacteria and activates the beneficial ones.

How is that working?

This is a tricky question as some bacteria may be useful in one environment (like certain bacteria useful for digestive processes in the intestines) but harmful in other environments (if you would put the same bacteria in your eyes, e.g.)

That makes this a very interesting topic for advanced research.

3.4.2 The effect of Agnihotra Ash on beneficial bacteria

3.4.2.1 Phosphate solubilizing bacteria

Water solubility of phosphorus in soil is increased when you mix it with Agnihotra Ash. (Control Ash does not have this effect.)

How does that change come about?

Hypothesis

Phosphate solubilizing bacteria bring about this change.

Method

Take some soil and measure the content of water soluble phosphorus / non soluble phosphorus.

Sterilize the soil in an autoclave so that no bacteria are left.

Add Agnihotra Ash and see whether the percentage of water soluble phosphorus increases.

If this happens the hypothesis would be refuted - as there can't be phosphate solubilizing bacteria in the soil after sterilisation. A new hypothesis of how Agnihotra Ash increases the percentage of water soluble phosphorus would be needed.

In case the hypothesis will be confirmed, means the percentage does not change in sterilized soil, we could then further examine whether Agnihotra ash

- speeds up the multiplication of these bacteria, or
- speeds up their activity.

If these phosphate solubilizing bacteria are isolated - maybe it is possible to study what happens when they come into contact with Agnihotra Ash. For comparison the same studies should be done with Control Ash.

3.4.2.2 Nitrogen fixing bacteria and other beneficial bacteria in soil

Similar experiments can be done with nitrogen fixing bacteria and other kinds of beneficial bacteria in soil.

3.4.3 The effect of Agnihotra Atmosphere on beneficial bacteria

Will Agnihotra Atmosphere do the same thing as Agnihotra Ash?

In order to find out the experiments suggested in 3.4.2. can be repeated, but instead of adding Agnihotra Ash the soil samples are kept in Agnihotra Atmosphere and measurements are taken after one week / one month / three months.

Control would be to keep the samples in a non-Agnihotra place (but light, temperature etc. should be same).

3.4.4 Do beneficial microorganisms help to improve water quality in Agnihotra Atmosphere?

Water quality has improved in Agnihotra Atmosphere (COD, DO, pH, total hardness, coliform bacteria) - see *Berk/Sharma 2015*.

How do these changes come about?

In this experiment the bottles were closed so a chemical reaction with Agnihotra Ash or Agnihotra smoke could not happen.

What then could affect these changes?

Dr. Devidas Belsare from Bhopal suggested the following hypothesis:

Hypothesis

There are microorganisms in polluted water which are activated by Agnihotra energy field and thus help to improve properties of water.

Method

For testing this hypothesis further studies in the field of microbiology are required, identifying microorganisms which can help improving water quality and examining closely how their activity is influenced by Agnihotra Atmosphere.

3.4.5 Change in the virulence of pathogenic bacteria

After studying the effect of Agnihotra Atmosphere on bacteria Dr. Girish Pathade, HOD Biotechnology, Fergusson College in Pune with his group of students also examined changes in properties of pathogenic bacteria thus finding out whether the virulence of bacteria is reduced by Agnihotra. (See: *Pathade/Abhang 2014.*)

These experiments can help us to understand better how Agnihotra helps to neutralize pathogenic bacteria, and therefore should be replicated.

3.4.5.1 Change in the virulence of pathogenic bacteria by adding Agnihotra Ash

Hypothesis

The virulence of pathogenic bacteria is reduced if you add Agnihotra Ash.

Method

Keep pathogenic bacteria like Staphylococcus aureus, Klebsiella pneumonia and Pseudomonas aeruginosa in petri dishes and add little bit of Agnihotra Ash. Examine the bacteria for haemolytic activity, resistance to phagocytosis, pigment formation and bacterial coagulation.

Perform the same tests with Control Ash instead of Agnihotra Ash and compare.

3.4.5.2 Change in the virulence of pathogenic bacteria in Agnihotra Atmosphere

Hypothesis

The virulence of pathogenic bacteria is reduced in Agnihotra Atmosphere.

Method

Keep pathogenic bacteria like Staphylococcus aureus, Klebsiella pneumonia and Pseudomonas aeruginosa in petri dishes and bring these into a room where Agnihotra is regularly performed. Examine the bacteria for haemolytic activity, resistance to phagocytosis,

pigment formation and bacterial coagulation.

Perform the same tests keeping the petri dishes away from Agnihotra Atmosphere and compare.

3.4.5.3 Further Studies

Assuming the results got in Fergusson College can be replicated and we can confirm that Agnihotra Ash and Agnihotra Atmosphere reduce the virulence of pathogenic bacteria, we then can ask the next question - which properties of the Agnihotra Ash bring these results about? And which effects of Agnihotra lead to these results?

In order to examine the second question one possibility for further research would be to see whether you have the same result if the petri dishes are kept in a Faraday Cage in Agnihotra Atmosphere. (Of course the control dishes also have to be put in Faraday Cages, in a room away from Agnihotra Atmosphere.)

4 Biology

Introduction: Effect of Agnihotra and Agnihotra Ash on Plants and Animals

The effect of Agnihotra on plants and animals can be easily seen and we got a lot of reports of people from all the continents stating that e.g. plants grow better, diseases are controlled, wounds of pets can be healed, etc. etc.

Systematic studies have been done especially on germination – the experiments are quite easy and you get results within a short time.

The effects of Agnihotra and Agnihotra Ash on animals has not been much studied scientifically. Only a few studies on the effects on fish and on cows were done. So there is still a wide scope for pioneering work in Biology!

4.1 Botany

4.1.1 Germination with Agnihotra Ash

Germination experiments adding Agnihotra Ash are documented in some articles respectively reports (see: *Heisnam/Swamy/Nagendra 2004, Sharma 2012, Pathade/Abhang 2014, Abhang et al. 2015*). Even in schools such experiments can easily be done – one was done by Boumika Patil in Amalner for some contest in the field of environmental studies, and this work won the first prize! (See: *Boumika 2012.*)

4.1.1.1 Agnihotra Ash in soil

Hypothesis

Agnihotra Ash, added to the soil, speeds up the germination process of seeds.

Method

Prepare three different plots (or containers with soil).

- a) Mix with Agnihotra Ash
- b) Mix with Control Ash
- c) Keep just the soil as total control

Put seeds in these three plots respectively containers (of course, same seeds).

Sunlight, watering etc. should be same.

After two weeks, compare germination rate, shoot length and total weight of the plants.

4.1.1.2 Germination with Agnihotra Ash water

Hypothesis

Agnihotra Ash Water, added to the soil, speeds up the germination process of seeds.

Method

Prepare three different plots (or containers with soil).

Put seeds in these three plots respectively containers (of course, same seeds).

Water the seeds with

- a) Agnihotra Ash Water
- b) Control Ash Water
- c) Just water (as total control) – take the same water as for preparation of Agnihotra Ash Water and Control Ash Water

Compare germination rate, shoot length and total weight after two weeks.

4.1.1.3 Germination with filtered Agnihotra Ash water

In case experiment 4.1.1.2 gives positive results, we could further find out whether this effect is due to chemical or physical properties of Agnihotra Ash particles present in Agnihotra Ash Water – or if the effect is also there if these particles are filtered out.

Hypothesis

The effect of Agnihotra Ash Water speeding up the germination process of seeds (see 4.1.1.2) is not depending on particles of Agnihotra Ash being present when watering the plants.

Method

Repeat experiment 4.1.1.2 but pass the Agnihotra Ash water through a micro filter before watering the plants.

In this way the effect of the particles would be minimized, the effect of Agnihotra Ash would be more on a subtle energy level.

Conclusion

If this experiment also shows positive results, we can conclude that Agnihotra Ash water – even without any particles of Agnihotra Ash left – has some properties different from normal water which help plants grow better.

Further studies then should concentrate on identifying these properties and find out the mechanisms how everything works: How does Agnihotra Ash change these properties of water during the process of preparing Agnihotra Ash Water? How do these changed properties influence the growth of plants? - There may be a relation to changed electric and magnetic properties of water as discussed below in the section of physics.

4.1.1.4 Effect of microwave oven**Hypothesis**

Microwave ovens have a detrimental effect on water which is used for plants.

Method

Prepare two different plots (or containers with soil).

Put seeds in these two plots respectively containers (of course, same seeds).

Water the seeds with

- a) Water which was boiled in a microwave oven (and then cooled down)
- b) Just water (as total control) – take the same water as you used for the treatment in the microwave oven

Compare germination rate, shoot length and total weight after two weeks.

In case this shows an inhibition of growth, one could test whether Agnihotra Ash, added to the water treated in the microwave oven, can reverse this effect.

4.1.2 Germination of seeds in Agnihotra Atmosphere

Hypothesis

Agnihotra Atmosphere speeds up the germination process of seeds.

Method

Take two clay pots, fill them with same soil and put same seeds.

- a) Place one clay pot in Agnihotra Atmosphere
- b) Place second clay pot in a room at least three km away from Agnihotra.

(In case it is too inconvenient to go away for such a distance you could also do the control experiment first and then start the experiment with Agnihotra.)

Watering, light and temperature conditions should be same.

Compare germination rate, shoot length and total weight after two weeks.

Advanced

Repeat this experiment but add one third variant:

- c) Place one clay pot in a room where Control Fire is maintained (see 2.5).

4.1.3 Germination in Agnihotra Atmosphere with Agnihotra Ash

Hypothesis

Germination shows best results if both Agnihotra Ash is used and the plants are kept in Agnihotra Atmosphere.

Method

Repeat the experiment 4.1.1.1 but additionally place the pots in Agnihotra Atmosphere.

Observe and compare with the results of 4.1.1 and 4.1.2.

4.1.4 Germination with chemical fertilizers

Can chemical fertilizers supply enough nutrients for plants to grow? Some scientists from Eastern Europe suggested the following simple experiment.

Method

Take three clay pots, fill them with soil which has been differently treated (but the original soil is same in all three variants):

- 1) Soil sterilised
- 2) Soil sterilised, chemical fertilizers added
- 3) Soil untreated, compost added

Put some seeds of, (e.g. wheat) in these three pots.

Make sure that all three get same sunlight, same water.

Compare after three days / one week / two weeks.

Hypothesis

Seeds in all three glasses will germinate - because of the nutrients in the seeds itself.

Then: No. 1) and 2) will get yellow and die.

No. 3) will thrive.

Conclusion:

If this hypothesis can be corroborated that would mean that the agrochemicals cannot really nourish the plants as the plants cannot directly absorb inorganic matter. Most decisive factor is the multitude of microorganisms present in normal soil.

In case the hypothesis is confirmed, we can also add one more variant:

Sterilized soil with added Agnihotra Ash.

4.1.5 Nutrition through Atmosphere

„Homa Organic Farming injects nutrients into the atmosphere to prevent disease and bring natural predators. Ancient science of Homa Therapy states that more than 75% of nutrition to plants and soil comes through the atmosphere. So if you make the atmosphere more nutritious and fragrant by Homa, a type of protective coating comes on plants, and diseases, fungi, pests, etc. do not thrive. Plants' capacity to breathe increases and the toxic effect of choking to death due to atmospheric toxins is eliminated.“ (*Berk/Johnson 2009*, p. 85)

Biodynamic farming states as well that most of the nutrition of plants comes from the atmosphere.

It is well known that plants absorb carbon through photosynthesis, the basic chemical equation being: $6 \text{CO}_2 + 12 \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2 + 6 \text{H}_2\text{O}$

Nitrogen is amply available in the atmosphere but cannot be taken in by plants directly from there. But there are nitrogen fixing bacteria which can enable the plants to make use of the nitrogen in the air.

4.1.5.1 How much nutrition do plants get from the atmosphere?

Experiment 1

Hypothesis

Plants get part of the nutrients from the atmosphere.

In Agnihotra Atmosphere plants are able to extract more nutrients from the atmosphere than in normal environment.

Method

Take some soil and test it for macro- and micro-nutrients.

Put this soil in two clay pots:

Put same seeds in both pots, e.g. some microgreens (mustard, sunflower etc.).

Place pot 1 in Agnihotra Atmosphere

pot 2 in non-Agnihotra Atmosphere

Light condition should be same, also watering should be same.

When the microgreens are ready, analyse both for nutrient content and also analyse the soil for macro- and micro-nutrients, then compare: Are all the nutrients present in the plants missing in the soil? Or is there a difference – those nutrients then must have been taken from the atmosphere by the plants.

More exact would be to also analyse the nutrients in the seeds and take that into account.

What is the difference between the plants in Agnihotra Atmosphere and those which are not?

4.1.5.2 How much nutrition do plants get from the atmosphere?

Experiment 2

A similar experiment would be:

Method

Grow vegetables like tomatoes etc. instead of microgreens.

This experiment would be more relevant for actual farming but takes more time, so better to start with germination or microgreens.

4.1.5.3 Nutrition from the atmosphere - more advanced:

Hypothesis

Plants get part of the nutrients from the atmosphere.

In Agnihotra Atmosphere plants are able to extract more nutrients from the atmosphere than in normal environment.

Method

Select some seeds and analyse the content of macro- and micro-nutrients. Let them germinate in aquiculture (hydroponics)

Analyse the amount of macro- and micro-nutrients of Homa Biosol (an organic fertilizer made from cow dung, cow urine, vermicompost, and Agnihotra Ash – see *Berk/Johnson 2009*) and add this biosol to the water. No other nutrients given to the aquiculture.

Do this experiment

- a) in the laboratory
- b) in the atmosphere of a Homa Farm

(light etc. should all be kept same).

After some weeks analyse the plants for macro- and micro-nutrients and compare with the nutrients which were in the seeds plus the nutrients added to the water.

Subtract the nutrients which are still in the water.

Do the plants contain more nutrients than originally there in the seeds plus the fertilizer?

If so, these additional nutrients can only come from the atmosphere.

Is there a difference in the nutrients between the plants kept in the laboratory and those kept in a Homa Farm?

It is well known that carbon is absorbed by plants from the surrounding air through photosynthesis.

Also, nitrogen from the air is made available to plants by nitrogen-fixing bacteria.

Any other nutrients which plants can get from the atmosphere?

This experiment could help to find that out and also help to understand the concept of "injecting nutrition to the atmosphere through Yajnya".

4.1.6 Plant Pathology

Introduction

The ancient Science of the Vedas says the following:

“The effect of Agnihotra Atmosphere and Agnihotra Ash on diseased plants can be noticed easily. Experiments in plant breeding in Agnihotra Atmosphere will open the doors to the ancient science of YAJNYA, i.e. the science of HOMA Therapy as given through Vedas.

One can easily see the effect of HOMA on plants. With plants we can be more controlled. We can use methods of photography, Kirlian photography or normal to illustrate the reactions of the plants to Agnihotra and Agnihotra Ash medicines. *It will be a breakthrough when the scientist applies Agnihotra medicines to a plant to study the effects.* Plants will be shown to be benefitted by Agnihotra Atmosphere and Agnihotra Ash medicines.” (*Paranjpe 1989*, p. 47)

4.1.6.1 Diseased Plants in Agnihotra Atmosphere

Hypothesis

Diseased plants heal better in Agnihotra Atmosphere than in non-Agnihotra Atmosphere

Method

Let a plant pathologist induce some disease on a selection of different plants, then place half of these diseased plants in Agnihotra Atmosphere, the rest in non-Agnihotra Atmosphere.

All other factors (light, water, etc.) should be same.

Compare after two days / one week / two weeks.

4.1.6.2 Diseased Plants treated with Agnihotra medicines

Hypothesis

Diseased plants heal better when treated with Agnihotra medicines as compared to conventional treatment.

Method

A plant pathologist induces some disease on a selection of different plants, then treat half of these diseased plants with Agnihotra Ash and Agnihotra Ash water; the second half will be treated by conventional methods.

All other factors (light, temperature, etc.) should be same. The plants kept as control get same quantity of water as the first group gets Agnihotra Ash water, and in same intervalls.

4.1.7 Plant Physiology

4.1.7.1 Chlorophyll content of plants in Agnihotra Atmosphere

When HOMA is done in the garden or under a tree the effect of the smoke first goes to the leaves. The smoke acts as a catalyst for the generation of chlorophyll in terms of a chemical reaction which can easily be shown to someone by a botanist who may choose to study the subject. (*Paranjpe 1989* p. 34)

Hypothesis

In Agnihotra Atmosphere the chlorophyll content of plants increases.

Method

Algae are easiest to do this experiment with.

Put green algae in water with appropriate nutrient solution and keep them:

- a) in Agnihotra Atmosphere of a Homa farm
- b) away from Agnihotra Atmosphere (at least 3 km away)

Measure the chlorophyll content and compare after five days.

4.1.7.2 Chlorophyll content of plants in water with Agnihotra Ash

Hypothesis

Agnihotra Ash helps to increase the chlorophyll content of algae.

Method

Put green algae in water with appropriate nutrient solution and add:

- a) Agnihotra Ash
- b) Control Ash
- c) nothing (as total control)

Measure and compare the chlorophyll content after five days.

4.1.7.3 Chlorophyll activity

Hypothesis

The activity of chlorophyll increases in Agnihotra Atmosphere.

Method

Take some water with green algae and divide into two portions kept in some glass container.

Keep the containers:

- a) in Agnihotra Atmosphere of a Homa farm

b) away from Agnihotra Atmosphere (at least 3 km away)

Measure the chlorophyll activity by comparing the chlorophyll fluorescence.

4.1.7.4 Cellular structure of plants

In Ancient Vedic Knowledge it is stated:

“Plants grown in YAJNYA atmosphere evolve networks of veins that are cylindrical and larger than normal, permitting water and nutrients easier movement to all parts of the plant. This helps growth and reproduction cycles. Also, it helps in the production of chlorophyll and plant breathing, thereby helping the oxygen recycling system of nature.” (*Paranjpe 1989*, p. 33)

Hypothesis

- 1) The structure in plants bred in Agnihotra Atmosphere is different compared to those which are not.
- 2) Cellular membranes of plants grown in Agnihotra Atmosphere show higher permeability than those of plants grown in non-Agnihotra Atmosphere.
- 3) Given the same concentration of nutrients the uptake rate is higher in Agnihotra Atmosphere.

Method

- 1) Take plants
 - a.) grown in Agnihotra Atmosphere
 - b.) grown minimum three kilometres away from Agnihotra Atmosphere

Prepare slides showing the cellular structure of both and compare.

- 2) Grow plants in Agnihotra Atmosphere and the same type outside of Agnihotra Atmosphere.
Compare the permeability of cellular membranes.
- 3) Grow plants in Agnihotra Atmosphere and the same type outside of Agnihotra Atmosphere in soil or hydroponics with controlled nutrients.

Compare the content of macro- and micro-nutrients in the plants after the growth period of these plants.

4.1.7.5 The root system in plants

Introduction

“The root system in plants changes due to YAJNYA atmosphere. Roots stay small and less troublesome due to the extreme quality of nutrients the plant extracts from the soil.” (*Paranjpe 1989*, p. 34)

Hypothesis

experimThe root systems of plants change beneficially in Agnihotra Atmosphere.

Method

Take plants

- a.) grown in Agnihotra Atmosphere
- b.) grown minimum three kilometres away from Agnihotra Atmosphere

Examine the root system.

4.1.8 The Role of Physics for Plant Life

Electric and electromagnetic fields play an important role in biological systems although these fields are rather weak.

Is it possible that Agnihotra and Agnihotra Ash have an influence on electric and magnetic fields? This could be a possible explanation of the effects of Agnihotra and Agnihotra Ash on plants, animals, and humans. Therefore this topic seems to be a very interesting and relevant area of research. Experts of physics and of plant physiology will have to work together.

4.1.8.1 The effect of negative ions for plant life

Negative ions seem to be important for all forms of life. Lack of negative ions indicates a state of pollution. Agnihotra increases the quantity of negative ions in our atmosphere (see 9.2.1.2). Can we examine the effect of negative ions generated by Agnihotra on plants?

Hypothesis

The negative ions generated by Agnihotra have a beneficial effect on plants.

Method

Select a room with low concentration of negative ions. Let seeds germinate and monitor the growth as well as the content of negative ions in the air.

After this test is completed start performing Agnihotra regularly in this room. Again monitor the growth of the sprouts as well as the content of negative ions in the air (should be higher).

Then repeat the second experiment (germination in Agnihotra Atmosphere) but keep the concentration of negative ions down to the original level by appropriate means. Monitor the growth of the sprouts.

4.1.8.2 Electromagnetic fields around trees

Electromagnetic fields within and around plants are rather subtle. In order to examine the effect of Agnihotra on such fields it seems natural to start with bigger plants. Therefore experiments with trees were suggested by some physicists from Eastern Europe. According to traditional Vedic Knowledge Banyan trees are especially suitable for such experiments.

Hypothesis

Agnihotra strengthens the electromagnetic field around Banyan trees.

Method

Select a tree which stands alone:

Other trees should be at least 30 metres away. No electricity, electric instruments, water etc. should be there within a radius of 500 metres. No buildings. No compass, no iron.

Several experiments are suggested.

Before you start you examine

- a) Physical properties (magnetic field, static field, resistivity of the soil); these have to be checked at different distances up to 200m.
- b) Botanical properties: Is the tree sick or healthy? Analysis of cells (in leaves and fruits), etc.

Then you do the experiments:

1st experiment:

Agnihotra is done (following exactly all the disciplines) only *one time*. The position is such that the Agnihotra pyramid, the tree, and the sun form one line. (In the morning you perform Agnihotra exactly West of the tree, facing East, and in the evening you perform Agnihotra exactly East of the tree, facing West.)

Then you immediately begin to check again all the properties described above. You repeat this checking after some hours, after one day, after two days, etc. Till the fifth day, always comparing the results with these obtained before Agnihotra was done.

2nd experiment:

Like first experiment, but you perform Agnihotra at sunrise sunset for five days, do the same checking as above and compare the results with those obtained before Agnihotra was done.

3rd experiment:

Like first experiment, but you continue performing Agnihotra for one month (both at sunrise and sunset), do the same checking and comparing.

4th experiment:

You select a sick tree, repeat the experiments 1 to 3 and see if some change in the botanical properties of the tree occurs. This tree should be at least three km distance from the first one.

For checking the physical properties very subtle instruments for measuring electromagnetic and electrostatic fields are required. The botanical examinations are done with a microscope – the person doing these tests has to be an expert who can discern subtle differences in the cell structure by help of a microscope.

4.1.8.3 *Effect of electromagnetic properties of water on plants*

In 4.1.7.4 it is suggested to test the hypothesis that the permeability of cellular membranes is increased in Agnihotra Atmosphere.

In case this hypothesis can be confirmed – the next question will be how these changes come about.

One possible answer could be the electromagnetic properties of water which are changed in Agnihotra Atmosphere (see the chapter on physics 9.2.2.1).

This will be an interesting topic for studies.

Experiment 1

Hypothesis

- 1) In Agnihotra Atmosphere certain electromagnetic properties of water like the magnetic permeability are changed.
- 2) These changes lead to an increased permeability of cellular membranes in plants.

Method

- 1) This experiment is described in the physics chapter, see 9.2.2.1.
- 2) Create an Agnihotra Atmosphere in a botanical laboratory, let some seeds germinate in this atmosphere and then examine the permeability of the cellular membranes of the resulting plants.

Is it possible to do these tests without destroying the plants? It is possible that such properties like permeability of membranes change when the plant dies.

Experiment 2

Hypothesis

- 1) In Agnihotra Ash Water certain electromagnetic properties like the magnetic permeability are changed.
- 2) These changes lead to an increased permeability of cellular membranes in plants.

Method

- 1) This experiment is described in the physics chapter, see 9.2.2.2.
- 2) Let some seeds germinate watering them with
 - a) Agnihotra Ash Water
 - b) Control Ash Water
 - c) Normal water (as total control)

and then examine the permeability of the cellular membranes of the resulting plants.

Is it possible to do these tests without destroying the plants? Such properties like permeability of membranes might change when the plant dies therefore better to examine on living plants.

4.1.8.4 Effect of electrosmog on plants

Are there plants which suffer in places of high electrosmog? If so an interesting simple experiment could be done as Agnihotra can neutralize electrosmog (see 9.2.1.3).

Hypothesis

Agnihotra Atmosphere can undo the negative effect of electrosmog on plants

Method

Select a place with high level of electrosmog – say an office with several laser printers, wireless routers etc. Measure the level of electromagnetic radiation.

Let seeds of plants sensitive to electrosmog germinate there and measure the development (number of seeds germination; root length, shoot length, total weight).

Then start performing Agnihotra regularly in this room and start germination the same variety of seeds, measure their development. Also measure the level of electromagnetic radiation.

4.1.8.5 Biophotons

Every cell of a living organism emits photons (light particles). This light is not strong enough to be seen with the naked eye but can be detected with a photomultiplier.

Diseased cells (like cancer cells in humans) show a different pattern of these biophoton emissions than healthy cells. This leads to an interesting experiment.

Hypothesis

Diseased cells can be brought back to normal in Agnihotra Atmosphere.

Method

Take diseased cells in a tissue culture and keep these containers with the tissue cultures in Agnihotra Atmosphere. Examine the patterns of biophoton emission before and after.

4.2 Zoology

About the effect on animals we have lots of reports of people who have seen improvement of their pets in Agnihotra Atmosphere, especially in their health conditions. Also Agnihotra Ash was applied successfully in many cases, e.g. in aquaria the health of fish increases and the water remains clean for much longer. Also wounds treated with Agnihotra Ash healed much faster.

But such effects have only sparsely been examined systematically so far. Some such results will be reported in the respective paragraphs. There is still a wide scope for innovative research in this field!

Experiments with breeding animals in Agnihotra Atmosphere of course can be done with all kinds of animals. Here I am concentrating on cows, bees, and earthworms because of their importance for agriculture (for that reason they are also called „the three farmer’s best friends“.)

At the end of this chapter some experiments with different animals are included.

4.2.1 Cows

Experience of many farmers show that the health of cows improves considerably in Homa atmosphere. Also it was noticed that cows on Homa farms are more peaceful as compared to neighbouring farms.

4.2.1.1 Breeding of cows

An experiment was conducted at the Zoological Department of the National Agricultural University in Tingo Maria, Peru, for a period of 18 months. It shows that in Homa atmosphere there is a considerable improvement as compared to control in the following respects:

- Reproductive Index
- Cow’s and calf’s mortality
- Muscle development
- Weight at birth
- Placenta Retention
- ~~should be cow-calf separation~~

Following table shows the results in detail:

PRODUCTIVE AND REPRODUCTIVE INDICATORS OF BREED CATTLE FOR MEAT IN THE HIGH HUALLAGA ZONE, COMPARISON OF FARMS WITH AND WITHOUT HOMA THERAPY

Variables	Indicators with Homa Therapy	Indicators without Homa Therapy	Indicators normal fort he zone
Reproductive Index (%)	88.6	60.0	65.0
Cow’s Mortality (%)	1.8	3.5	4.0

Calf's Mortality (%)	3.5	11.5	10.0
Muscle Development (%)	16.0	8.7	12.0
Weight at Birth (kg)	35.0-40.0	30.0	28.0
Difficult Birth (%)	0	1.5	2.0
Placenta Retention (%)	0	1.0	1.5
Cow – calf separation (months)	5.0	6.0-7.0	6.0

Good if this experiment could be repeated.

Hypothesis

Breeding cows in Homa atmosphere has advantages over control in several relevant aspects as: Fertility, cow's and calf's mortality, weight at birth, muscle development, difficulties at birth, placenta retention, and cow-calf separation.

Method

For this comparison you need two goshalas (cowsheds) with same number of cows, and the cows at the two places must be same in health, age, etc.

- a) In one goshala you start performing Agnihotra and four hours of Tryambakam Homa, also the cows get Agnihotra Ash in their fodder and in the drinking water.
- b) In the second goshala for control you add Control Ash to fodder and drinking water; otherwise the treatment in both goshalas is same.

The experiment should be done at least for two years.

Following parameters are to be checked regularly:

- details about health
- about fertility and pregnancy
- ease of delivery, health of calves
- about medical treatments

and compared between the two goshalas.

4.2.1.2 Milk Production

There are reports from different countries that in Agnihotra Atmosphere milk production increases as well as the fat content of milk.

Good if this can be tested in some controlled experiment.

Hypothesis

Both quantity and quality (mainly fat content) of milk production by cows kept in Agnihotra Atmosphere increases.

Method

Have one goshala with Agnihotra Atmosphere and one for control as described more in detail in 6.2.

Other factors, especially fodder, should be same.

Measure quantity and quality of milk from both cowsheds and compare.

4.2.1.3 Treatment of Cows with Homa Therapy

Monika Koch, a German pharmacist, developed medicines based on Agnihotra Ash and used with wonderful results on all kind of human diseases.

When the farmer from whom they got their cow dung said that one of his cows was troubled by exema she tried Agnihotra Ash. Nothing else had helped, but the ash cured the eczema within a few days.

Another cow did not want to eat and got very weak – they added Agnihotra ash to the fodder, the cow started to eat and got strong again soon.

Since then many different diseases in cows have been treated by Homa farmers all over the planet. Yet till now no systematic study has been done in this area, therefore it would be an interesting topic for research.

Hypothesis

Agnihotra Ash medicines offer an efficient cure for many diseases of cows.

Method

Treat diseased cows with the different Agnihotra Ash medicines:

- Agnihotra Ash
- Agnihotra Ash mixed with Ghee
- Agnihotra Ash water
- Agnihotra Ash mixed with salt

Agnihotra Ash and Agnihotra Ash water can be used internally and externally, the two other medicines externally. Agnihotra Ash mixed with salt is useful to protect cows from ticks.

In severe cases bring a sick cow to a Homa cowshed and treat her there with the Agnihotra medicines. Compare with the results people get with conventional medicines in similar cases.

4.2.2 Bees

The work of the Homa organic farmer is complemented by the work of bees.

1. Bees contribute to agriculture with the pollination of agricultural and fruit crops, in forestry and also to cattle and dairy farming, by pollinating the pastures.
2. Bees produce honeycombs containing high quality honey, pollen, wax, propolis and royal jelly, through the Homa Therapy effects. These products of the bees are categorized as both valuable food and medicine. In particular, the honey of bees in Homa

atmosphere has more potent anti-biotic effects than non-Homa honey.
3. Bees aid in the preservation of the plant kingdom.

4.2.2.1 Control of colony collapse disorder

Due to pollution, honeybees are dying now on a mass scale worldwide. Bees cannot get enough nutrition to survive. They are also severely affected to their detriment by applications of chemical pesticides and fertilizers in agriculture, as well as genetically modified organisms and even mobile phone towers. Scarcity of bees is a major threat to agricultural production. (Quoted from: www.homafarming.com)

Experiences of Homa Farms show that there is reduced or even no loss of bee colonies – which is astonishing compared to the situation of bees in non-Homa places. Also, wild bees are attracted to Agnihotra Atmosphere as you can see, e.g., in the Homa Farm Tapovan (near Dhule, India)

Hypothesis

There is reduced or even no loss of bee colonies which are kept in Agnihotra Atmosphere. Health of beehives increases in Agnihotra Atmosphere.

Method

Take 20 bee colonies from same origin and make two groups of ten each, making sure that health (especially health of the queen), number of bees, etc. are same in the two groups.

Bring the two groups to different locations:

- a) A Homa farm where Agnihotra Atmosphere is kept
- b) A place without Agnihotra (and minimum 3 kilometres away from the Agnihotra place)

Treatment of bees will be same, only for group a) you add Agnihotra Ash to the water and food for the bees, for group b) you add Control Ash instead.

Monitor the situation and after one year compare the results.

4.2.2.2 Pollination and Production in Agnihotra Atmosphere

„Bees are attracted to Homa atmosphere as the amount of energy they receive from Agnihotra fire helps them to perform at a greater level of efficiency. When this is translated to pollination, they can help to increase the yields of crops. This is especially true with corn, tomatoes, berries, fruit and the like.“ (Paranjpe 1989, p. 39)

Hypothesis

Pollination is increased in Agnihotra Atmosphere

Method

Have a Homa Farm and a non-Homa farm for control as described in 6.2 and plant crops like corn, tomatoes, berries or fruit.

Compare pollination and yield after one season.

4.2.2.3 Sanitary Treatment of Bees with Homa Therapy

Beehives are affected by contamination. That is why a high incidence of plagues and diseases exist inside the area where bees are raised. The most frequent pathogenic agents are insects, such as ants, lice, moths, mites, wasps, blowflies, beetles, etc.

Due to food shortages in agricultural areas, beehives are sometimes robbed. While removing the honey, the robbing insects can leave microbes that produce illness in the bees.

- a) If a beehive is attacked by insects, use Agnihotra ash and apply it after cleaning the area. Sprinkle the Agnihotra ash powder after sunset and surround each beehive with the Agnihotra ash.
- b) If there is an ant attack, besides carrying out the procedure described above, look for nests of ants and sprinkle them also with the Agnihotra ash. Conventional technology in beehive handling uses chemical substances like carbon bisulphate or calcium cyanide for this purpose, putting the purity and integrity of the honey and the health of the bees at risk.
- c) If there are lice present in the beehives, it has been observed that they disappear through the effect of Homa atmosphere and the smoke that is generated through the Homa fires.
- d) When the hives are installed near the Om Tryambakam hut of a Homa farm, this strengthens even more the health of the bees.
- e) *Nosema apis* is a disease that frequently can be found in the intestines of bees, putting them into a state of lethargy. As preventive medicine and treatment, complementary to Homa Therapy, one has the Agnihotra ash water solution and the sources of drinking water to which Agnihotra ash is added.

Many illnesses can be prevented by applying the solution of Agnihotra ash water to the beehives, after having cleaned them. You can even use a brush to apply the Agnihotra ash water solution to the whole surface of the frames. (Quoted from: www.homafarming.com)

Hypothesis

Agnihotra Ash preparations are effective for solving different health problems in beehives.

Method

Try the methods mentioned above in affected beehives and compare to conventional treatments.

4.2.2.4 Advanced: Hormones in bees

Ancient Vedic wisdom states:

“Inborn in the honeybee are certain hormones that are produced solely in Homa atmosphere. This subject is foreign to anything science has encountered so far in this respect. These hormones help the nutritional levels in vegetables and fruits to yield at much increased rates. Usually drone bees do not work. However in an area where Homa Therapy is applied, the drones begin to work like the worker bees, contributing to honey production. This special phenomenon occurs only through the effect of Homa Therapy.” (Vasant Paranjpe, Satsang vol. 9 No.14, Dec 1981)

Hypothesis

- a) In Agnihotra Atmosphere bees develop certain hormones beneficial for plants.
- b) In Agnihotra Atmosphere drones turn into working bees.

Method

Have a Homa Farm and a non-Homa farm for control as described in 6.2 and examine the bees

- a) for hormones
- b) for the behavior of the drones – are they really do the work of working bees like collecting honey?

4.2.3 Earthworms

4.2.3.1 Multiplication of earthworms

In Agnihotra Atmosphere earthworms multiply at a higher rate. Observations in Tapovan, a Homa Farm near Dhule / India show that:

„In less than one month the number of earth worms may double in Homa atmosphere.

Normally this takes from 3 to 4 months.

With Homa technology we obtain minimum 12 harvests per year. Some Homa farms have reported from 17 to 18 harvests in a year. With conventional method, maximum harvests are 8 per year.“ (www.homafarming.com)

Hypothesis

Multiplication of earthworms in Agnihotra Atmosphere is sped up.

Method

Select

- a) a Homa Farm (where Agnihotra Atmosphere is kept)
- b) a normal farm without Agnihotra, at least three kilometres away

and prepare vermiculture beds in both places.

Get worms like *eisenia hortensis* and divide them evenly between the two places.

Treatment (food, moisture, shade etc.) should be same. Add Agnihotra ash in place a) regularly and in same intervals Control Ash in place b).

Compare the quantity of earthworms after three months / six months / one year.

4.2.3.2 Production of hormones in earthworms

„The earthworm is important to farming. YAJNYA atmosphere increases the hormones in earthworms involved in their reproductive organs and helps multiplication of the species which in turn helps the soil to become more rich.“ (Paranjpe 1989 p. 37)

Can this statement from traditional Vedic knowledge be examined?

Hypothesis

In Agnihotra Atmosphere hormones in the reproductive organs are increased.

Method

Have a Homa Farm and a non-Homa farm for control as described in 6.2, examine the hormones in the reproductive organs of the earthworms and compare.

4.2.4 Breeding and Healing of different Animals

A few experiments have been done with different animals and it will be interesting to replicate and also to expand the studies to more varieties – of course without hurting these animals, always respecting the principle of Ahimsa (non-violence).

4.2.4.1 Therapeutic Effect of Agnihotra Ash on Wound-Healing in Rabbits

Dr A.G. Mondkar, Grant Medical College, Bombay, did a study about the therapeutic use of Agnihotra ash against scabies in rabbits. Rabbits are quite often infected with scabies -- marked by snow white crust formations on their nose, ear margins and skin. The infection then becomes systemic and the animal dies.

A mixture of Agnihotra Ash and ghee was applied to the infected areas and the crust fell off already on the third day. With the normal treatment using benzyl benzoate and salicylic acid, it took five days for the crust to detach itself from the control rabbit. Another notable advantage of this was that the preparation was not irritating like benzyl benzoate or salicylic acid. The rabbits always lick that application because of irritation and the young ones die of poisoning. This risk could be avoided with Agnihotra ash.

These results promise a solution to microbial pollution by the performance of Agnihotra and ingestion of Agnihotra ash medicines.

The full report is available at:

<http://homatherapy.org/content/therapeutic-effect-agnihotra-ash-wound-healing-rabbits>

Hypothesis

Scabies in rabbits can be effectively treated with a mixture of Agnihotra Ash and ghee

Method

Mix equal volume of Agnihotra Ash and ghee and apply to the affected areas. Monitor the healing process and compare to conventional method of treatment.

4.2.4.2 Antibacterial and Wound Healing Effects of Agnihotra Ash on Albino Rats

The following experiment was done at the Armed Forces Medical College, New Delhi, by Wing Commander D.V.K. Rao, Lt. Col. Madan Deshpande, and Col. R.S. Tiwari.

Although the results show good healing effects of using Agnihotra Ash on rats we do not suggest a replication as this experiment is not following the Ahimsa principle.

10 gm of dry Agnihotra ash was dissolved in 100 ml of distilled water. The solution was filtered through filter paper and was autoclaved. 0.3 ml of this fluid was distributed on 100 six mm Whatman No. 1 discs so that each contained ~3µ litre of Agnihotra extract. ABST was done on various pathogenic bacteria e.g. one strain of pseudomonas, five strains of proteus, seven strains of E. coli, three strains of Staphylococcus pyogenes and one strain of Klebsiella by disc diffusion method. The replica method was used to find out whether the antibacterial activity of Agnihotra if any was bactericidal or bacteriostatic.

The wound healing effect was studied on two albino rats by excising 15 mm diameter skin thickness discs from the flanks and applying after 48 hours 25% strength of Agnihotra ash in cow ghee on one side and keeping the other side as control. The rate of contraction of wounds was studied by measuring the diameter of wounds from the skin margins daily for 21 days. Once the scar was formed the healed scars were excised and histopathological examination was done.

Findings

The 5 strains of proteus showed susceptibility to Agnihotra ash with an average zone of inhibition of 10 mm diameter, 7 strains of E. coli showed 9 mm average zone of inhibition and in the case of 5 strains of Staphylococcus, one strain of Pseudomonas and one strain of Klebsiella it was 10 mm, average zone of inhibition in each. In all cases the Agnihotra ash proved to be bacteriostatic.

The rate of wound contraction was better on the Agnihotra ointment applied wound. The histopathological examination of the scar tissue showed near normal histology in cases of lesion applied with Agnihotra ash as compared to increased fibrous tissue in case of control.

Discussion

From the above experiment it has been proved that Agnihotra ash has antibacterial effect against well known pathogenic microbes such as pseudomonas, proteus, E. coli, Klebsiella and Staphylococcus pyogenes which are present in superficial infections and hence application of Agnihotra ash in infections of superficial wounds will be helpful if not totally eliminating the infection as the activity is bacteriostatic in nature.

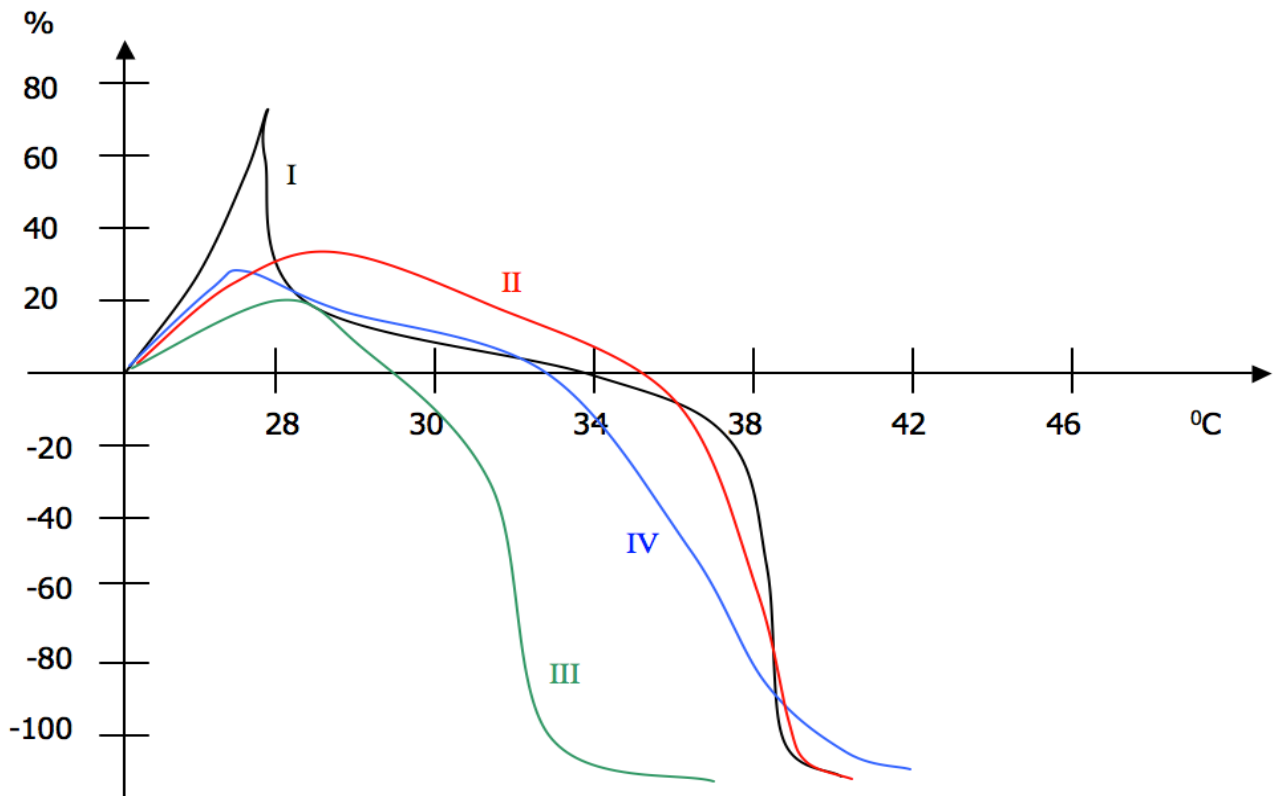
It has also been observed that Agnihotra ash helps wound healing by way of better wound contraction and minimal scar tissue.

(From: www.homatherapy.org/content/antibacterial-and-wound-healing-effects-agnihotra-ash-albino-rats)

4.2.4.3 Phagocytes and paramecia

This experiment was done in Poland. The activity of phagocytes and paramecia in relation to the temperature was measured. Agnihotra Atmosphere was compared with other interventions – infrared radiation, heating through convection, and bioenergy treatment (sending Prana by a healer). The original measurement was done at a room temperature of 26°C, and changes were indicated as positive or negative percentages of this original measurement.

Changes in the activity of phagocytes and paramecia



- I. Agnihotra
- II. Infrared radiation
- III. Heating through convection
- IV. Bioenergy treatment

Interesting the peak at 28° C with Agnihotra treatment.

Would be good if this experiment could be repeated.

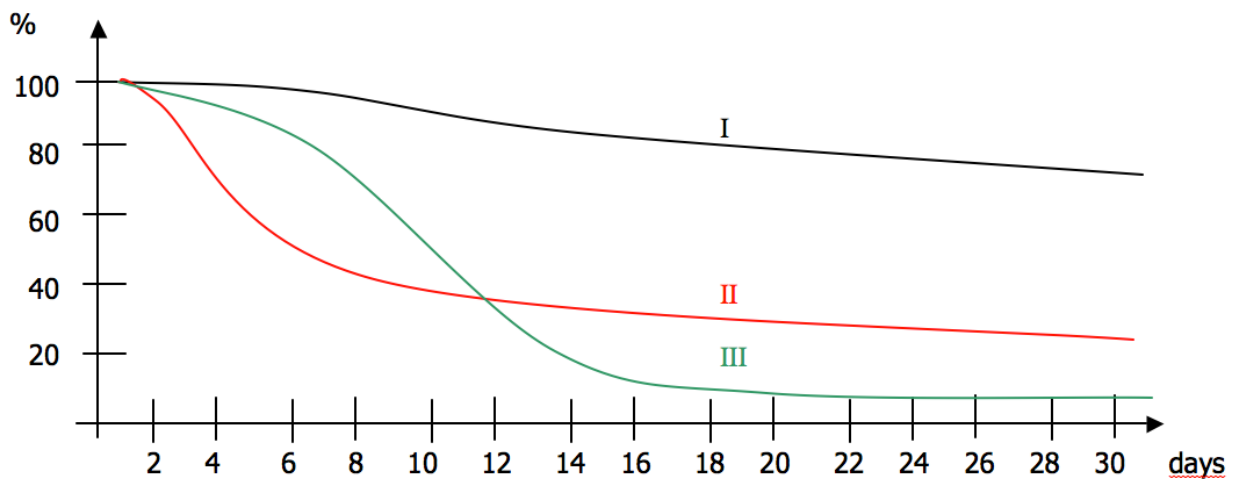
4.2.4.4 Mortality of fish

This experiment was done in a shop for aquarium fishes. Whenever a new shipment of fish was added to the aquarium of the shop, diseases developed quite often and a high percentage of the fish died. The problem was an infection with algae mycosis.

Treatment was Agnihotra (only once a day in the evening – the shop was closed at sunrise) and for control conventional medicines and Prana healing.

Agnihotra Atmosphere showed the best results – although Agnihotra was performed only once per day. No Agnihotra ash was added to the water (so that purely the effect of Agnihotra in terms of physics could be seen, not those in terms of chemistry).

Survival rate of fish infected with algae mycosis



- I. Agnihotra
- II. Conventional medicines
- III. Prana healing

Would be good to replicate this experiment – but of course with Agnihotra both morning and evening, and as second variant additionally add Agnihotra Ash (for control Control Ash should be added).

4.2.4.5 Treatment of fish with Agnihotra Ash

A M.Sc. Thesis on „Application of Agnihotra Ash as innovative therapy in skin wound healing in gold fish“ was done by Megha Kale in the Department of Zoology at Holkar Science College in Indore (M.P.).

Diseased goldfish (*carassius auratus auratus*) were bought from a local dealer in ornamental fish and divided into two groups. They suffered from white spot disease which is caused by the protozoan parasite *ichthyophthirius multifiliis*. This parasite is capable of killing large numbers of fish in a short period of time.

One group was treated with Agnihotra Ash, the second was conventionally treated with NaCl, green malachite, and copper sulfate. Otherwise the conditions (size of the aquarium, food supply, aeration of the aquaria, number of plants there etc.) were kept same.

The fish treated with Agnihotra Ash recovered faster and also the water in the aquarium stayed clear for longer time.

An analysis of Agnihotra Ash showed all the trace elements necessary for healing this disease, and from that Megha Kale draws the conclusion these ingredients of Agnihotra Ash are responsible for the healing disease in the goldfish.

If this is true treatment with Control Ash (which likely will have similar chemical composition, but this of course will have to be tested) should lead to the same healing effects.

In order to find out about that it would be good if this experiment could be repeated using

- a) Agnihotra Ash
- b) Control Ash
- c) Conventional medicines

Similar experiments also could be done with different varieties of fish and different diseases.

4.2.4.6 Breeding of frogs

Prof. Dr. Wojtek Puchalski, an environmental biologist from Poland, did an experiment about the development of tadpoles of the common frog (*rana temporaria*) in Bhruhu Aranya, a Homa Farm in the mountainous area of Southern Poland in the winter 2008/2009. It showed that Agnihotra Atmosphere and Agnihotra Ash helped to speed up the development and reduced mortality. Good if this experiment can be repeated in different climatic regions also.

4.2.4.6.1 Development of frogs in Agnihotra Atmosphere

Hypothesis

The development from tadpoles into frogs is sped up in Agnihotra Atmosphere, and also the mortality is reduced.

Method

Dig two 50 litres plastic containers in the ground

- a) in Agnihotra Atmosphere
- b) in non-Agnihotra Atmosphere (at least three km away from the Agnihotra place)

Fill these containers with water and appropriate nutrients (like pond sediment, floating filamentous algae, macrophytes and decaying leaves).

Add 50 freshly hatched tadpoles (*Rana temporaria*) from the same egg cluster to each container.

Cover the containers with some net, preventing large particles to fall into the containers, and also preventing predators to enter. (Water has to be added when necessary.)

Observe the development of the tadpoles to frogs:

- How long does the development take?
- What is the mortality?
- Examine the frogs for health, weight, etc.

4.2.4.6.2 Development of frogs with Agnihotra Ash

Hypothesis

The development from tadpoles into frogs is sped up if Agnihotra Ash is added, and also the mortality is reduced.

Method

Dig three 50 litres plastic containers in the ground

- a) Add 50 g of Agnihotra Ash
- b) Add 50 g of Control Ash
- c) Do not add anything (as total control)

Fill these containers with water and appropriate nutrients (like pond sediment, floating filamentous algae, macrophytes and decaying leaves).

Add 50 freshly hatched tadpoles (*Rana temporaria*) from the same egg cluster to each container.

Cover the containers with some net, preventing large particles to fall into the containers, and also preventing predators to enter. (Water has to be added when necessary.)

Observe the development of the tadpoles to frogs:

- How long does the development take?
- What is the mortality?
- Examine the frogs for health, weight, etc.

This experiment is quite interesting for environmental sciences as frogs are among the endangered species. If replications would confirm the findings from Poland, Agnihotra would be established as a method support biodiversity.

Of course also good to conduct similar experiments with other endangered species.

5 Biotechnology

At the Department of Biotechnology in Fergusson College, Pune, India, several experiments have been done by Pranay Abhang and some other students under the guidance of the Head of Department, Dr. Girish Pathade.

The results of the effects of Agnihotra and Agnihotra Ash were discussed in the chapter Microbiology and those about seed germination with Agnihotra Ash in the chapter Botany.

Then there were interesting experiments about the effect of Agnihotra Ash on gene toxicity (of two different herbicides), and more suggestions for further experiments were discussed with Dr. Pathade also. For more details, see: Fergusson College Report.

5.1 Gene toxicity

Experiments in Fergusson College showed that gene toxicity can be neutralized by Agnihotra Ash:

a) Colchicine (a genotoxic substance) was added to water and a beaker was filled with this mixture to the brim.

An onion was put on top.

b) Then a second jar was filled up with the same mixture, and Agnihotra Ash was added. Again an onion was put on top.

In the first case – the rootlets did not grow (which was to be expected because of the genotoxic substance).

But in the beaker with added Agnihotra Ash long roots developed, thus showing that the genotoxic effect of colchicine was neutralized (see photo below).

Photos missing



a) Containing genotoxic chemical (colchicine)

b) Containing genotoxic chemical (colchicine) + Agnihotra Ash

This experiment was repeated with another herbicide, methyl parathione, with same result.

Good if these experiments can be replicated.

5.1.1 Effect of Agnihotra Ash on genotoxic substances

5.1.1.1 Effect of Agnihotra Ash on colchicine

Hypothesis

Agnihotra Ash neutralizes the genotoxic effect of colchicine.

Method

Repeat the experiment as described above.

Add one more control: Add Control Ash to the mixture of water and colchicine.

Compare the growth of the rootlets.

5.1.1.2 Effect of Agnihotra Ash on methyl parathione

Hypothesis

Agnihotra Ash neutralizes the genotoxic effect of methyl parathione.

Method

Repeat the experiment as described above, using methyl parathione instead of colchicine.

Also here add a second control: Add Control Ash to the mixture of water and methyl parathione.

Compare the growth of the rootlets.

5.1.1.3 Effect of Agnihotra Ash on other herbicides

Of course it would be interesting to replicate these experiments using other herbicides instead of colchicine respectively methyl parathione.

Method like above, just replacing say colchicine by some other herbicide.

5.1.2 Neutralization of genotoxic effects of herbicides: Underlying mechanism?

The experiments described in 5.1.1 show that Agnihotra Ash does neutralize the genotoxic effect of herbicides like colchicine and methyl parathione.

But what is the mechanism?

An obvious suggestion is the following hypothesis:

Hypothesis

Agnihotra Ash actually added to a mixture of water with certain herbicides degrades these herbicides.

Method

Add Agnihotra Ash to the mixture of water and the herbicide. (Best to repeat with all the different herbicides used.)

After one week analyse the mixture for the herbicide – has the concentration decreased or is even the herbicide totally broken down?

In case it is broken down (at least partially), examine into which substances the herbicide was degraded.

Conclusion

In case the herbicide has been degraded the mechanism of how Agnihotra Ash neutralizes the genotoxic effect is clear.

In case the herbicide is not degraded we have to examine how Agnihotra Ash could change the properties of this herbicide so that it is no longer genotoxic.

5.2 Studying the effect of Agnihotra on a cellular level

Effect of Agnihotra Atmosphere and Agnihotra Ash on growth of proteins

Effect of Agnihotra and Agnihotra Ash on the repair of cancer cells

Biophoton activity in Agnihotra Atmosphere?

5.3 Experiments with tissue culture

There are cells which help to repair cancer cells.

Can Agnihotra Ash support this process?

The aging process of humans is depending on the level of certain enzymes and hormones.

E.g. with diabetic people or with high blood pressure people the aging is faster.

You can test these enzymes and hormones in blood, urine, saliva.

If we add Agnihotra Ash - will the level be normalized?

Similar tests can be done with heart patients.

Certain microorganisms in the body are beneficial.

In case of diseases the level of these beneficial microorganisms is lower.

Can practise of Agnihotra and intake of Agnihotra Ash bring this level back?

If you make your own curd from the same bacterial culture and take it for one month this helps with digestive problems.

Adding Agnihotra Ash helps with the cure?

Does the curd last longer if you add Agnihotra Ash?

6 Agriculture - Horticulture

6.1 Background

6.1.1 Why Homa Organic Farming?

It seems that conventional agriculture has come to a dead end. It has contributed to the overall pollution of soil, water resources, and atmosphere, and has been responsible for degradation of the soil in large areas. There every year farmers have to use more agrochemicals just to get the same yields as in the year before which is economically not much longer feasible for farmers.

On top of that in India there are large areas of acidic soil, alkaline soil, saline soil, and desertification proceeds at an alarmingly high speed.

What is the way out?

We need a method of agriculture which not only stops adding further to the pollution of soil, water resources, and atmosphere, so we have to go for organic farming. But the farming method should also give enough yield to feed an increasing population, and it should be able to deal with the pollution of our environment created so far. The only method which we are aware of is Homa Organic Farming. (If you know of another method which does all that, please let us know.)

Therefore it is important to do more research on that topic.

6.1.2 What is Homa Organic Farming?

Homa Farming is based on regular performance of Agnihotra. Additionally some other fire is performed daily for a few hours and Agnihotra Ash is applied to the soil, to the plants, and added to water. Also a special resonance technique is used to make the effect of Agnihotra available on larger areas (for details see *Berk/Johnson 2009* p. 87-94, copied here as Annexure no. 12.1).

It was first applied on a larger scale in South America end of last century. A breakthrough happened when a fungus disease called Black Sigatoka hit banana plantations and no other known method was able to control this disease. With Homa Farming this Black Sigatoka could be eradicated, and the production even increased with Homa methods.

After this success the Peruvian government got interested, more projects were supported – all under the supervision of the respective agricultural departments – and a lot of technical reports were released by the agricultural engineers in charge.

These reports cover all the main crops grown in that area like banana, coconuts, cocoa, coffee, mangoes, cotton, citrus fruits, grapes, palm oil, and different kinds of vegetables like cucumbers, cabbage, tomatoes, avocados and beans. Following some of results summarized mentioned in these reports.

6.1.3 Reports: Effects of Homa Farming in different countries

6.1.3.1 Diseases and pests controlled by Homa Organic Farming

Bananas:

Black Sigatoka (*mycosphaerella fijiensis*), Yellow Sigatoka (*mycosphaerella musicola*) Mal de Panama (*fusarium oxysporum var. cubense*), Nematodes (*rodopholus similis*), Black Gorgojo (*cosmopolites sordidus*), Cordana (*cordana musae*)

Cotton:

Blackfly (*aphis gossypii*), cotton boll weevil (*heliolithis virescens*), Texas moth (*anomis texana*), cotton bug (*dysdercus peruvianus*), Pink Bollworm (*pectinophora gossypiella*)

Tomatoes:

Phytophthora

Citrus fruits:

Parasite plants, plant lice, different kinds of fungi

Cocoa:

Witches' broom (*crinipellis pernicioso*), Moliniasis (*monilliophthora roreri*), phytophthora

Sugar cane:

Woolly aphid

Higher yields with Homa Organic Farming

Cotton, bananas, Jatropha curcas, mangoes, tomatoes, cocoa

Lower costs of production

Cotton

Time of germination/production cycle reduced

Bananas, grapes, cotton, citrus fruits, jatropha curcas, vegetables, esp. tomatoes

Less harvesting losses

Grapes

Rejuvenation of diseased plants

Citrus fruits, black pepper: Sick leaves fall off, new leaves develop.

Cocoa: Due to long dry season leaves fell off – with Homa plants rejuvenated.

In addition to these technical reports given by agricultural engineers, there was quite some systematic research done in the field of agriculture and horticulture.

Experiments about the germination of rice seeds were done repeatedly at SVYASA, Bangalore (see *Dave 1997, Heisnam/Swamy/Nagendra 2004, Omkar 2008*).

Dr. Selvaraj, Head of Department of the Institute of Commercial Horticulture in Ooty (Tamil Nadu Agricultural University) did some studies on the effect of Agnihotra on the yield and the health of rose, carnation, and gerbera as well on yield and health of cabbage and other vegetables (see *Selvaraj 2009*).

At the Agricultural University Palampur, Himachal Pradesh, a series of experiments has been done showing the effect of Agnihotra or of Agnihotra Ash on the growth of vegetables, on the

algae mycosis enrichment of compost, and on the treatment of diseases and pests. (See *Rameshwar/Punam/Atul 2009*). Also a very detailed study was done to measure the effect of changing the different disciplines of Agnihotra (vessel, timing, offering) on the nutrient contents of the resulting ash (see *Kumari 2009*).

These first studies then led to the decision of Planning Commission, Government of India, to support and sponsor a first International Scientific Conference on Homa Organic Farming. Scientists from different Universities and Government institutions came, shared their results, and discussed how to proceed further. (For more detailed information see *Berk/Johnson 2009*.)

This gave a push for more scientific studies. In 2010 and 2011 three M.Sc. theses have been completed at Dharwad Agricultural University under the guidance of Dr. Pramod Basarkar on research on the effect of Homa Farming on soybean, tomato, and cabbage. Result was that both quantity and quality of production increased, pests and diseases could be controlled by Homa methods. Quality of production was measured by the parameters like TSS (Brix), contents of ascorbic acid and phenols. Both soil phosphatase activity and soil dehydrogenase activity increased in Homa Farming as compared to control.

The fact that Homa Organic Farming works has been well established. The technical reports and the studies already done show that Homa Organic Farming leads to better production, deals with all different kinds of pests and diseases, and also increases the profits of farmers as input costs are low and production is more. Still good to replicate the experiment on farm level, comparing Homa Organic Farming with conventional farming in respect to quantity and quality of production, control of pests and diseases, and also the economics of both farming methods (see: 6.2).

But even if such a comparison on a farm level corroborates the results we have so far - still the question remains: How do these positive effects come about, what are the underlying mechanisms which can help understand how Agnihotra and Homa work?

Studies which can help us to understand on a deeper level how Homa Organic Farming works are suggested in 6.3.

6.2 Comparison of Homa Organic Farming and other Farming Methods on Farm Level

Can we replicate the positive results of Homa Organic Farming as compared to conventional farming also on the level of a farm?

In order to examine the following two projects are suggested.

6.2.1 Comparison of Homa Organic Farming and Conventional Farming on Farm Level

Hypothesis

Homa Organic Farming is superior to conventional farming also on farm level regarding all relevant parameters like:

Quantity and quality of production

Resistance to disease and pests

Shelf live of products

Economics of production

Quality of the soil before and after.

Method

For this project two farms are needed in the same area so that weather conditions are same, also soil should be same.

One farm will be turned into a Homa Organic Farm, the other farm will be used as a conventional farm for comparison.

The two farms should be at some distance from each other (minimum three kilometres) in order to avoid an impact of the Homa fires on the non-Homa farm.

Before starting the experiment a soil analysis should be done to make sure that soil quality is comparable on both farms.

On the Homa Farm a resonance system will be installed by Homa Farming experts. This helps to extend the effect of Agnihotra to the whole area of the farm (up to 200 acres). For details see *Berk/Johnson 2009* pp. 86-94 (included in this manual as Annexure no. 12.1). Homa Farming techniques will be performed regularly as prescribed in this annexure.

On both farms the basic farming operations should be same, same seeds, same way of treating the soil, of watering, etc.

The difference is: On the Homa Farm in addition to the atmosphere created by Agnihotra and some additional fires Agnihotra Ash will be used when planting the seeds; it will be added to the water when watering plants; for treatment of pests and diseases different Agnihotra Ash applications will be used; fertilisation will be through use of compost and vermicompost, mulching, and spraying of Homa Biosol (see Annexure 12.2)

On the conventional farm normal practices using agrochemicals for fertilization, treatment of pests and diseases will be used.

Wheat, some oil seeds, vegetables and fruit trees are selected for plantation.

Parameters to be tested:

Soil attributes: Physical, chemical, and biological

Organic carbon

Organic matter

C/N ratio

Content of macro and micro nutrients

Soil pH

Number of earthworms

Moisture holding capacity of the soil

Soil: Microbiological traits

Total bacteria
Fungi
Actinomycetes
Azotobacter
Phosphate solubilizing bacteria
Nitrogen fixing bacteria
Phosphorus solubilising bacteria
Root nodules

Agronomical traits

Time and percentage of germination
Plant growth parameters
Root system parameters
Yield parameters

Physiological traits

Leaf area expansion
Biomass accumulation rate, photosynthesis rate, chlorophyll content
Level of photosynthesis
Source sink ratio
Fluorescence
Canopy temperature
Nutritional content
Content of secondary metabolites in medicinal herbs

Pathological traits

Disease intensity
Disease resistance

Effectiveness and duration of healing with Homa methods as compared to conventional methods

Entomological traits

Population of insect & pests
Population of predators

Quality traits (Bio-chemical traits)

Wheat protein
Wheat gluten
Hardness

Chickpea protein
Chickpea methionine
Chickpea tryptophan
Chickpea polyphenols
Mustard oil percent
Mustard fatty acid
Mustard glucocynolate
Mustard erucin acid

Biodiversity

Biodiversity of plants and animals

6.2.2 Comparison of Homa Organic Farming and “normal” Organic Farming on Farm Level

A second project can be done, comparing organic farming with Homa Organic Farming.

On both farms the basic farming operations should be same, same seeds, same way of treating the soil, of watering, etc.

Procedures: On Homa organic field

Agnihotra is performed regularly at sunrise and sunset

Om Tryambakam fire is performed for four hours a day – and on full moon and new moon days, for 12 hours if possible.

Agnihotra Ash will be (a) used when planting the seeds; and (b) added to the water when watering plants;

For treatment of pests and diseases different Agnihotra Ash applications will be used;

Fertilisation will be through use of compost and vermicompost, mulching, and spraying of Homa Biosol (see Annexure 11.2)

On the non-Homa field Control Ash will be used instead of Agnihotra Ash (control ash is obtained by burning the same substances, cow dung, cow ghee, rice, but without the specific disciplines of Agnihotra like the copper vessel of fixed size and shape, mantras, and timings at sunrise and sunset).

Parameters to be tested same as in 6.2.1.

These projects (6.2.1 and 6.2.2) should be done for three years to see the results in different weather conditions etc. and to have a solid basis of data through these replications.

In case this project corroborates the results we got so far in controlled conditions but on smaller level or on Homa Farms without exact comparison then still the question is how these effects of Homa Farming come about.

Following some suggestions how we can find out some underlying mechanisms which can explain that.

These experiments can be done as part of the project or also independently.

6.3 Suggested Experiments: The Effect of Agnihotra and Homa Therapy in Farming

6.3.1 Effects of Homa Farming on Soil

The quality of soil (physical, chemical, and biological parameters) are of great importance for the growth of plants. Which effect has Homa Atmosphere on the soil? Following some suggested experiments.

6.3.1.1 Effects of Homa Farming on Sodic Soil

In the Krishi Vignan Kendra near Unnao wheat was planted on sodic soil on three plots: one with agro-chemicals, one with vermicompost and one with vermicompost and Agnihotra Ash. After harvesting the soil pH was tested – with agro-chemicals it was 9.86, with vermicompost 9.06, and with vermicompost and Agnihotra Ash the pH came down to 7.67.

This leads to the following hypothesis:

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash make it possible to grow crops on sodic soil which normally would not grow there. The pH is getting back to normal after some time.

Method

In an area with highly sodic soil start a Homa Farm (with resonance system) and select a second place at least three kilometres away (with same soil conditions).

Plant crops and vegetables which do not grow well on sodic soil in both places.

Add Agnihotra Ash during planting and for watering on the Homa Farm, Control Ash on the other farm kept for control.

Compare after one year / two years / three years, also analyse the soil for pH and all different chemical, biological and physical properties.

6.3.1.2 Effects of Homa Farming on Acidic Soil

At a Homa Farm in Southern Poland, Europe, the government agricultural engineer said that nothing will grow there after doing a soil test, mainly because of high acidity (pH was 4.4).

But these people started planting vegetables, herbs etc anyway, and the observation was that everything grew perfectly well including tomatoes (which nobody in the area can grow). Later the pH was measured again and it had come up to 7.2.

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash make it possible to grow crops on acidic soil which normally would not grow there. The pH is getting back to normal after some time.

Method

In an area with highly acidic soil start a Homa Farm (with resonance system) and select a second place at least three kilometres away (with same soil conditions).

Plant crops and vegetables which do not grow well on acidic soil in both places.

Add Agnihotra Ash during planting and for watering on the Homa Farm, Control Ash on the other farm kept for control.

Compare after one year / two years / three years, also analyse the soil for pH and all different chemical, biological and physical properties.

6.3.1.3 *Effects of Homa Farming on Saline Soil*

No experiment has been done so far with saline soil – but there were good results of salinity in water which could be reduced considerably in different places. Therefore it seems worthwhile to do a study on saline soil also.

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash make it possible to grow crops on saline soil which normally would not allow such growth. The pH is getting back to normal after some time.

Method

In an area with highly saline soil start a Homa Farm (with resonance system) and select a second place at least three kilometres away (with same soil conditions).

Plant crops and vegetables which do not grow well on saline soil in both places.

Add Agnihotra Ash during planting and for watering on the Homa Farm, Control Ash on the other farm kept for control.

Compare after one year / two years / three years, and analyse the soil for salinity and pH and all different chemical, biological and physical properties.

6.3.1.4 *Neutralizing toxic residues of pesticides*

Hypothesis

Agnihotra and Agnihotra ash neutralize the effect of toxic residues of pesticides in soil.

Method

Take soil which is polluted with residues of pesticides. (If the soil of the Homa Farm shows this kind of pollution before the project starts you can take that soil, otherwise get some soil from outside.) Measure the concentration of these residues.

Put the polluted soil in two containers like clay pots and keep them

- a) on a Homa Farm
- b) on a conventional farm.

In a) mix the soil with Agnihotra Ash, in b) mix the soil with Control Ash.

Plant same seeds or seedlings in both containers.

Water the plants with a) Agnihotra Ash Water and b) with Control Ash Water.

After one season test the soil again for these residues and compare.

6.3.1.5 Nutrient content of Soil in Homa Atmosphere 1

Does Homa Atmosphere have an effect on the nutrient content of soil? An observation from a Homa Farm in Karnataka suggests that. The farmer had planted sugar cane for ten consecutive years and had a good yield all these years (compared to conventional farmers in the area). It is known that sugar cane extracts a lot of nutrients from the soil (similar to corn). This result is therefore unexpected (of course no chemical fertilizers were added to the soil). This leads to the following hypothesis:

Hypothesis

The content of macro- and micro-nutrients in soil is enhanced in Homa Atmosphere.

Method

Select two plots with same content of nutrients in the soil. The plots should be at least three kilometres away from each other.

- a) One plot will be used as Homa Farm (with resonance system and the daily fires as prescribed for Homa Farming)
- b) Second plot will be used as normal Organic Farm for comparison

Plant crops which are highly nutrient consumptive like sugar cane or corn. Farming operations will be same on both plots, only for irrigation

on plot a) Agnihotra Ash is added to the water,

on plot b) Control Ash is added.

Measure the soil for macro- and micro-nutrients after one season.

Next season, repeat the experiment planting the same crop again.

6.3.1.6 Nutrient content of Soil in Homa Atmosphere 2

Experiment 6.3.1.5 could be modified comparing Homa Organic Farming with conventional farming. In conventional farming chemical fertilizers will be used, in Homa Organic Farming mulching and Homa Biosol.

6.3.1.7 *Earthworms*

Hypothesis

The number of earthworms increases in Homa Atmosphere

Method

Select two plots with same content of nutrients in the soil. The plots should be at least three kilometres away from each other.

- a) One plot will be used as Homa Farm (with resonance system and the daily fires as prescribed for Homa Farming)
- b) Second plot will be used as normal Organic Farm for comparison

Check the soil for number of earthworms on both plots before the project starts.

Check again after half a year / one year / two years / three years and compare.

More detailed experiments regarding earthworms are described in para 4.2.3 in the chapter about Zoology.

6.3.1.8 *Water solubility of phosphorus*

In previous experiments it has been shown that adding Agnihotra Ash to soil increases the content of water soluble phosphorus. Good to replicate this experiment, and interesting to see whether just the Homa Atmosphere has the same effect.

It is suggested to do the three following experiments with replications using different soils as e.g. the pH of soil seems to have an effect on water solubility of phosphorus.

6.3.1.8.1 *Water solubility of phosphorus in Homa Atmosphere*

Hypothesis

The content of water soluble phosphorus in soil increases in Homa Atmosphere.

Method

Put soil into two clay pots. Examine the content of water soluble phosphorus.

Place one in Homa Atmosphere, the second one outside (at least three kilometres away).

Keep the soil moist and measure the water soluble phosphorus again after three months / six months. Compare.

6.3.1.8.2 *Water solubility of phosphorus with Agnihotra Ash*

Hypothesis

The content of water soluble phosphorus in soil increases if you add Agnihotra Ash.

Method

Put soil into two clay pots. Examine the content of water soluble phosphorus.

Keep these pots in non-Homa Atmosphere.

Mix the soil of one pot with Agnihotra Ash, the second with Control Ash.
Keep the soil moist and measure the water soluble phosphorus again after three months / six months. Compare.

6.3.1.8.3 Water solubility of phosphorus with Agnihotra Ash in Homa Atmosphere

Hypothesis

The content of water soluble phosphorus in soil increases even more with Agnihotra Ash in Homa Atmosphere.

Method

Put soil into two clay pots. Examine the content of water soluble phosphorus.

Mix the soil of one pot with Agnihotra Ash, the second with Control Ash.

Place the first pot in Homa Atmosphere, the second one outside (at least three kilometres away).

Keep the soil moist and measure the water soluble phosphorus again after three months / six months. Compare these two pots – and then compare with experiments 6.3.1.8.1 and 6.3.1.8.2.

6.3.1.8.4 Mechanism for increased water solubility of phosphorus

Provided the experiments above show a positive result, then the question arises how Agnihotra Ash and Agnihotra Atmosphere can increase the water solubility of phosphorus. One recent study showed that phosphorus solubilizing bacteria multiply at a higher rate when Agnihotra Ash is added to soil (see: *Berde /Kulkarni 2015*).

Good to replicate this experiment, also comparing with adding Control Ash to the soil.

An additional mechanism could be that the activity of phosphorus solubilizing bacteria is enhanced by adding Agnihotra Ash to soil and/or by keeping soil in Agnihotra Atmosphere.

Hypothesis

Agnihotra Ash and/or Agnihotra Atmosphere activate phosphorus solubilising bacteria.

Method

1st experiment

Prepare autoclaved soil and measure the level of water soluble phosphorus.

Mix Agnihotra Ash to this soil.

Measure the level of water soluble phosphorus again after four weeks. (The period can be adjusted according to when a change was seen in the experiment 6.3.1.8.2.)

In case there would be an increase of water soluble phosphorus similar to 6.3.1.8.2, then it would be unlikely that water solubilising bacteria would play an important role in this process – as in autoclaved soil no bacteria should be left (and also Agnihotra Ash should be bacteria-free). In this case a new hypothesis about the underlying mechanism would have to be found.

But in case there is no or less increase of water soluble phosphorus compared to 6.3.1.8.2, it would be reasonable to conclude that water solubilising bacteria play an important role in this process, and a second experiment is suggested:

2nd experiment

Prepare autoclaved soil and put it into two clay pots. Examine the content of water soluble phosphorus. Add same quantity of phosphorus solubilising bacteria to the two pots.

Mix the soil of one pot with Agnihotra Ash, the second with Control Ash.

Place the first pot

- a) in Homa Atmosphere,
- b) the second one outside (at least three kilometres away).

Measure the content of water soluble phosphorus in both pots and also measure the quantity of the phosphorus solubilising bacteria.

In case the available phosphorus of a) is higher than that of b) but the quantity of phosphorus solubilising bacteria is not different, this would mean that the activity of phosphorus solubilising bacteria increases with Agnihotra Ash and Agnihotra Atmosphere.

In case the available phosphorus of a) is higher than that of b) and also the quantity of phosphorus solubilising bacteria is higher, it means that these helpful bacteria multiply at a higher rate with Agnihotra Ash and Agnihotra Atmosphere.

6.3.1.9 Effect of Agnihotra on the Rhizosphere

The rhizosphere is the soil-plant root interphase and in practice consists of the soil adhering to the root besides the loose soil surrounding it. Plant growth promoting rhizobacteria (PGPR) are potential agents for the biological control of plant pathogens. The importance of the rhizosphere in Homa Organic Farming for plant growth and plant health has especially been stressed by Dr. R.K. Pathak during the last decade or so.

Which effect do Agnihotra Ash and Agnihotra Atmosphere have on the rhizosphere? Following experiments can help to find out.

6.3.1.9.1 Effect of Agnihotra Ash and Agnihotra Atmosphere on beneficial bacteria

Hypothesis

The activity of plant growth promoting rhizobacteria (PGPR) is enhanced if Agnihotra Ash is added to the soil and the plants are kept in Agnihotra Atmosphere.

Method

Put autoclaved soil in two clay pots and add the same amount of PGRP.

Then add:

- a) Agnihotra Ash to the first pot
- b) Control Ash (same quantity) to the second pot

Mix properly. Keep the soil moist.

Measure both activity and growth of the plant growth promoting rhizobacteria after some time.

6.3.1.9.2 Effect of Agnihotra and Agnihotra Atmosphere on root nodules

Hypothesis

Root nodules develop better in soil enhanced with Agnihotra Ash and in Agnihotra Atmosphere.

Method

Put autoclaved soil in two clay pots.

Then add:

- a) Agnihotra Ash to the first pot
- b) Control Ash (same quantity) to the second pot

Mix properly. Plant seeds of plants which are developing root nodules, and after the time which the roots normally take to develop. Compare.

6.3.1.10 Physical properties of soil

Which effects do Agnihotra Asha and Agnihotra Atmosphere have on physical properties of soil? We have reports showing that the moisture holding capacity of soil increases, and also the aeration of the soil is improved. This suggests that the structure of the soil is changing. Good to test this in controlled conditions.

Another interesting and potentially relevant subject is that of magnetic and paramagnetic properties of soil. Not much research has been done in this area in general, and what has been done - especially by Dr. Philip Callahan – is not yet widely known and recognized. Still an interesting subject for further studies!

According to Callahan, paramagnetism is a low level energy which can exert a tremendous impact upon plants and soil micro-organisms. Productive volcanic soils are invariably highly paramagnetic. This phenomenon is characterised by the capacity of these soils to intercept electromagnetic energy (usually derived from lightning) and to store, transform and transmit this energy to surrounding plants and micro-organisms. (For more information, see e.g. *Callahan 1995*)

As this is a new subject I do not want to formulate hypotheses – but just want to suggest that at some point scientists look into this matter as it possibly helps to understand some secrets of plants' growth and also the impact of Agnihotra on plants.

6.3.2 Effect of Homa Farming on water resources

Different tests showed that in Agnihotra Atmosphere both acidic and alkaline water sources (like borewells) came back to normal and also salinity was reduced.

As the quality of water is of great importance for the growth of plants and as in India there are large areas where acidic water / alkaline water / saline water is predominant, it makes sense to do a systematic study of this subject.

6.3.2.1 *Effects of Homa Farming on Alkaline Water*

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash help to bring the pH of alkaline water of borewells etc. back to normal.

Method

In an area with highly alkaline water select two places at least three kilometres away (with same water conditions).

a) At one place perform Agnihotra regularly next to the borewell and add Agnihotra Ash regularly (twice daily) to the borewell.

b) At the second place put Control Ash regularly (twice daily) to the borewell.

Measure water quality after three months / six months / one year, of course pH but you can also include other parameters like COD, total hardness, count of coliform bacteria, and compare.

6.3.2.2 *Effects of Homa Farming on Acidic Water*

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash help to bring the pH of acidic water of borewells etc. back to normal.

Method

In an area with highly acidic water select two places at least three kilometres away (with same water conditions).

a) At one place perform Agnihotra regularly next to the borewell and add Agnihotra Ash regularly (twice daily) to the borewell.

b) At the second place put Control Ash regularly (twice daily) to the borewell.

Measure water quality after three months / six months / one year, of course pH but you can also include other parameters like COD, total hardness, count of coliform bacteria, and compare.

6.3.2.3 *Effects of Homa Farming on Saline Water*

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash help to bring the pH of saline water of borewells etc. back to normal.

Method

In an area with highly saline water select two places at least three kilometres away (with same water conditions).

a) At one place perform Agnihotra regularly next to the borewell and add Agnihotra Ash regularly (twice daily) to the borewell.

b) At the second place put Control Ash regularly (twice daily) to the borewell.

Measure water quality after three months / six months / one year, of course salinity and pH but you can also include other parameters like COD, total hardness, count of coliform bacteria, and compare.

6.3.3 Effects of Homa Farming on the atmosphere

Homa Farming creates a different type of atmosphere it seems which has beneficial effects on plants, on seeds, on controlling pests, and also it contains more nutrients than normal. These claims should be tested.

6.3.3.1 Testing the quality of aromatic and medicinal herbs

“Agnihotra Atmosphere can restore potency to medicinal plants. Experiments should be done in this respect.” (Paranjpe 1989, p. 47)

Preliminary studies suggest showed positive results. Good to study in a more systematic way.

Hypothesis

Medicinal properties of herbs are increased in Homa Atmosphere.

Method

Select a variety of medicinal herbs.

Take the same seeds (or cuttings) and plant

- a) on a Homa Farm
- b) on an organic farm for control (at least three kilometres away from the Homa place).

After harvesting test for the relevant secondary metabolites (by means of Liquid or Gas Chromatography, e.g.) and compare.

6.3.3.2 Quality of seeds in Homa atmosphere

Hypothesis

Seeds in Homa atmosphere get stronger and more disease resistant.

Method

Take some organic seeds.

Plant them

- a) in Homa atmosphere

b) at least three kilometres away from Homa atmosphere

Soil and treatment should be same otherwise.

After one season prepare seeds and compare the quality of Homa seeds and non-Homa seeds.

Repeat using the seeds you got from the first step of the experiments so that we get a comparison of several generations of Homa / non-Homa seeds.

6.3.3.3 The effect of Agnihotra Atmosphere in Greenhouses

There are reports about positive effects of Agnihotra Atmosphere in greenhouses, see *Selvaraj 2009*. Especially the effects on flower cultivation – yield and disease resistance - were examined. These experiments can be repeated with a wider variety of plants.

Hypothesis

Agnihotra Atmosphere in greenhouses help to get better yield and also to control diseases.

Method

Select two sites at least three kilometres away from each other and put similar greenhouses there.

Plant a variety of different flowers and vegetables (same in both greenhouses).

Perform Agnihotra in one greenhouse and add Agnihotra Ash to the plants.

Perform a control fire in the second greenhouse and add Control Ash.

Monitor any diseases and at the end compare the quality and quantity of the yield.

6.3.3.4 Entomological traits

In many places it was reported that when Homa Farming practices were started, pests like mango hoppers and millibugs were reduced drastically.

This could be studied by an entomologist – first repeat the test, and second try to understand how does Agnihotra Atmosphere get rid of these pests without killing them?

Hypothesis

On a Homa Farm pests like mango hoppers and millibugs are reduced drastically.

Method

Select two mango farms which are heavily infested by mango hoppers and millibugs.

Start Homa Organic Farming on the first farm (including a resonance system and the use of Agnihotra Ash), and perform Control Fires and use Control Ash on the second farm.

Monitor the number of mango hoppers and millibugs as well as the damage done by them during one season and compare.

Advanced

In case this experiment confirms the reports we have so far and on the Homa Farm these pests can be controlled as opposed to the control, then the question is: How does Agnihotra Atmosphere get rid of these pests without killing them?

This is a challenge for an entomologist to find out the underlying mechanisms.

6.3.4 Nutrition of plants through the atmosphere

In Ancient Science it is said that plants get more than 75% of their nutrition through the atmosphere. Also Rudolf Steiner, the founder of biodynamic farming, states the same. Also it is said that now because of the pollution of the atmosphere this process is impaired.

As purification of the atmosphere is the paramount effect of Agnihotra, it is an obvious topic to research how Agnihotra affects the nutrients supply of plants through the atmosphere.

6.3.4.1 How much nutrition do plants get from the atmosphere?

Experiment 1

Hypothesis

Plants get a considerable part of their nutrients from the atmosphere.

In Agnihotra Atmosphere plants are able to extract more nutrients from the atmosphere than in normal environment.

Method

Take some soil and test it for macro- and micro-nutrients.

Put this soil in two clay pots:

Put same seeds in both pots, e.g. some microgreens (mustard, sunflower etc.).

Place pot 1 in Agnihotra Atmosphere

pot 2 in non-Agnihotra Atmosphere

Light condition should be same, also watering should be same.

When the microgreens are ready, analyse both for nutrient content and also analyse the soil for macro- and micro-nutrients, then compare: Are all the nutrients present in the plants missing in the soil? Or is there a difference – those nutrients then must have been taken from the atmosphere by the plants.

More exact would be to also analyse the nutrients in the seeds and take that into account.

What is the difference between the plants in Agnihotra Atmosphere and those which are not?

6.3.4.2 How much nutrition do plants get from the atmosphere?

Experiment 2

A similar experiment would be:

Method

Grow vegetables like tomatoes etc. instead of microgreens.

This experiment would be more relevant for actual farming but takes more time, so better to start with germination or microgreens.

6.3.4.3 Nutrition from the atmosphere - more advanced:

Hypothesis

Plants get part of the nutrients from the atmosphere.

In Agnihotra Atmosphere plants are able to extract more nutrients from the atmosphere than in normal environment.

Method

Select some seeds and analyse the content of macro- and micro-nutrients. Let them germinate in hydroculture (hydroponics)

Analyse the amount of macro- and micro-nutrients of Homa Biosol (an organic fertilizer made from cow dung, cow urine, vermicompost, and Agnihotra Ash – see *Berk/Johnson 2009*) and add this biosol to the water. No other nutrients given to the hydroculture.

Do this experiment

- a) in the laboratory
- b) in the atmosphere of a Homa Farm

(light etc. should all be kept same).

After some weeks analyse the plants for macro- and micro-nutrients and compare with the nutrients which were in the seeds plus the nutrients added to the water.

Subtract the nutrients which are still in the water.

Do the plants contain more nutrients than originally there in the seeds plus the fertilizer?

If so, these additional nutrients can only come from the atmosphere.

Is there a difference in the nutrients between the plants kept in the laboratory and those kept in a Homa Farm?

It is well known that carbon is absorbed by plants from the surrounding air through photosynthesis.

Also, nitrogen from the air is made available to plants by nitrogen-fixing bacteria.

Any other nutrients which plants can get from the atmosphere?

This experiment could help to find that out and also help to understand the concept of "injecting nutrition to the atmosphere through Yajnya".

6.3.5 Measuring the effects of the resonance technique

This experiment has to be done on a Homa farm with resonance technique.

6.3.5.1 Effect of Agnihotra near the resonance pillar

Hypothesis

The resonance system helps to increase the energy next to the resonance pillars.

Method

Measure the energy in the Agnihotra Shala with the Life Energy Meter (or a comparable instrument to measure subtle energies, see Chapter 10) before / during / after Agnihotra.

Similarly, measure the energy at the resonance pillars before / during / after Agnihotra (Agnihotra is only performed in the Agnihotra Shala, not at the resonance pillars!).

As comparison perform Agnihotra at some other place (no resonance system), measure the energy of Agnihotra with the Life Energy Meter (or a comparable instrument to measure subtle energies) before / during / after Agnihotra.

At the same time, measure the energy at the same distance which we have at the Homa Farm between Agnishala and resonance pillar.

6.3.5.2 Effect of Agnihotra at same distance

Second experiment:

Hypothesis

Without resonance system the effect of Agnihotra is weaker at a distance from the Agnihotra Shala.

Method

Select a place where Agnihotra is performed regularly, but no resonance system installed.

Measure the energy in the Agnihotra Shala with the Life Energy Meter (or a comparable instrument to measure subtle energies) before / during / after Agnihotra.

Similarly, measure the energy at the same distance the resonance pillar was at the Homa Farm - before / during / after Agnihotra (which is only done in the Agnihotra Shala!).

Compare with the measurements of 6.3.5.1.

6.3.5.3 Effect of Agnihotra at resonance pillar - without pyramid

Third experiment:

Hypothesis

The Agnihotra pyramid which is placed on top of the resonance pillar is essential for increasing the energy field of Agnihotra.

Method

Go back to the Homa Farm where the first experiment was done.

Measure the energy in the Agnihotra Shala with the Life Energy Meter (or a comparable instrument to measure subtle energies) before / during / after Agnihotra.

Similarly, measure the energy at the resonance pillar - but remove the pyramid kept on this resonance pillar just for the experiment and keep this pyramid away from the pillar during the measurements. Then measure the energy before / during / after Agnihotra.

Compare the results with those of 6.3.5.1.

Of course, after the experiment put the pyramid back on the resonance column.

6.3.5.4 Effect of Agnihotra between Agnihotra hut and the resonance pillar

Hypothesis

The energy level will be increased throughout the Homa Farm by the resonance system.

Method

Measure the energy in the Agnihotra Shala with the Life Energy Meter (or a comparable instrument to measure subtle energies, see Chapter 10) before / during / after Agnihotra.

Similarly, measure the energy at some place between the Agnihotra hut and one of the resonance pillars before / during / after Agnihotra. (Agnihotra is only done in the Agnihotra Shala, not at the resonance pillars!).

These tests can be repeated doing the measurements of the energy level during Agnihotra time at different points of the Homa Farm.

6.4 The Effect of Agnihotra and Homa Therapy in Animal Husbandry

Introduction

Cows form an essential component of any sustainable ecological agriculture.

The dairy cow is also an important aspect of the economy of any region.

This is why in this chapter on Animal Husbandry we concentrate on cows.

(The effect of Agnihotra on other ecologically relevant animals are dealt with in chapter 4.2, Zoology.)

Experience of many farmers show that the health of cows improves considerably in Homa atmosphere. Also it was noticed that cows on Homa farms show an improvement in health and are more peaceful as compared to neighbouring farms.

6.4.1 Breeding of cows

An experiment was conducted at the Zoological Department of the National Agricultural University in Tingo Maria, Peru, for a period of 18 months. It shows that in Homa atmosphere there is a considerable improvement as compared to control in the following respects:

- Reproductive Index
- Cow's and calf's mortality
- Muscle development
- Weight at birth
- Placenta Retention
- Cow – calf separation

Following table shows the results in detail:

PRODUCTIVE AND REPRODUCTIVE INDICATORS OF BREED CATTLE FOR MEAT IN THE HIGH HUALLAGA ZONE, COMPARISON OF FARMS WITH AND WITHOUT HOMA THERAPY

Variables	Indicators with Homa Therapy	Indicators without Homa Therapy	Indicators normal for the zone
Reproductive Index (%)	88.6	60.0	65.0
Cow's Mortality (%)	1.8	3.5	4.0
Calf's Mortality (%)	3.5	11.5	10.0
Muscle Development (%)	16.0	8.7	12.0
Weight at Birth (kg)	35.0-40.0	30.0	28.0
Difficult Birth (%)	0	1.5	2.0
Placenta Retention (%)	0	1.0	1.5
Cow – calf separation (months)	5.0	6.0-7.0	6.0

Good if this experiment could be repeated.

Hypothesis

Breeding cows in Homa atmosphere has advantages over control in several relevant aspects as: Fertility, cow's and calf's mortality, weight at birth, muscle development, difficulties at birth, placenta retention, and cow-calf separation.

Method

For this comparison you need two goshalas with same number of cows, and the cows at the two places must be same in health, age, etc.

- a) In one goshala you start performing Agnihotra and four hours of Tryambakam Homa, also the cows get Agnihotra Ash in their fodder and in the drinking water.
- b) In the second goshala for control you add Control Ash to fodder and drinking water; otherwise the treatment in both goshalas is same.

The experiment should be done at least for two years.

Following parameters are checked regularly:

- details about health
- about fertility and pregnancy
- ease of delivery, health of calves
- about medical treatments

and compared between the two goshalas.

6.4.2 Milk Production

There are reports from different countries that in Agnihotra Atmosphere milk production increases as well as the fat content of milk.

Good if this can be tested in some controlled experiment.

Hypothesis

Both quantity and quality (mainly fat content) of milk production by cows in kept in Agnihotra Atmosphere increases.

Method

Have one goshala with Agnihotra Atmosphere and one for control as described more in detail in 4.2.2.1.

Other factors, especially fodder, should be same.

Measure quantity and quality of milk from both cowsheds and compare.

6.4.3 Treatment of Cows with Homa Therapy

Monika Koch, a German pharmacist, developed medicines based on Agnihotra Ash and used with wonderful results on all kind of human diseases.

When the farmer from whom they got their cow dung said that one of his cows was troubled by exema she tried Agnihotra Ash. Nothing else had helped, but the ash cured the eczema within a few days.

Another cow did not want to eat and got very weak – they added Agnihotra ash to the fodder, the cow started to eat and got strong again soon.

Since then many different diseases in cows have been treated by Homa farmers all over the planet. Yet till now no systematic study has been done in this area, therefore it would be an interesting topic for research.

6.4.3.1 Effect of Agnihotra Ash Medicines on Cows

Hypothesis

Agnihotra Ash medicines offer an efficient cure for many diseases of cows.

Method

Treat diseased cows with the different Agnihotra Ash medicines:

- Agnihotra Ash
- Agnihotra Ash mixed with Ghee
- Agnihotra Ash water
- Agnihotra Ash mixed with salt

Agnihotra Ash and Agnihotra Ash water can be used internally and externally, the two other medicines externally. Agnihotra Ash mixed with salt is useful to protect cows from ticks.

In severe cases bring a sick cow to a Homa cowshed and treat her there with the Agnihotra medicines. Compare with the results people get with conventional medicines in similar cases.

6.4.3.2 Effect of Agnihotra Atmosphere on Cows

Hypothesis

Cows in Homa atmosphere improve in health.

Milk production increases as well as the fat content of the milk.

Problems in delivery are reduced.

Method

For a solid study it would be best to have

- a) one Homa Goshala and
- b) a second Goshala with comparable conditions (like similar number of cows, similar health conditions, etc.) for control.

An alternative would be a sequential comparison:

Collecting all relevant data from past like

- number of cows
- milk production
- cream percentage of the milk
- details about health
- about fertility and pregnancy
- ease of delivery, health of calves
- about medical treatments

and then compare with the data after Homa has begun.

There should be no other changes (like fodder for the cows, daily routine like grazing, etc.).

If change of seasons make a big difference for the cows then this study should last for one year. Otherwise difficult to exclude seasonal factors.

Homa treatment in goshala consists of

- a) daily Agnihotra at the exact time of sunrise and sunset
- b) four hours of Tryambakam fire daily; at full moon and no moon days up to 24 hours
- c) adding Agnihotra Ash to the fodder and to the drinking water
- d) using Agnihotra Ash medicines for the cows

Tests would be for the same parameters mentioned above, then comparison either with the second goshala which would be control or with the data from the past.

7 Human Health / Psychology

7.1 The effect of Agnihotra on Physiological Parameters

7.1.1 The effect of Agnihotra on Hypertension (High Blood Pressure)

Hypertension is an important factor for several diseases and a high percentage of the population suffers from it.

The medications which are commonly prescribed often have negative side effects and must be taken for life.

Preliminary studies have shown that the blood pressure came back in direction of normal after only one Agnihotra. Means if the blood pressure was high, it went down. If it was low, it went up.

If this preliminary observation could be established performance of Agnihotra could help a great number of people to solve one major health problem.

Hypothesis

Agnihotra can help to regulate the blood pressure.

Method

Four groups are randomly selected for the experiment:

- 1) Members of the first group sit for Agnihotra every morning and evening and also take half a tea spoon of Agnihotra Ash three times a day.
- 2) People of this group are performing Agnihotra themselves and also take half a tea spoon of Agnihotra Ash three times a day. Agnihotra is being done under supervision so that it is made sure that it is performed correctly.
- 3) Control group sitting for ten minutes morning and evening meditating with some candle and getting Control Ash three times a day.
- 4) Absolute control: No treatment or exercise at all.

Blood pressure is measured half an hour before and after Agnihotra.

For the long term effect blood pressure can be measured in the middle of the day and/or at night.

24 hours non-invasive ambulatory blood pressure monitoring if available can be used for a select group of subjects.

Other physiological parameters like pulse, respiration rate, and body temperature will be measured in larger intervals.

Suggested time period for the experiment is three months.

7.1.2 The Effect of Agnihotra on Joint Pain

Preliminary observations show that Agnihotra Ash can help to reduce pain in aching joints.

Hypothesis

Agnihotra ointment (mixture of ghee and Agnihotra Ash) applied on aching joints helps to give greater relief to pain than creams of conventional medicine.

Method

Out of a group of people with joint pain (arthritis) two groups are randomly created.

Group 1)

Agnihotra ointment (mixture of ghee and Agnihotra Ash) is applied on the aching joints.

Group 2)

A ointment used in conventional medicine (the best available) is applied on the aching joints.

The study could be done in a hospital with a large number of arthritis patients.

Observations will be:

- a) Pain relief
- b) Reduction of swelling
- c) Mobility of the joints
- d) Improvement over time until complete healing.

7.1.3 The Effect of Agnihotra on Blood Clotting Time

There are many observations showing that the bleeding of wounds is stemmed within short time if Agnihotra Ash is applied to the wound. But this has not yet been tested experimentally.

Hypothesis

If you put powdered Agnihotra Ash on a bleeding wound the blood coagulates faster than it would without Agnihotra Ash.

Method

How to make an experiment out of this?

We do not want to actually cut people and then try Agnihotra Ash (as compared to some conventional treatment), and also we do not want to do this with animals.

One idea would be to use Agnihotra Ash in hospitals - either after operations or in the outpatients ward.

Another source of subjects could be a high-risk situation - like a sports match, for example - during which wounds are very common.

Of course, the doctors responsible would have to agree.

7.1.4 The effect of Agnihotra on electromagnetic properties of human cells

Electric and magnetic fields play an important role in biological systems although these fields are rather weak.

Is it possible that Agnihotra and Agnihotra Ash have an influence on electric and magnetic fields? This could be a possible explanation of the effects of Agnihotra and Agnihotra Ash on plants, animals, and humans. Therefore this topic seems to be a very interesting and relevant area of research. Experts of physics and of physiology will have to work together.

Already it has been shown that some electromagnetic properties of water which are changed in Agnihotra Atmosphere (see the chapter on physics, 9.2.2)

This can have an impact on the functioning of human cells.

7.1.4.1 The effect of Agnihotra Atmosphere on electromagnetic properties of human cells

Hypothesis

- 1) In Agnihotra Atmosphere certain electromagnetic properties of water like the magnetic permeability are changed.
- 2) These changes lead to an increased permeability of cellular membranes.

Method

- 1) This experiment is described in the physics chapter, see 9.2.2.1.
- 2) Create an Agnihotra Atmosphere in a laboratory, and observe the development of human cells in tissue culture. Is there a change in the permeability of the cellular membranes as compared to same experiment outside of Agnihotra Atmosphere?

7.1.4.2 The effect of Agnihotra Ash Water on electromagnetic properties of human cells

Hypothesis

- 1) In Agnihotra Ash Water certain electromagnetic properties like the magnetic permeability are changed.
- 2) These changes lead to an increased permeability of cellular membranes.

Method

- a. This experiment is described in the physics chapter, see 9.2.2.4.
- b. Observe the development of human cells in tissue culture kept in
 - a) Culture medium with added Agnihotra Ash Water
 - b) Culture medium with added Control Ash Water
 - c) Just culture medium (as total control)

and then examine the permeability of the cellular membranes.

7.1.5 Effect of Agnihotra and Agnihotra Ash on Cancer Cells

There are several reports that Agnihotra and Agnihotra Ash helped to cure cancer. Can this result be replicated on cellular level?

7.1.5.1 Effect of Agnihotra Atmosphere on Cancer Cells

Hypothesis

Agnihotra Atmosphere reduces the multiplication of cancer cells.

Method

Keep cancer cells in a tissue culture and observe the growth for some time.

Then start performing Agnihotra regularly in this lab and observe the growth for the same time period.

Compare.

7.1.5.2 Effect of Agnihotra Ash on Cancer Cells

Hypothesis

Agnihotra Ash reduces the multiplication of cancer cells.

Method

Keep cancer cells in a tissue culture with:

- a) Culture medium with added Agnihotra Ash Water
- b) Culture medium with added Control Ash Water
- c) Just culture medium (as total control)

Compare.

7.1.6 The effect of Agnihotra Atmosphere and Agnihotra Ash on the Activity of Biophotons

Every cell of a living organism emits photons (light particles) called biophotons. This light is not strong enough to be seen with the naked eye but can be detected with a photomultiplier.

Diseased cells (like cancer cells in humans) show a different pattern of these biophoton emissions than healthy cells. This leads to an interesting experiment.

7.1.6.1 The effect of Agnihotra Atmosphere on the Activity of Biophotons

Hypothesis

The biophoton emission of diseased cells like cancer cells can be brought back to normal in Agnihotra Atmosphere.

Method

Take diseased cells in a tissue culture and keep these containers with the tissue cultures in Agnihotra Atmosphere. Examine the patterns of biophoton emission before and after.

7.1.6.2 The effect of Agnihotra Ash on the Activity of Biophotons

Hypothesis

The biophoton emission of diseased cells like cancer cells can be brought back to normal in Agnihotra Ash medium.

Method

Keep cancer cells in a tissue culture with:

- a) Culture medium with added Agnihotra Ash Water
- b) Culture medium with added Control Ash Water
- c) Just culture medium (as total control)

Examine the patterns of biophoton emissions and compare.

7.2 The effect of Agnihotra on Psychological Parameters

7.2.1 The Effect of Agnihotra on Stress

Introduction

Now it is widely accepted that stress is one of the most important single causes of diseases.

The first effect of Agnihotra is on the mind: It is performed for purification of the atmosphere. By inducing a change in the atmosphere you bring about change in functioning of Prana (life energy). Prana and mind are like two sides of the same coin and hence the beneficial change of Agnihotra on the atmosphere is transposed to the realm of the mind thus reducing tension. This is what ancient Knowledge of the Vedas tells us.

Can that be confirmed by modern experimentation?

In *Yudin/Berk 2013* quite encouraging results are documented from an experiment done in Moscow, Russia. Would be good to have a wider set of data.

7.2.1.1 The Effect of Agnihotra on Stress – Experiment 1

Hypothesis

Stress is reduced if people attend or perform Agnihotra regularly.

Method

Three groups will be randomly selected:

- 1) Attend Agnihotra regularly morning and evening
- 2) Perform Agnihotra regularly morning and evening
- 3) Control - meditate by looking at a candle light for 10 minutes morning and evening.

Stress level is measured by using a questionnaire like SLC-90-R before and after the experimental period. Then compare the results of the three groups.

7.2.1.2 The Effect of Agnihotra on Stress – Experiment 2

A second experiment on the effect of Agnihotra on stress reduction was recently done by Dr. Andrea Chavez and Dr. Ernesto Vega at the University Finis Terrae in Santiago de Chile. Out of more than 400 students the 42 students which showed highest stress level were invited for this study. Two statistically equivalent groups were formed. Both groups attended a Tai Chi lesson for half an hour at two different locations. At the first location Agnihotra was performed in a neighbouring room during the Tai Chi lesson (but the students did not know about that). The second location was nearly three kilometres away, no Agnihotra being performed there.

Stress was measured before and after the intervention by testing the following parameters:

- 1) Measurement of cortisol in the saliva using the ELISA test
- 2) Measuring levels of electrical conductivity of the skin at 24 points
- 3) Measuring the constriction status of the dilatator muscles of the eyes

The results showed a statistically significant difference between these two groups, showing that just being in a room next to where Agnihotra is performed reduces stress levels. The final report will be published soon.

It is suggested to replicate this experiment using the same (or similar) physiological parameters to determine stress levels.

Good if two more groups could be included:

- 1) Control
- 2) Agnihotra is done in an adjoining room
- 3) Agnihotra is done in the room where test persons are
- 4) Test persons perform Agnihotra themselves

Also it would be good to not just examine the effect of one Agnihotra – but extend the test for one week (of morning and evening Agnihotra).

7.2.1.3 The Effect of Agnihotra on Stress – Experiment 3

Another experiment could be done similar to Experiment 2 but using different physiological parameters. Especially the heart rate variability is said to be a golden standard to determine stress level.

Hypothesis

Stress is reduced if people attend or perform Agnihotra regularly.

Method

Three groups will be randomly selected:

- 1) Attend Agnihotra regularly morning and evening
- 2) Perform Agnihotra regularly morning and evening
- 3) Control - meditate by looking at a candle light for 10 minutes morning and evening.

Stress level is by measuring physiological indicators of stress

- a) blood pressure
- b) depth of breathing,
- c) heart rate variability

before and after the experimental period.

Then compare the results of the three groups.

7.2.2 Effect of Agnihotra on Human Brain – Physiological Parameters

According to Vedic Knowledge, „Agnihotra makes the performer (YAJAMAN in Sanskrit) more intelligent. It renews the brain cells.“ (*Paranjpe 1989* p.19)

„If there is some kind of brain disorder, if the affected one will sit for Agnihotra HOMA twice daily at sunrise and sunset, the smoke has a good effect on the brain, on the nervous system.“ (*Paranjpe 1989* p.20)

In a paper titled ‘Physiological Effects of Mantras on Mind and Body’ was presented at a Yoga Conference held at IIT, Delhi on 4th November, 1989 by Dr. W. Selvamurthy, Scientist, Defence Institute of Physiology and Allied Sciences, Delhi.

In his study Dr. Selvamurthy has observed neuro-physiological effects of Agnihotra mantra i.e. two mantras at sunset time. Eight healthy men were chosen for study. They reported at 16.00 hours on two consecutive days. First day for control recording when ritual mimicking Agnihotra was performed. Instead of mantras some irrelevant syllables of the duration of Agnihotra mantras were uttered. Next day evening Agnihotra was performed. Recording of physiological parameters viz. Heart rate, ECG lead-II, blood pressure recorded. He has observed that heart rate showed a trend of decline during Agnihotra as compared to control. Skin temperature was raised by 1°C during Agnihotra whereas control did not show such change. GSR remained significantly higher during Agnihotra as compared to control session. ECG showed DC shift in base like some extraneous electrical interference like response only during exact period of sunset Agnihotra. EEG showed constant changes. Power in Alpha band increased while there was tendency of suppression in Delta power. The CSA showed trend of leftward shift in Alpha power with build up power in Alpha and Theta bands persisting for more than 15 minutes in all montages. The power Spectral analysis showed consistent augmentation of power in all four bands during Agnihotra suggesting an occurrence of Cerebral Cortical Synchronisation . Mental tranquility observed could be attributed to rise in Alpha power by 20% during performance. Thus Agnihotra atmosphere has beneficial effect in the form of mental tranquility.

This is a very interesting study, and it would be good if this could be followed up.

Hypothesis

Physiological and neuro-physiological parameters like heart rate, blood pressure, ECG, and EEG shows significant changes during Agnihotra.

Method

Two groups are randomly selected.

One group sit for morning and evening Agnihotra for one week.

The other group sits for a control fire (wrong time, wrong mantras, wrong vessel).

The above mentioned physiological parameters are tested before the experiment and after, and also a few times before and after Agnihotra.

7.2.3 Effect of Agnihotra on Pranayama Exercises / Meditation

According to the ancient Knowledge of the Vedas, a polluted atmosphere has a detrimental effect on our mind. It seems obvious that in polluted atmosphere all efforts to purify our minds will be harder. Such efforts are pranayama and meditation. This can be tested.

Hypothesis

Pranayama / meditation done in Agnihotra Atmosphere has an increased effect. People who actually perform Agnihotra have an even better effect than those just attending Agnihotra.

Method

Three groups will be randomly selected:

- 1) Attends Agnihotra, right after starts pranayama / meditation
- 2) Performs Agnihotra, right after starts pranayama / meditation
- 3) Control: looking at a candle light for 10 minutes, right after starts pranayama / meditation.

Interview the people after the experiment about the deepness of their experience with pranayama / meditation and compare.

7.2.4 Effect of Agnihotra on Drug Deaddiction

Introduction

Drug addiction is a big problem for the individual (some moments of happiness are followed by long periods of suffering; problems in relations, in the job etc.) as well as for society (costs for healthcare system; less productivity; traffic accidents; criminality).

Although there are many methods trying to solve the problem of drug addiction there seems to be no really good solution so far.

Homa drug deaddiction programme has given promising results in several cases of longtime users of several drugs, see for example *Golechha/Deshpande/Sethi/Singh 1987*.

The following experiment is suggested for the case of marijuana addiction – but can of course be done in a similar way for all other types of addiction.

Hypothesis

Homa Therapy drug deaddiction programme helps to control the addiction to marijuana.

Method

It is proposed that four groups of "marijuana addicts" be organized for the purpose of experimental data collection.

Each group will be composed of 10 addicts, 5 female, 5 male, of ages 18 to 30. For the purpose of this study, "marijuana addict" is to be defined as one who has used marijuana on a daily basis for 3 or more years. Furthermore, their use of the drug must have resulted in their being 'under the influence' for at least 50% of all waking hours.

Of course, all participants must agree to cooperate with the parameters of the experiment (above all, participating in daily sunrise/sunset Agnihotra) as well as monitor their use and/or abstinence of marijuana.

Participants must be interviewed and to be classified as

- a) feeling that their use of marijuana was interfering with their lives and that
- b) if a way to at least reduce and ideally eliminate marijuana could be found, they would be willing to try.

Group 1: each group member agrees to do Agnihotra precisely as prescribed. Any missed Agnihotras must be documented.

Group 2: each group member does sunrise/sunset Agnihotra AND one hour of daily Om Tryambakam Yajnya

Group 3: each group member does 15-20 minutes of Hatha yoga each day

Group 4: each group member meets for 15-20 minutes daily for a meeting based on principles of the 12 Steps of Marijuana Anonymous

Each group member must precisely document any use of marijuana during the experiment which should be conducted for six months.

Random testing of urine for purposes of supporting alleged abstinence should be conducted to lend additional credence to experimental results.

This testing will be continued for one year after the six month experiment period.

7.2.5 Effects of Agnihotra on motivation

In treatments of drug addiction one big problem is to get the addicts motivated to get rid of their drugs.

In many cases people who started to perform Agnihotra told that this practice helped them to keep the motivation strong. This should be tested.

Hypothesis

Agnihotra Atmosphere helps to strengthen one's motivation. People who actually perform Agnihotra have an even better effect than those just attending Agnihotra.

Method

For the experiment we need people who report that they have difficulties to keep up their motivation (to get rid of drugs, e.g., but also to attain other goals). Measure the motivation level with appropriate tools like questionnaires.

Three groups will be randomly selected:

- 1) Attends Agnihotra

2) Performs Agnihotra

3) Control: looking at a candle light for 10 minutes twice a day.

Continue with this practice for at least one month, better for three months.

Then measure motivation levels again and compare.

7.2.6 Effects of Agnihotra on Self-Actualization

Self-actualization is a central concept in different psychological schools and became popular as the final level of psychological development in Abraham Maslow's pyramid of needs. Self-actualization means living up to one's true nature and full capacities. This seems to be an important factor for people's happiness.

Hypothesis

Agnihotra Atmosphere helps people to come closer to self-realization. People who actually perform Agnihotra have an even better effect than those just attending Agnihotra.

Method

For the experiment we need people who report that they have difficulties reach self-realization.

Measure the level of self-realization before the experiment with appropriate tools like questionnaires.

Three groups will be randomly selected:

1) Attends Agnihotra

2) Performs Agnihotra

3) Control: looking at a candle light for 10 minutes twice a day.

Continue with this practice for at least one month, better for three months.

Then measure the level of self-realization again and compare.

7.2.7 Effectiveness of Psychotherapy in Agnihotra Atmosphere

In some psychotherapy practice in Baltimore, U.S.A., Agnihotra was performed in one of the rooms but not in the therapy room so that patients did not see or smell any difference. The effectiveness of therapeutical interventions before and after Agnihotra was started was compared – and the result was that this effectiveness increased in Agnihotra Atmosphere.

Hypothesis

Effectiveness of psychotherapeutic treatments increases in Agnihotra Atmosphere.

Method

For a controlled experiment better to have two psychotherapy practices (at least three kilometres away from each other) with similar kind of patients, of problems, and of treatment methods.

Perform Agnihotra in one room of the first practice (be careful that patients are not aware of any change), not in the second one.

Monitor the results of therapies in both practices during three months and compare.

If you want to exclude the effect of the opinions of the therapist, one room in both practices could be locked and twice per day the scientist doing this experiment would come to both places, in the first one at sunrise/sunset performing Agnihotra, in the second one before or after just sitting for 15 minutes, burning some incense or so.

7.3 Effects of Agnihotra on General Health

7.3.1 The Effect of Agnihotra on Personality, General Health, and Emotional Health

Introduction

Several studies were done at SVYASA (Swami Vivekananda Yoga Anusandhana Samsthana, Bangalore, India) testing the effect of Yoga on general health, emotional health and personality (see *Deshpande/Nagendra/Nagarathna 2008*, *Deshpande/Nagendra/Nagarathna 2009*, *Khemka/Ramarao/Hankey 2011*).

Similar studies could be done by simply substituting Yoga with Agnihotra.

Hypothesis

Agnihotra has a positive effect on selected psychological and health parameters.

Method

Three groups are randomly selected.

Group 1) attends Agnihotra regularly

Group 2) each subject performs Agnihotra regularly

Group 3) Control - Control group could meditate on the flame of a candle.

Variables to be measured:

- a) Sustained attention
- b) Emotional Intelligence EQ
- c) General Health GHQ
- d) Guna (personality)

The study should last for 30 days, the assessment tests will be conducted before and after this

period.

7.3.2 Epidemiological studies on long term practitioners of Agnihotra

Introduction

We regularly receive reports of healing through Agnihotra from people of various countries. These data have not yet been systematically evaluated.

Hypothesis

The general health of Agnihotra practitioners improves over time.

Method

Sending out a pre and post questionnaire to a random group of 1000 selected from a database of Agnihotra practitioners.

The questionnaire will be based on the GHQ.

7.3.3 Controlling „Super Bugs“ in Hospitals

Recent studies show that alone in U.S. every year more than 20000 people die in hospitals because of „super bugs“, antibiotics resistant bacteria. (Source: Centers for Disease Control and Prevention, see e.g. the report on <http://www.nbcnews.com/health/health-news/cdc-warns-growing-threat-superbugs-n44431>.)

The experiments mentioned in the chapter on microbiology show that different pathogenic bacteria can be controlled by Agnihotra Atmosphere and by Agnihotra Ash. This leads to the following suggestion:

Hypothesis

Agnihotra and Agnihotra Ash can help to control super bugs in hospitals.

Method

Experiment 1:

Isolate these multi-resistant bacteria into petri dishes and add Agnihotra Ash. See whether the multiplication is inhibited. If so, it makes sense to see the effect on larger scale:

Experiment 2:

Perform Agnihotra in one room in a hospital which is infested by multi-resistant bacteria. Also offer Agnihotra Ash water to the patients for drinking.

Monitor the presence of these super bugs and see whether they can be controlled by this method.

7.4 Effects of Agnihotra on a more subtle level

7.4.1 The Effect of Agnihotra on Acugraph and GDV Measures

Introduction

Acugraph measurements done before/after Agnihotra showed some interesting changes in persons, provided Agnihotra is being done properly and people are not too much disturbed.

Long time ago several studies were made with Agnihotra and Kirlian photography checking the energy level of hands of a patient before and after Agnihotra. There was a definite change. "Holes" in the energy pattern around the hands were closed after Agnihotra. The GDV equipment can do much more, e.g. measuring the chakras of a person, etc.

Hypothesis

Agnihotra has a positive effect on the energy body of a person as can be measured using Acugraph and GDV.

Method

a) Acugraph:

Measuring the meridians before and after Agnihotra.

b) GDV

Measuring chakras before / after Agnihotra

In case there are changes:

See for how long these changes last

Control group could sit and meditate looking into a candle, for example.

Longer term study: Is there some permanent effect?

People are attending/performing Agnihotra for 30 days

Measurements can be done in the middle of the day and/or at night.

7.4.2 The effect of Agnihotra on chakras - measured with Electrosomatographic Scanning

Electrosomatographic scanning is a method recently developed which measures impedances through six electrodes attached to the human body and thus gets information about body organs

and systems. Measurement only takes three minutes, therefore electrodermal scanning. (See e.g.: <http://www.spiritualresearchfoundation.org/spiritualresearch/studies-with-biofeedback-and-other-equipment/esm/introduction>.) This method can also be used to measure energy levels of our chakras, the energy centres of our body according to ancient knowledge.

Hypothesis

Attending / performing Agnihotra helps to harmonize the energy levels of chakras in humans.

Method

From the participants in the study three groups will be randomly selected:

- 1) Attends Agnihotra
- 2) Performs Agnihotra
- 3) Control: looking at a candle light for 10 minutes twice a day.

Measure the energy level of the chakras before and after Agnihotra (respectively the control activity).

If possible it would be good to continue this experiment and see what changes are there after say three weeks of attending/performing Agnihotra.

8 Chemistry

Introduction

It is not likely that chemistry will lead to a full understanding of how Agnihotra works. For example a chemical analysis of Agnihotra Ash and Control Ash most probably will not show significant differences as the same substances are being used, which also means we can expect similar temperature of combustion. Of course this is just a hypothesis which has to be tested.

Still chemistry can help a lot to come to a better understanding of Agnihotra, mainly by analyzing the effects of Agnihotra and Agnihotra Ash on our environment (atmosphere, soil, water) and on our food.

If we find that there is a difference between Agnihotra Ash and Control Ash say in the effect on degrading harmful chemicals in water, and if the hypothesis will be confirmed that there is no significant difference in the analysis of Agnihotra Ash and Control Ash, then we will have to look into properties of these ashes in terms of physics. But chemistry will lay the groundwork for this further research.

8.1 Analyzing the Agnihotra Ash vs. Control Ash

Introduction

Agnihotra Ash and Control Ash have different effects (on microbes, on plant growth, etc.). Is there a difference in the chemical analysis which could explain these different effects?

Hypothesis

There is no significant difference in the chemical analysis of Agnihotra Ash and Control Ash.

Method

For that, three ash samples of different Agnihotra fires are taken as well as three samples of different Control Ash fires.

Cow dung, ghee and rice have to be from the same sources.

The fires (Agnihotra respectively control fire) are done with same quantities of cow dung, ghee, and rice.

These six samples of ashes are analysed (e.g. through spectrum analysis) to determine which chemical elements are present in which percentages.

The results are compared.

8.2 Effect of Agnihotra on the Atmosphere

8.2.1 Analyse Agnihotra fumes

Agnihotra fumes have beneficial effects like neutralizing pathogenic bacteria, see for example *Mondkar 1982*.

Can we explain these effects in terms of chemistry? Mondkar suggests the hypothesis that the

reason for the reduction of pathogenic bacteria is that Agnihotra fumes are rich in formaldehyde and other substances like ethylene oxide, propylene oxide, and butyrolactone which have an inhibitory effect on microorganisms.

As far as I know this hypothesis has been quoted several times but never tested. Would be good to do this finally and find that out the chemical composition of the fumes of Agnihotra. It would be good to also analyse the fumes of a control fire for comparison.

Hypothesis

Agnihotra fumes are rich in formaldehyde, ethylene oxide, propylene oxide, and beta-propiolactone which inhibit the growth of microorganisms.

Method

Collect the Agnihotra fumes through some wide hood kept above the Agnihotra fire and let them stream through a water container. Then analyze, e.g. with spectrum analysis.

This hood if possible made from glass or wood, no metal should be used, and it should not come too close to the pyramid so that the Agnihotra process is not affected.

Repeat the same procedure with a control fire. Either do this experiment with the control fire at some distance (minimum three kilometres away from Agnihotra) or do the experiment with control fire first, then the experiment with Agnihotra.

8.2.2 The effect of Agnihotra on harmful chemicals in the air

We have seen that Agnihotra reduces harmful bacteria in air (see Chapter 3, Microbiology). This suggests the assumption a similar reduction could also be there for harmful chemicals in the air.

Indoor air often is higher in harmful chemicals, especially volatile organic carbons than outdoor air as there is less exchange of air.

8.2.2.1 Effect of Agnihotra on harmful chemicals present in indoor air

Hypothesis

Practice of Agnihotra reduces harmful chemicals in the air.

Method

Collect air samples in a room with a high volume air sampler before and after Agnihotra.

Especially check for volatile organic carbons.

Measure before and after one Agnihotra and then continue the practice of Agnihotra for at least two weeks to examine the long term effect.

For comparison do the same test but with control fire instead of Agnihotra. This test should be done either at some distance or before that with Agnihotra so that the effect of Agnihotra does

not interfere.

8.2.2.2 *Effect of Agnihotra on harmful chemicals induced into air*

Some pollutants can also be brought to the room before the experiments to see whether and how Agnihotra helps to reduce them.

An experiment done at Fergusson College, Pune, showed that SO_x which was induced into the room could be successfully reduced (see *Fergusson College 2013*).

Good if it can be replicated, taking the air samples 1 hour / 3 hours / 6 hours after Agnihotra.

Method

Same quantity of SO_x is spread a closed room and the concentration is measured.

Then Agnihotra is performed in this room. Doors and windows have to be closed.

Take and analyse air samples 1 hour / 3 hours / 6 hours after spreading SO_x .

For comparison do the same test but with control fire instead of Agnihotra. This test should be done either at some distance or before that with Agnihotra so that the effect of Agnihotra does not interfere.

A similar experiment can be done with NO_x .

(This was done in Fergusson College also - but the experiment did not show a reduction.

The air sample was taken right after Agnihotra. - maybe it takes longer to degrade NO_x .

To check this hypothesis it would be good to repeat the experiment with air samples taken 1 hour / 3 hours / 6 hours after Agnihotra.

A second hypothesis was that it depend on the level of NO_x whether there will be a reduction or not. (A certain level of NO_x is healthy - maybe Agnihotra helped to achieve this healthy level. In this case - if the level of NO_x is too high - would the level come back to normal if you practise Agnihotra in the room?)

8.3 Water

8.3.1 Improvement of water quality in Agnihotra Atmosphere

An Experiment showed that there was per average a reduction of 60% as compared to control in COD (Chemical Oxygen Demand) after keeping the water samples in an Agnihotra place for five days.

The bottles were closed and no Agnihotra Ash added.

This experiment can be repeated.

Hypothesis

COD is reduced considerably if you keep water in closed bottles in Agnihotra Atmosphere.

Method

Take polluted water (e.g. from some river), put it in say 10 glass bottles, place half of these bottles in an Agnihotra room (where Agnihotra is performed regularly), the other half in a laboratory best three kilometres away from the Agnihotra place.

Measure COD of both experiment and control samples at the beginning / after one day / after three days / after five days.

8.3.2 Improvement of water quality through Agnihotra Ash

Adding Agnihotra Ash to water leads to a considerable improvement in the microbiological and physical qualities of water.

Will it also help to improve chemical qualities?

Hypothesis

COD is reduced considerably if Agnihotra Ash is added to water.

Method

Take polluted water (e.g. from some river), put it in 9 glass bottles.

Make three groups of these bottles and:

- a) Add Agnihotra Ash to the first lot of three bottles
- b) Add Control Ash to the second lot of three bottles, and
- c) Keep the remaining three bottles as total control, nothing added.

Measure COD of all samples at the beginning / after one day / after three days / after five days.

8.3.3 Degradation of genotoxic chemicals

An experiment at Fergusson College, Pune, showed that Agnihotra Ash showed activating effect on cell division and also neutralises toxic effect of Colchicine and Methyl Parathion (which normally prevent cell division). (See *Fergusson College 2013*)

Yet we do not know yet whether Agnihotra Ash just neutralised the genotoxic effect of Colchicine and Methyl Parathion - or whether Agnihotra Ash actually helped to degrade these herbicides. This should be tested.

Hypothesis

Agnihotra Ash helps to degrade Colchicine and Methyl Parathion in water.

Method

Put Colchicine into water in a concentration high enough to prevent cell division.

Divide into three glass jars and

- a) Add Agnihotra Ash to the first jar
- b) Add Control Ash to the second jar, and
- c) Keep the third jar as total control.

Measure the quantity of Colchicine in the three jars after one day / three days / seven days and compare.

Repeat the same experiment with Methyl Parathion instead of Colchicine.

8.3.4 Residues of pesticides etc. in drinking water

Due to widespread use of herbicides like Endosulfan, DDT, and Glyphosate (the main ingredient in Monsanto's Roundup) in certain areas of India like Kerala residues of these highly toxic chemicals can be found in drinking water.

Can Agnihotra Ash help to purify our drinking water in regard to these substances?

Hypothesis

If you add Agnihotra Ash to drinking water which contains Endosulfan, this Endosulfan will be chemically degraded into non-toxic substances.

Method

Add Endosulfan to drinking water. The concentration should be as high as the highest value found in drinking water.

Divide into three glass jars and

- a) Add Agnihotra Ash to the first jar
- b) Add Control Ash to the second jar, and
- c) Keep the third jar as total control.

Measure the quantity of Endosulfan in the three jars after one day / three days / seven days and compare.

Repeat the same experiment with DDT and then with Glyphosate (Roundup) instead of Endosulfan.

8.3.5 Arsenic in water

Arsenic (As) is a trace element essential for life. In higher concentrations and in certain chemical combinations - mainly arsenite (AsO_3) and arsenate (AsO_4) - though it is toxic. In certain areas in India (like in parts of U.P.) toxic concentrations of arsenic can be found in drinking water. This has a big impact on the health of humans and animals there.

Hypothesis

Agnihotra Ash helps to degrade arsenite and arsenate in drinking water into less toxic forms.

Method

Take drinking water contaminated with arsenic in form of arsenite (AsO_3) and arsenate (AsO_4). Divide into three glass jars and

- a) Add Agnihotra Ash to the first jar
- b) Add Control Ash to the second jar, and
- c) Keep the third jar as total control.

Measure the quantity of arsenite und arsenate in the three jars after one day / three days / seven days and compare.

8.3.6 Fluoride in water

In several areas drinking water is polluted by fluoride. Can Agnihotra Ash help to neutralize the negative effects?

Hypothesis

Agnihotra Ash helps to degrade fluoride in drinking water into less toxic forms.

Method

Take drinking water contaminated with fluoride. Divide into three glass jars and

- a) Add Agnihotra Ash to the first jar
- b) Add Control Ash to the second jar, and
- c) Keep the third jar as total control.

Measure the quantity of fluoride in the three jars after one day / three days / seven days and compare.

8.4 Soil

8.4.1 Soil - water soluble phosphorus

Water solubility of phosphorus in soil is increased when you mix it with Agnihotra Ash. (Control Ash does not have this effect.)

Experiment was done in U.S. and in Germany and should be replicated.

The experiment is described in 6.3.1.8.2.

8.4.2 Degrading poisonous substances in soil

8.4.2.1 Soil - residues of pesticides etc.

Residues of pesticides, herbicides, and poisonous fertilizers in soil are dangerous as they partly will be absorbed by plants, partly they will go to the subsoil water. Very dangerous are Endosulfan, DDT and Glyphosate. Can Agnihotra Ash help to neutralize or degrade these poisonous substances in soil?

Hypothesis

Agnihotra Ash helps to neutralize or degrade poisonous substances like Endosulfan, DDT and Glyphosate in soil.

Method

Take soil which is polluted with Endosulfan / DDT / Glyphosate and keep it in clay pots, say six pots with each of the herbicide resp. pesticide. Measure the level of the herbicide resp. pesticide.

Make two groups of three pots with each of the herbicide resp. pesticide.

First group: Mix Agnihotra Ash into the soil.

Second group: Mix Control Ash into the soil.

Keep the soil moist and measure the level of the herbicide resp. pesticide again after one month / three months / half a year.

In case a place with Agnihotra Atmosphere is in the vicinity you could also put another group of pots with Agnihotra Ash in this Agnihotra Atmosphere.

8.4.2.2 The effect of Agnihotra Ash and Agnihotra Atmosphere on Dioxins

Dioxins are very dangerous chemicals. In some areas they are in the soil or in water resources like in Italy near Seveso after an explosion in some chemical factory, and mainly in large areas of Vietnam where during the war the so-called Agent Orange was sprayed from airplanes to defoliate the jungles. The most toxic ingredients of Agent Orange are dioxins. Can Agnihotra help to remove this terrible environmental pollution?

Hypothesis

Agnihotra Atmosphere and/or Agnihotra Ash help to break down dioxins which are in soil and water into less toxic chemicals.

Method

Experiment 1

Take soil and mix it with dioxins. Measure the level of the dioxins. Fill six clay pots with this soil, three for experiment and three for control.

Add Agnihotra Ash to the first group and mix. Keep these pots in Agnihotra Atmosphere.

Add Control Ash to the second group and mix. Keep these pots away from Agnihotra Atmosphere (at least three kilometres).

Keep the soil moist and measure the level of the dioxins again after one month / three months / half a year.

Experiment 2

Take water and mix it with dioxins. Measure the level of the dioxins. Fill six glass jars with this water, three for experiment and three for control.

Add Agnihotra Ash to the first group and mix. Keep these jars in Agnihotra Atmosphere.

Add Control Ash to the second group and mix. Keep these jars away from Agnihotra Atmosphere (at least three kilometres).

Measure the level of the dioxin again after one month / three months / half a year.

Of course proper care has to be taken during this experiment as dioxins are very dangerous poisonous substances.

8.4.2.3 Methyl Isocyanate (MIC)

The biggest industrial catastrophe in terms of persons killed was the explosion at the Union Carbide Factory in Bhopal. Methyl Isocyanate (MIC) gas leaked after the explosion from Union Carbide Factory in Bhopal causing great havoc.

But although thousands of people died because of that and many more got all kinds of diseases, no family member of those performing Agnihotra in the area died or even got sick. This was quite astonishing and was reported in national newspapers.

Now, decades later, there are still high concentrations of MIC both in soil and groundwater. Could Agnihotra help to degrade Methyl Isocyanate?

Hypothesis

Agnihotra Atmosphere and Agnihotra Ash help to degrade Methyl Isocyanate.

Method

Experiment 1: Soil

Take soil and mix it with Methyl Isocyanate (MIC) or get such soil from nearby the Union Carbide Factory in Bhopal. Measure the level of MIC. Fill six clay pots with this soil, three for experiment and three for control.

Add Agnihotra Ash to the first group and mix. Keep these pots in Agnihotra Atmosphere.

Add Control Ash to the second group and mix. Keep these pots away from Agnihotra Atmosphere (at least three kilometres).

Keep the soil moist and measure the level of the MIC again after one month / three months / half a year.

Experiment 2: Water

Take water and mix it with Methyl Isocyanate (MIC) or get such water from polluted wells nearby the Union Carbide Factory in Bhopal. Measure the level of MIC. Fill six glass jars with this water, three for experiment and three for control.

Add Agnihotra Ash to the first group and mix. Keep these jars in Agnihotra Atmosphere.

Add Control Ash to the second group and mix. Keep these jars away from Agnihotra Atmosphere (at least three kilometres).

Measure the level of the MIC again after one month / three months / half a year.

Of course proper care has to be taken during this experiment as Methyl Isocyanate is a very dangerous poisonous substance.

8.5 Food

8.5.1 Nutrient content

8.5.1.1 Nutritional value of edible plants

“Nutritional value of edible plants decreases” (*Paranjpe 1989* p. 55). According to ancient Vedic Knowledge this development can be reversed when plants are grown in Agnihotra Atmosphere. Interesting to test this statement.

Hypothesis

The nutritional value of edible plants is higher when you plant in Agnihotra Atmosphere.

Method

Select two plots of different size, with same soil and climatic conditions – best close by but still at least three kilometres away from each other.

- a) On one plot perform Agnihotra regularly morning and evening
- b) On the second plot perform the Control Fire (see 2.5).

Take seeds of different vegetables and plant them on these two plots. Treatment of plants are same, only when watering the plants add Agnihotra Ash in case a) and Control Ash in case b).

After harvesting examine the vegetables for the content of those elements which are relevant for the nutritional value of our food. (An expert in nutrition physiology can be consulted about the most important factors.)

Compare.

8.5.2 The Effect of Agnihotra Ash on Pesticides in our Food.

A recent study done by the Food Safety and Standards Authority (under Union Agriculture Ministry, India) found out that vegetables and fruits contain up to one thousand times more of pesticides than the permissible limits (see report in Times of India, Nov. 8, 2013). This leads to number of health issues. – Can soaking in Agnihotra Ash Water help? If so that would be a great help for the whole country; therefore this experiment can have a great impact.

Hypothesis

Soaking vegetables and fruits in Agnihotra Ash Water helps to neutralize the residues of pesticides and herbicides.

Method

Experiment 1

Take different kinds of fruits and vegetables and measure the level of residues of pesticides and herbicides.

Soak these fruits and vegetables:

- a) In water with Agnihotra Ash
- b) In water with Control Ash
- c) In water, nothing added.

Measure the level of pesticides/herbicides levels again after 12 / 24 / 48 hours.

If there is a clear change we then also know what will be the minimum time we have to keep our food in Agnihotra Ash water.

Experiment 2

Some fruits (like strawberries) cannot remain in water for a long time.

Instead of soaking in Agnihotra Ash water just rub with Agnihotra Ash. Wait for 3 hours and measure again.

Control: Rub with Control Ash.

Measure the level of pesticides/herbicides levels before and after.

8.5.3 The effect of Agnihotra Ash on Growth Hormones in our Food

Growth hormones like oxytocin are often used to grow bitter melon and other vegetables.

Residues of these hormones in our food may pose some health problems.

Hypothesis

Soaking vegetables treated with growth hormones in Agnihotra Ash water helps to degrade these hormones.

Method

Take different kinds of vegetables treated with growth hormones and measure the level of those. Measure the level of growth hormones.

Soak these vegetables:

- a) In water with Agnihotra Ash
- b) In water with Control Ash
- c) In water, nothing added.

Measure the level of growth hormones again after 12 / 24 / 48 hours.

If there is a clear change we then also know what will be the minimum time we have to keep our food in Agnihotra Ash water.

9 Physics

9.1 Introduction

In the chapters before a lot of experiments have been listed by which we can examine whether there is an effect of Agnihotra on the environment, on plants, animals and humans. Some of these experiments have already been successfully completed which show definitely some effect of Agnihotra and of Agnihotra Ash.

Still, the question remains how these effects come about.

This situation gets even more puzzling when we look at the experiments in which Agnihotra Ash is compared with Control Ash:

Number of experiments show that Agnihotra Ash has certain effects (like reducing pathogenic bacteria in air, soil, and water or speeding up the growth of seeds) whereas the Control Ash does not have these effects - although the chemical analysis of both most likely are same. (For details see beginning of the chapter on Chemistry.)

How then can we explain the differences between Agnihotra and a normal fire burning the same substances, and of Agnihotra Ash and Control Ash?

First step to come to a better understanding is to see how Agnihotra changes properties of water, for example. These changes could then explain why bacteria are affected in that water.

Also, if we can see a difference in Agnihotra Ash and Control Ash if analyzed by methods of modern physics, this could help to understand why Agnihotra Ash brings about beneficial changes which Control Ash fails to do.

And then, if we for example find a change in magnetic properties of water in Agnihotra Atmosphere, we will then have to go back to biology and see whether these changed properties of water help to understand the mechanisms which are responsible for control of pathogenic bacteria.

Second step will be to find out how the disciplines of Agnihotra - specific ingredients, a pyramid shaped vessel of certain size, exact timings and certain mantras - lead to the changes in properties of water, of soil, etc. etc.

It is all about sound, vibration, resonance, the specific size and shape of the copper pyramid, and the exact timing of sunrise and sunset. First we have to understand the impact and the relevance of all these factors - and then try to understand how all these factors work together.

Most probably Aristotle's statement applies here: „The whole is greater than the sum of its parts.“

Still, let us start with studying the parts, and then see how much this helps to understand the whole. A long way to go but at least some beginning steps already have been taken.

9.2 Effect of Agnihotra on physically measurable properties of air, water, and soil

9.2.1 Effects on air

9.2.1.1 Harmful particles in air

We have seen that Agnihotra purifies the air from biological pollution (pathogenic bacteria are removed in Agnihotra Atmosphere, see Chapter 3.3). Regarding chemical pollution, some preliminary tests show the reduction of SO_x and more experiments are suggested (see Chapter 8.2.2). What about the physical pollution of the air in terms of particles? As far as we know this has not been scientifically tested. But one scientist from U.S. gave a possible explanation:

„Pat Flanagan suggested a physical explanation for the depolluting effect of the Agnihotra smoke, pointing out that its colloidal molecules of ghee and cow manure could chelatingly attract and grab pollutants in the air, the way water is purified by being flocculated. The seized molecules, he added, as they settle on the ground would alkalize the soil; and if they came into contact with a plant they would stick to the leaves and act as a time-release foliar nutrient. Physically, because of the ghee and the manure, the smoke would be electrically charged.“ (Quote from *Tompkins/Bird 1989*, p. 254)

Still, before testing this explanation, we should first see whether we actually can confirm that harmful particles in the air including nanoparticles are reduced when you perform Agnihotra.

Hypothesis

Performance of Agnihotra reduces the quantity of harmful particles including nanoparticles in the air.

Method

Prepare a room with all kinds of particles (like from the exhaust pipe of diesel engines).

Measure the number and distribution of sizes.

Perform Agnihotra in this room.

Measure particles again after 1 hour / 3 hours / 12 hours.

As particles may also settle naturally for comparison it is good to do similar measurements after inducing the same kind of particles into a second room with a Control Fire and a third room without any fire. A distance of min. three kilometres should be kept between Agnihotra and control.

An air sampler can be used for particles which are large enough to be collected by the filter paper of the air sampler.

For nanoparticles special equipment is needed.

Advanced

Prof. Kulkarni, Physics Department of Fergusson College, Pune hypothesizes that there could be a change of the size of particle in the air of a room if you perform Agnihotra there. This possibility should be examined.

Hypothesis

The size of airborne particles in a room will change if you perform Agnihotra in that room.

Method

Measure particle size in the air before and after Agnihotra.

9.2.1.2 Negative ions in the air

Negative ions are an indicator of fresh air.

An experiment done in Germany showed that the percentage of negative ions in the air increases through Agnihotra. This experiment should be repeated.

Hypothesis

Performing Agnihotra increases the amount of negative ions in the air.

Method

Measure the concentration of negative ions in the air before Agnihotra and then immediately / one hour / three hours / twelve hours after Agnihotra.

Advanced

In case this experiment confirms the result received in Germany earlier, a second experiment is suggested to compare Agnihotra Fire with Control Fire:

Hypothesis

The increase of negative ions in the air does not happen in the same way if you perform a Control Fire instead of proper Agnihotra.

Method

Conduct the experiment like described above but instead of Agnihotra you do a Control Fire (a fire of same ingredients, also a copper vessel, but not our Agnihotra pyramid, and no mantra, no sunrise/sunset time).

In case there is no difference in the effect of Agnihotra and the Control Fire on the concentration of negative ions, this would mean that negative ions could not explain the positive impact of Agnihotra on our environment.

But in case there is a difference as the hypothesis suggests, we would need an explanation of that difference: What then happens in an Agnihotra flame different from a normal flame?

Are there some plasma properties in the Agnihotra flame which help to understand the difference?

9.2.1.3 Electrosmog

On a Homa Farm in Australia measurements with a Trifield EMF Meter showed an astonishing result: A power line crosses the land and is very close to the Agnihotra hut. Outside the property the reading shows quite high EMF. On the land of the Homa Farm, at a distance of 50 m from the Agnihotra hut, the EMF Meter shows low level EMF and next to the Agnihotra hut the reading is zero although right there the transformer is installed.



Fig.1 Outside of Om Shree Dham property on the public road under power lines the meter registers quite high EMF. On low sensitivity setting.



Fig.3 The meter registering zero EMF . Taken next to the Power transformer. Colours have been contrasted to show up dial.

Hypothesis

Regular performance of Agnihotra is able to reduce „electrosmog“ (magnetic / electric / electromagnetic fields).

(This hypothesis is not very clear as the preliminary findings do not state clearly what exactly was measured, electromagnetic field, electrostatic field, or magnetic field? And in case of electromagnetic field - then which range of frequencies did this instrument measure? Some initial measurements have to be made to formulate the final hypothesis.)

Method 1

Find some power line where you have an Agnihotra hut close by.

Measure the magnetic / electric / electromagnetic fields in different places along this power line outside the Homa place. Then do the same measurements next to the Agnihotra hut and then 50 m away / 100 m away. See whether there is a significant difference.

Method 2

Take some equipment with high "electrosmog" like a microwave oven, a mobile phone or an adapter.

Measure the magnetic / electric / electromagnetic field next to this equipment. Then bring the equipment into a room where Agnihotra is being performed for at least three months.

Repeat the measurements and see whether there is a difference.

Advanced 1

In case the results from Australia can be confirmed, the challenge will be to explain how this effect comes about.

But before putting up speculations about that topic better to wait till we have the results of the suggested measurements above.

Still interesting to see these findings (again: provided the Australian results can be replicated) in the context of the change in magnetic permeability of water (see section 9.2.2.1).

Advanced 2

In case the Australian results cannot be replicated, still the question is - can Agnihotra Atmosphere reduce or neutralize the harmful effects of electromagnetic radiations?

This experiment would have to be planned with some experts in the field of negative impacts of such radiation on humans, animals, plants. If possible experiments with plants would be preferred as it is easier to establish controlled conditions.

9.2.2 Effects on Water

Agnihotra and Agnihotra Ash change some properties of water in terms of physics also (not only in terms of microbiology or chemistry): If you for example add Agnihotra Ash to water and then make photos of the crystal formation according to the Emoto method (see: <http://www.masaru-emoto.net/english/how-photographs-are-taken.html>), you can see very nice water crystals whereas the plain water shows irregular structures. A collection of such photos where Agnihotra Ash from different places of the world has been used can be found in *Emoto/Paranjpe/Aranda 2012*. It seems very intuitive that the water quality has improved but in terms of modern physics this result is not significant.

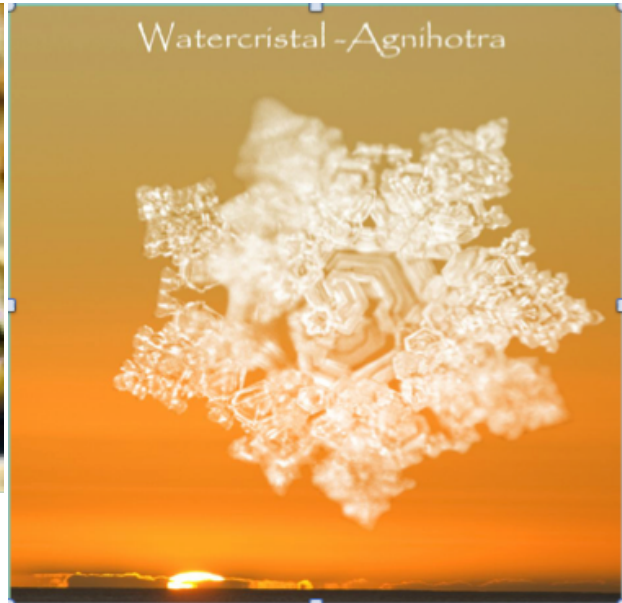


Abbildung 1 Water crystal Tokyo tap water

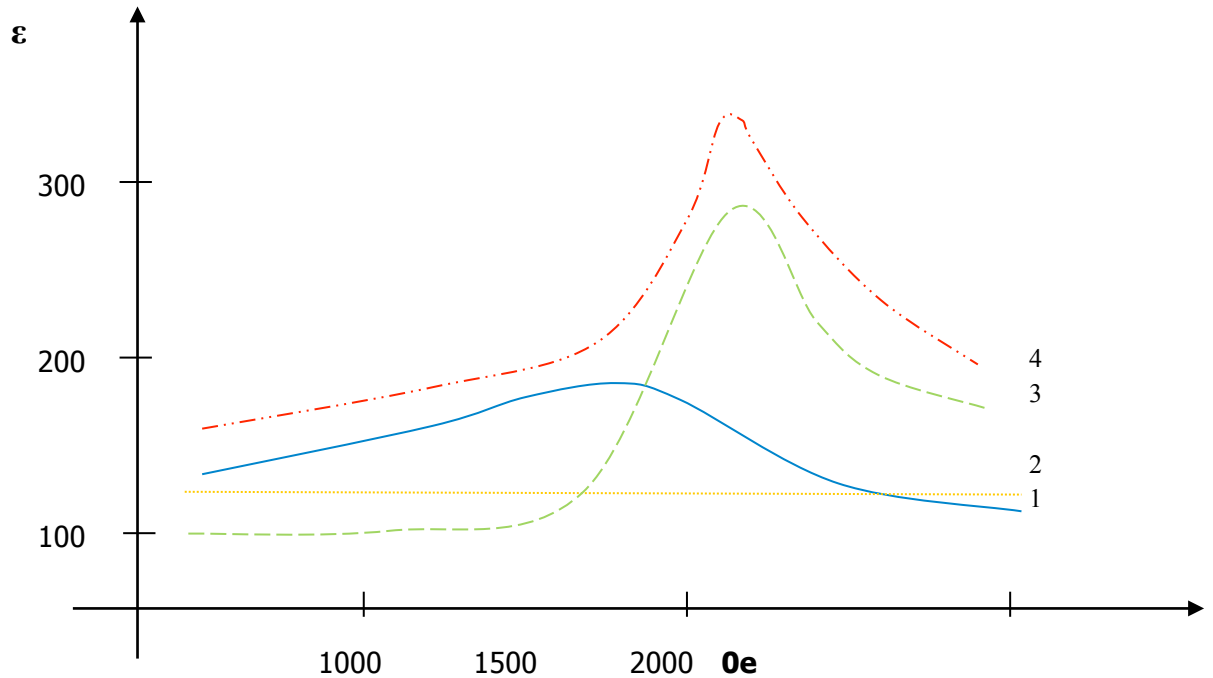
Still, these photos show that there must be some change in water quality and we have still to find out on which properties of water these are based.

But we have some measurements which show clear results of how water properties are being changed in terms of physics if you keep this water in Agnihotra Atmosphere or if you add Agnihotra Ash to it. Following some experiments which show such change of physical properties of water.

9.2.2.1 Magnetic permeability of water kept in Agnihotra Atmosphere

Change of dielectric permeability of water in magnetic fields

This experiment was done long time ago in Eastern Europe.



Changes in the dielectric permittivity of water under the influence of magnetic fields

- 1) Water not affected by Agnihotra
- 2) Average
- 3) Tap water in Agnihotra Atmosphere
- 4) Distilled water in Agnihotra Atmosphere

$d = 1 \text{ m}$

You see a clear difference in the dielectric permeability of water in magnetic fields if Agnihotra is performed in the room.

Note: No Agnihotra Ash was added so that chemical influences were excluded.

Good to repeat this experiment

As electric and magnetic properties of water are relevant for many physiological processes in cells of plants, a positive result of the experiment will lead to interesting interdisciplinary studies.

9.2.2.2 *Magnetic permeability of water treated with Agnihotra Ash*

The experiment 9.2.2.1 can be repeated – but with adding Agnihotra Ash to the water instead of performing Agnihotra in the room.

Hypothesis

The dielectric permeability of water in magnetic fields changes if you add Agnihotra Ash to the water.

Method

Keep water in a large glass aquarium, create a magnetic field with known characteristics on one side and measure the strength of the magnetic field on the other side. Calculate the magnetic permeability.

Then add Agnihotra Ash to the water and do the measurement again. Compare the values of magnetic permeability before and after – and also compare with the result of 9.2.2.1.

Further studies

Combine 9.2.2.1 and 9.2.2.2 – means Agnihotra is performed in this room and also Agnihotra Ash added to the water. See if the effect is more than if you only use one of the treatments.

One further control would be to repeat the experiment with Control Ash.

9.2.2.3 Light absorption of water kept in Agnihotra Atmosphere

Also this study was done long time ago in Eastern Europe.

Method

Take a glass basin filled with water.

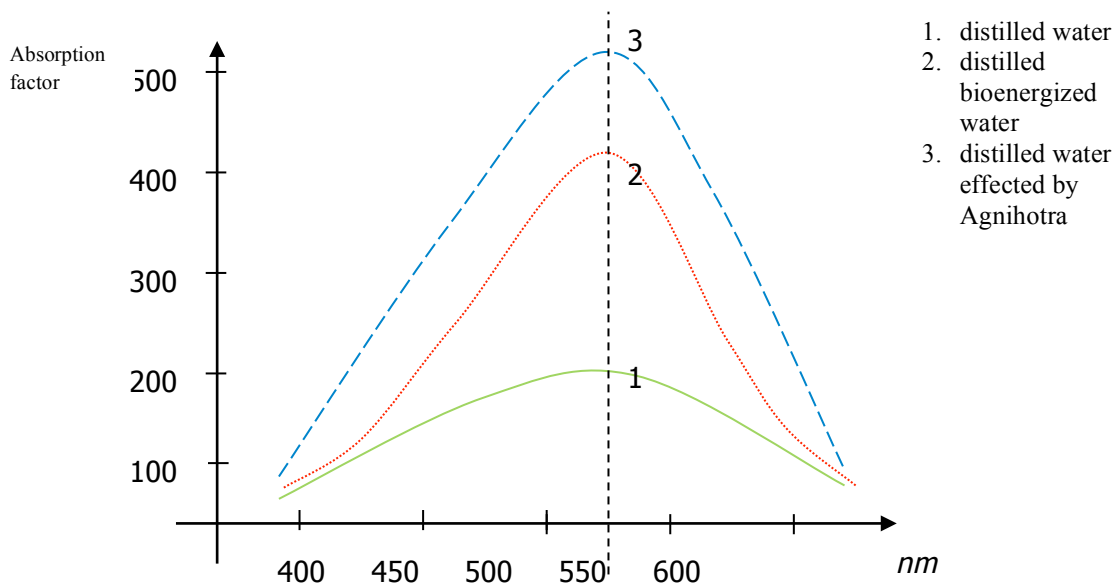
Put some light source at one end of the basin.

At the other end the light intensity is measured.

First, distilled water was used as control.

Second: Same water but some Prana healing was done to the water.

Third: Agnihotra was performed in the room.



There is a big difference between control and water in Agnihotra Atmosphere.

Good if this experiment can be repeated.

9.2.2.4 Light absorption of water treated with Agnihotra Ash

The experiment 9.2.2.3 can be repeated – but with adding Agnihotra Ash to the water instead of performing Agnihotra in the room.

Hypothesis

The light absorption of water changes if you add Agnihotra Ash to the water.

Method

Keep water in a large glass aquarium, install a light source with known characteristics on one side and measure the strength of the light in the different frequencies on the other side. Calculate the absorption.

Then add Agnihotra Ash to the water and do the measurement again. Compare the values of absorption before and after – and also compare with the result of 9.2.2.3.

Further studies

Combine 9.2.2.3 and 9.2.2.4 – means Agnihotra is performed in this room and also Agnihotra Ash added to the water. See if the effect is more than if you only use one of the treatments.

One further control would be to repeat the experiment with Control Ash.

9.2.2.5 Cluster formation of water kept in Agnihotra Atmosphere

Although water is H₂O if analysed in terms of chemistry – still we can see differences like the Emoto crystals. Some people claim that water has some kind of „memory“ and can store e.g. positive emotions like gratefulness or love. (Emoto has shown that actually the crystal formation changes when we put our concentration on the water.) – Can we see these differences in terms of physics? Already we have seen a change in physical properties like magnetic permeability or light absorption. Cluster formation may be one area in which the so-called „memory“ of water can be found.

Hypothesis

If you keep water in Agnihotra Atmosphere, the cluster pattern will change.

(This hypothesis is rather imprecise – we do not know yet what is happening, but it seems an interesting topic to see whether some changes are happening.)

Method

Take normal tap water and examine the cluster structure (with appropriate spectroscopic techniques like Nuclear Magnetic Resonance, NMR).

Keep the water in Agnihotra Atmosphere for at least 24 hours and examine again.

Conclusion

If a difference can be detected, the original hypothesis can be formulated more precisely and more tests can be done to see whether there is a replicable change in the cluster formation, also

by using different types of water at the beginning.

9.2.2.6 Cluster formation of water with added Agnihotra Ash

Hypothesis

If you add Agnihotra Ash to water, the cluster pattern will change.
(This hypothesis is rather imprecise – see 9.2.2.5)

Method

Take normal tap water and examine the cluster structure (with appropriate spectroscopic techniques like Nuclear Magnetic Resonance, NMR).

Add Agnihotra Ash to this water and wait at least 24 hours; examine again.

Conclusion

If a difference can be detected, the original hypothesis can be formulated more precisely and more tests can be done to see whether there is a replicable change in the cluster formation, also by using different types of water at the beginning.

9.2.3 Advanced: Water kept in Agnihotra Atmosphere in a Faraday Cage

In Chapter 10 an experiment is described regarding the effect of Agnihotra Atmosphere on water parameters like COD, DO, pH, total hardness, and count of coliform bacteria. Measuring these parameters is part of chemistry respectively microbiology, not directly interesting for physics.

But one observation does have relevance for physics: The same measurements were also done after the water samples were kept in closed bottles inside a Faraday Cage – and the improvement of water quality happened in the same way. This will be discussed more in detail in Chapter 10.2.

Here we want to discuss one question – if the chemical and microbiological parameters of water improve in Agnihotra Atmosphere even if the water samples are kept in a Faraday Cage – would the physical parameters discussed above also change if the water is kept in a Faraday Cage?

Hypothesis

Water parameters like magnetic permeability, light absorption and cluster formation change if this water is kept in a Faraday Cage in Agnihotra Atmosphere.

Method

Repeat the experiments 9.2.2.1, 9.2.2.3, and 9.2.2.5 but build a Faraday Cage around the water container (e.g.: Cover the glass with metal sheets from all sides and make sure all joints are done perfectly).

The initial measurement you do before you start with Agnihotra and before you build the metal cage.

The second measurement you do after five days of Agnihotra in that room. Of course you have to remove the metal cage for that measurement. Move the water container out of the room with

Agnihotra Atmosphere before removing the metal cage in order to prevent full effect of the Agnihotra Atmosphere (including electromagnetic field).

Conclusion

The experiment mentioned (and discussed in detail in chapter 10.2) showed that chemical and microbiological parameters changed whether or not the water samples were kept in a Faraday Cage.

If we get a similar result also for some physical properties of water, this would be an even stronger indication for some energy field of hitherto unknown kind around Agnihotra.

9.2.4 Effects on Soil

Parameters like porosity and water-holding capacity are discussed in the chapter on Agriculture above (Chapter 6.3.1.10). The experiments suggested there could be repeated of course.

Here I want to mention one additional aspect – the magnetic and paramagnetic properties of soil. Not much research has been done in this area in general, and what has been done - especially by Dr. Philip Callahan – is not yet widely known and recognized. Still an interesting subject for further studies!

According to Callahan, paramagnetism of soils is a low level energy which can exert a tremendous impact upon plants and soil micro-organisms. Productive volcanic soils are invariably highly paramagnetic. This phenomenon is characterised by the capacity of these soils to intercept electromagnetic energy (usually derived from lightning) and to store, transform and transmit this energy to surrounding plants and micro-organisms. (For more information, see e.g. *Callahan 1995.*)

As this is a new subject I do not want to formulate hypotheses – but just want to suggest that at some point scientists look into this matter as it possibly helps to understand some secrets of plants' growth and also the impact of Agnihotra on plants.

9.3 Physically measurable properties of Agnihotra Ash

Microbiological and biological experiments have clearly shown that there is a difference between Agnihotra Ash and Control Ash e.g. regarding the effect on bacteria or on growth of plants.

If these two types of ash have different effects - then there must be a difference in their properties which will explain these different effects.

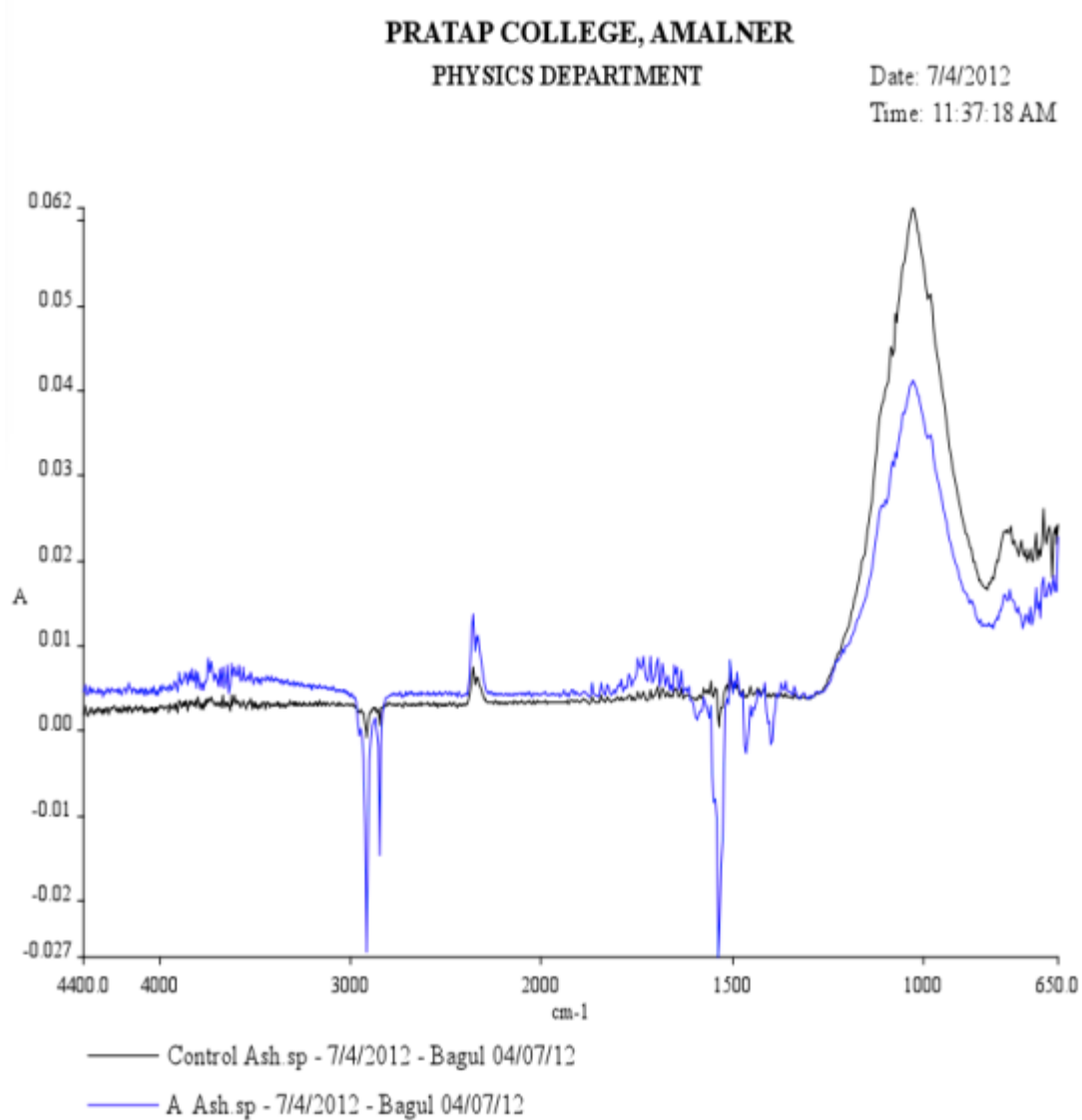
The hypothesis (not yet confirmed though) mentioned above in the chapter on chemistry was that there is no difference in the chemical analysis of Agnihotra Ash and Control Ash. Can we find different properties in Agnihotra Ash and Control Ash in terms of physics?

Recently several institutes analyzed the Agnihotra Ash as compared to Control Ash with methods of modern physics like X-ray diffraction and infrared absorption analysis. Clear differences between the two types of ashes were found.

Next step will be to repeat these tests and then interpret the results. Following experiments are suggested:

9.3.1 Infrared absorption

Dr. Patil, Principal of Pratap College in Amalner/Maharashtra, India, compared infrared absorption of Agnihotra Ash and Control Ash:

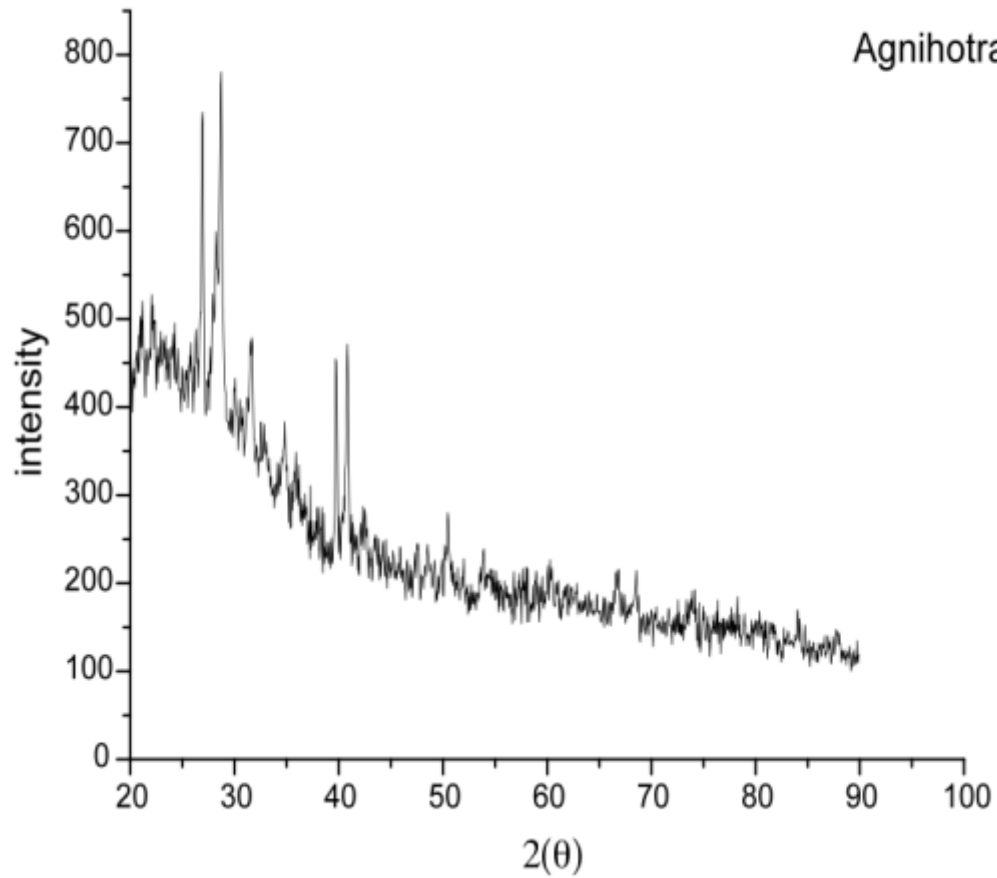


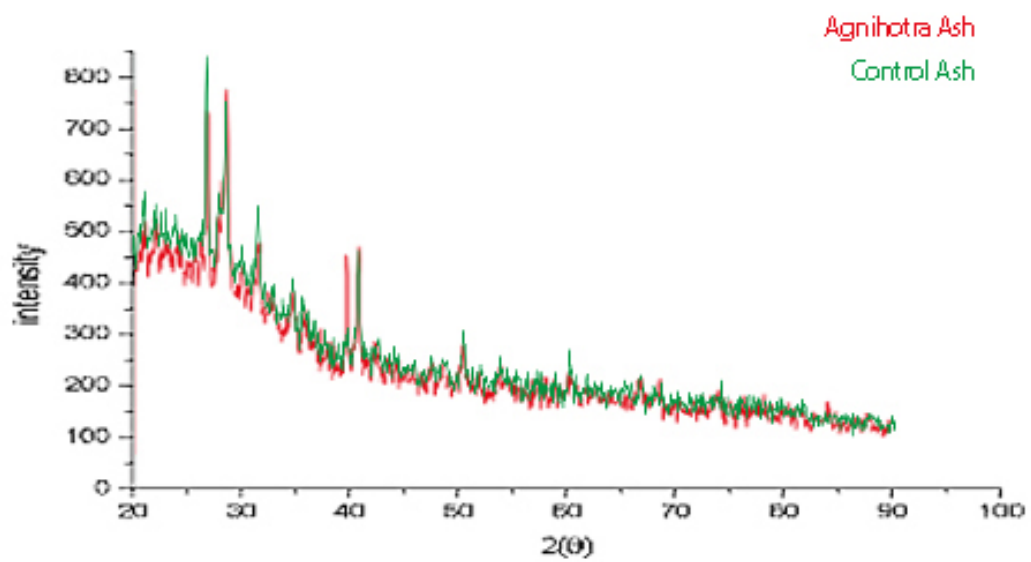
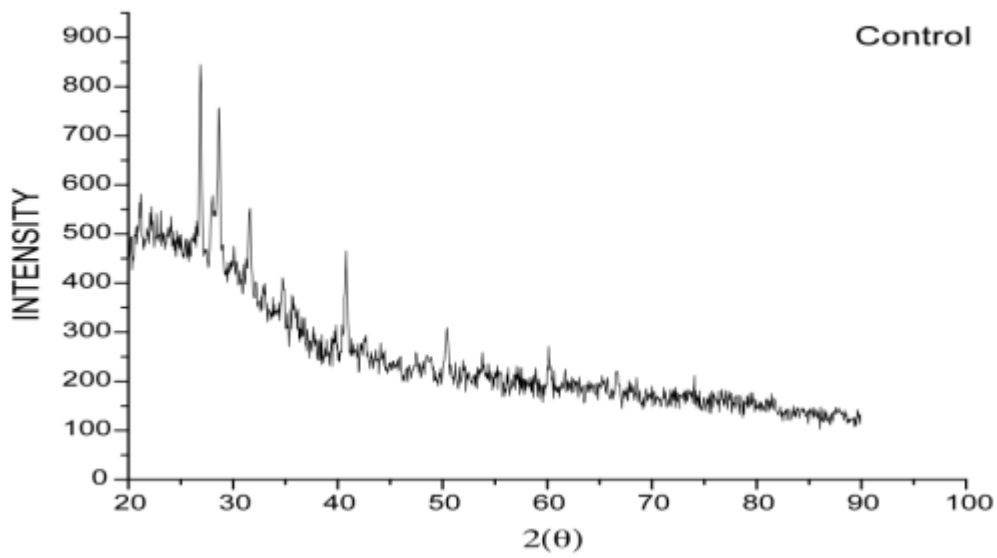
The comparison shows a clear difference - some peaks have a different height and there are some additional peaks in the Agnihotra Ash graph.

This experiment should be repeated, and then an interpretation of the result is needed.

9.3.2 X-ray diffraction

An X-ray diffraction measurement was done with Agnihotra Ash and Control Ash at IIT Madras in Chennai. See the result:

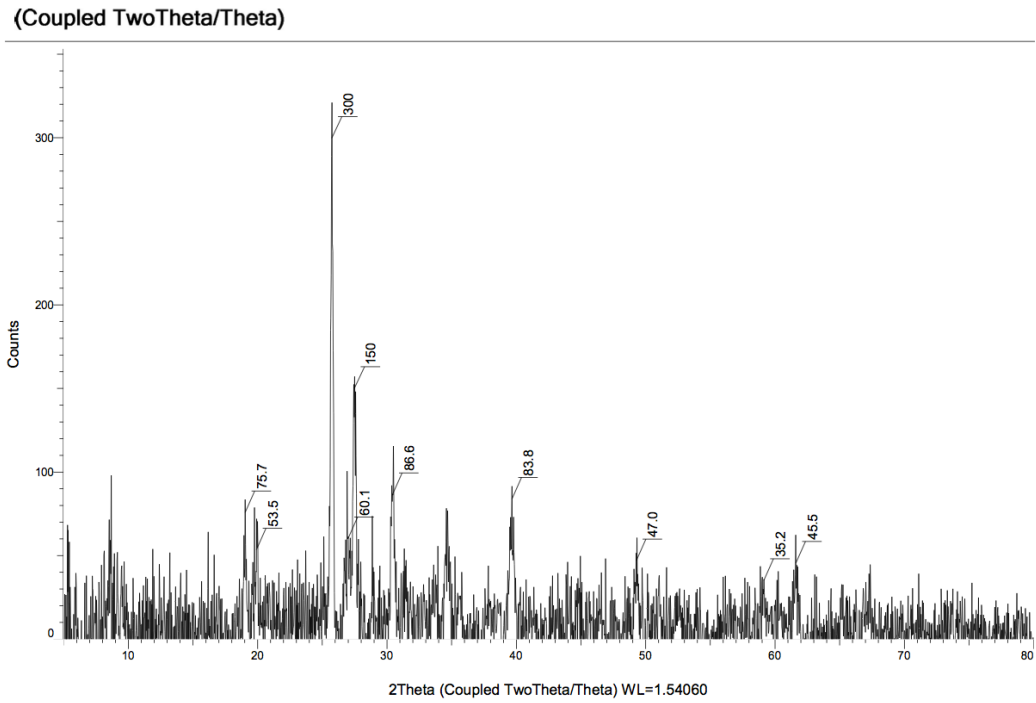




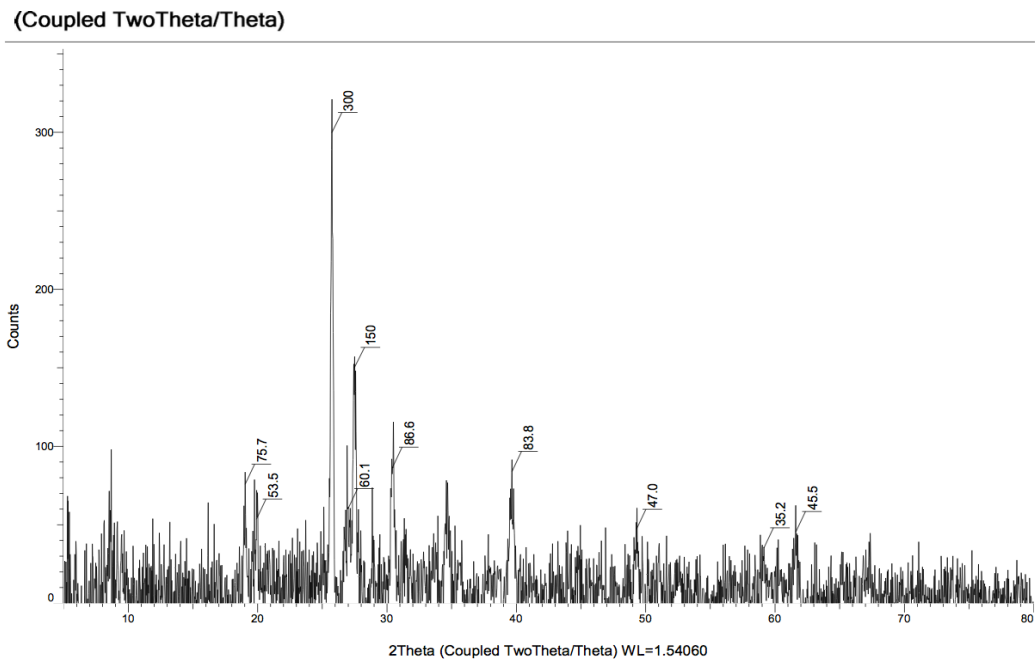
The comparison shows some clear differences.

Recently similar studies were done at North Maharashtra University in Jalgoan, M.H., India. Again clear differences can be seen:

Agnihotra Ash D VALUE



Control Ash D VALUE



This experiment should be repeated, and then an interpretation of the results is needed.

9.3.3 Particle size - surface area

Hypothesis

One hypothesis for (at least some of) the effects of Agnihotra Ash is that its particles are smaller than those of Control Ash, thus having a larger active surface.

Method

With Scanning Electron Microscopy (SEM) you determine particle size of both Agnihotra Ash and Control Ash and compare.

Conclusion and further studies

Suppose the initial results of differences between Agnihotra Ash and Control Ash will be confirmed by further studies.

Next step will be to interpret these results.

In case of particle size one thing seems clear: Smaller particle size means larger surface area. If Agnihotra Ash has a smaller particle size compared to Control Ash, this means that there is a larger surface area in Agnihotra Ash where reactions with the environment (liquids like water, solids like soil, gases like the air) can happen.

In case of X-ray diffraction the question is: The different peaks which we see when comparing Agnihotra Ash with Control Ash - what are the elements corresponding to these peaks? Which relevance do these results have for biological systems?

The comparison of infrared absorption shows that the absorption of infrared light shows some clear peaks with Agnihotra Ash where there are none with Control Ash. Do these peaks have a specific importance in biological processes?

Thus the discussion of these experiments will lead to more studies in the field of plant or human physiology.

Interesting also that Dr. Abhay Shendye from Pune examined the infrared radiation from Agnihotra and suggests that this can help to understand number of effects of Agnihotra on plants, for example (see: *Shendye 2009*)

9.4 Magnetic field around plants

Electromagnetic field within and around plants are rather subtle. In order to examine the effect of Agnihotra on such fields it seems natural to start with bigger plants, therefore experiments with trees were suggested by some physicists from Eastern Europe. According to traditional Vedic Knowledge Banyan trees are especially suitable for such experiments, so best to start with Banyan trees and later expanding the experiments to other plants also. A very good overview on the effects of magnetisms on plants is given in the book „Magnetobiology and Biomagnetism“ by Dr. P.V. Sanker Narayan, Madras Institute of Magnetobiology (*Sanker Narayan 2009*).

Hypothesis

Agnihotra strengthens the electromagnetic field around Banyan trees.

Method

Select a tree which stands alone:

Other trees should be at least 30 metres away. No electricity, electric instruments, water etc. should be there within a radius of 500 metres. No buildings. No compass, no iron.

Several experiments are suggested.

Before you start you examine

- a) Physical properties (magnetic field, static field, resistivity of the soil); these have to be checked at different distances up to 200m.
- b) Botanical properties: Is the tree sick or healthy? Analysis of cells (in leaves and fruits), etc.

Then you do the experiments:

1st experiment:

Agnihotra is done (following exactly all the disciplines) only *one time*. The position is such that the tree, the Agnihotra pyramid and the sun form one line. (In the morning you would perform Agnihotra exactly East of the tree, in the evening exactly West of the tree.)

Then you immediately begin to check again all the properties described above. You repeat this checking after some hours, after one day, after two days, etc. Till the fifth day, always comparing the results with these obtained before Agnihotra was done.

2nd experiment:

Like first experiment, but you perform Agnihotra at sunrise sunset for five days, do the same checking as above and compare the results with those obtained before Agnihotra was done.

3rd experiment:

Like first experiment, but you continue performing Agnihotra for one month (both at sunrise and sunset), do the same checking and comparing.

4th experiment:

You select a sick tree, repeat the experiments 1 to 3 and see if some change in the botanical properties of the tree occurs. This tree should be at least 5 km distance from the first one.

For checking the physical properties very subtle instruments for measuring electromagnetic and electrostatic fields are required.

9.5 Nuclear Physics and Quantum Theory

Radioactivity is one major aspect of manmade pollution of this planet, maybe even the most serious one. The latest disaster at the Fukushima nuclear plants in Japan has not only affected large parts of Japan itself, but now also substantial levels of radiation are being reported on the West Coast of U.S. and especially in California now. This news may be suppressed in mainstream media to keep people from panicking.

Our senses do not warn us if there is high radioactivity in the environment, which makes this kind of pollution even more dangerous. Unless you are exposed to extremely high doses there is not immediate effect – but there is no safe limit as ionizing radiation from different exposures accumulate in the body.

What can we do to protect ourselves from radioactivity? According to ancient knowledge:

“When Agnihotra is performed, the Agnihotra smoke gathers particles of harmful radiation in the atmosphere and on a very subtle level neutralises their radioactive effect. Nothing is destroyed, merely changed.” (Paranjpe 1989, p. 21)

There are some reports showing that Agnihotra and Agnihotra Ash have helped to neutralize the effect of radioactivity. First was after the Chernobyl accident in former Soviet Union in 1986. Large areas of Europe were contaminated and farmers were not allowed to sell any products unless government officials had tested and certified that radiation levels were below the accepted limits.

These tests showed no increased radioactivity in milk and vegetables on one single farm in one part of Austria – all other farms around showed rather high levels and these products could not be sold. This one exceptional farm was one where Agnihotra and some additional Vedic Homas were performed regularly and Agnihotra Ash given to the soil and to the cows. Alas, the owner of that farm did not realize how important that result, so no experiments were made at that time to get more data.

One lady in Germany had developed thyroid cancer after Chernobyl and the doctors gave a poor prognosis, just a few more months to live with chemotherapy. This lady decided instead of suffering and dying in the hospital to go home and die in peace there. She fasted and only drank Agnihotra Ash Water. After a couple of weeks she went to the hospital again for a check-up – and the cancer had gone.

One interesting experiment was done in India long time back: Agnihotra was performed by a group of people. The ingredients for Agnihotra were radioactive – but the resulting Agnihotra Ash was not.

Good if this experiment could be repeated.

Another experiment was done two years back in the Physics Institute of Academy of Science, Kiev (former Soviet Union, now Ukraine). The scientists had received radioactive rice from the Fukushima region for some tests. They measured the level of radioactivity, then put the rice in Agnihotra Ash Water and measured again daily. After three days radioactivity began to go down, and after ten days only the background radioactivity was left.

We wanted to repeat this experiment at Pune University. Prof. Dr. Dhole offered his help. Alas the rice which we got from Japan was not radioactive enough, therefore a replication of the Kiev experiment is still pending.

Following experiments are suggested.

Experiment 1

Hypothesis

Agnihotra Ash neutralizes radioactivity in food.

Method

Take three pcs. of radioactive apples, determine the level of radioactivity (alpha, beta and gamma radiation).

Take three glass beakers (big enough that one apple can fit) and fill them with pure water.

Measure radioactivity of these three glass beakers with water. (It should be only background radiation – this measurement is just for reasons of precaution.)

Then add Agnihotra Ash to these three beakers. Stir properly and put one apple in each of the containers with Agnihotra Ash water. The apples should be fully covered by Agnihotra Ash water.

Wait for three days / one week / 14 days, then measure radioactivity again (of each of the three containers with water and apple).

Then you can also measure the radioactivity of the apples separately.

(There is the possibility that radioactive particles would go from the apples into the water so it could be that apples show lower radioactivity, the Agnihotra Ash water higher radioactivity. But according to our hypothesis this is unlikely to happen.)

In case there is still a higher than background level of radioactivity after one week continue with measuring until

- a) background level is reached, or
- b) no more decrease is happening.

As an additional control you could also take one more glass container, fill with water and put an apple inside, but instead of Agnihotra Ash add control ash, and also you can keep one container with water and an apple as total control.

Do the same measurements mentioned above.

See whether there is any change in radioactivity. (Hypothesis: There will be none.)

Experiment 2

Now there are reports that sand on the beaches of California has become radioactive because of the Fukushima incident, posing a danger to the people going there. Can Agnihotra Ash neutralize radioactivity in these sands?

Hypothesis

Agnihotra Ash neutralizes radioactive sand.

Method

Take radioactive sand (from the coast near Fukushima or now also from some coast in California). Measure the level of radioactivity.

Mix it with

- a) Agnihotra Ash
- b) Control Ash

Measure radioactivity of a) and b) after 3 days / 7 days / 14 days and compare.

Experiment 3

Hypothesis

Cow dung from a Homa Farm does not show any increased level of radioactivity.

Method

First, check cow dung from different non-Homa places for radioactivity.

In case no more radioactivity than normal background radiation can be found, the experiment does not make sense.

But in case there is higher radioactivity, the following is suggested:

Take cow dung from a conventional farm which is radioactive, and compare with cow dung from a Homa Farm which should be in the area but at least three kilometres away.

Experiment 4

As background information the following is interesting.

According to ancient tradition cow dung helps to neutralize harmful radiation, and this is why walls and floors are still covered by cow dung in villages. We heard that Russian scientists inquired about cow dung as a means to protect spacecrafts from radiation in space but this has not been made public.

Interesting to check whether this ancient method works!

Hypothesis

Cow dung neutralizes radioactivity in a room if you cover walls and floor.

Method

Go to an area with high radioactivity. (There are some places like that in Kerala, where natural radioactivity is rather high.)

Build two huts made from clay. Check the clay for radioactivity before (and if also the clay is radioactive best to use clay from further away which is neutral).

Measure radioactivity inside both huts. It should be same.

Apply cow dung on the walls and the floor of one hut, and

apply buffalo dung on the walls and the floor of the second hut.

Measure radioactivity again in both huts and see whether there is a difference.

As a variation if you do not want to go to places with high radioactivity, you can also build these two huts wherever it is convenient, apply cow dung respectively buffalo dung, and then have a source of radiation of known specification outside of both huts.

Measure radioactivity before and after applying the dung in both huts. Compare between the two huts.

Advanced

In case the preliminary reports and tests about Agnihotra ash neutralizing radioactivity can be confirmed – then how can we understand this phenomenon?

The half life of radioactive elements is seen as a constant which cannot normally be changed (unless you bombard the elements with neutrons). Therefore it is difficult to understand how Agnihotra Ash could neutralize radioactivity in much shorter time like a few days.

But recently some experiments have been done in Eastern Europe which perhaps could help to explain. Prof. Vysotskii from Kiev University and Prof. Kornilova (Moscow University) could show in several experiments that e.g. the decay of Cs^{137} was sped up 35 times by adding some mixture of microbes, nutrients, and salts. Biophysical reasons and possible physical mechanisms of isotope transmutation in biological systems are described in their books *Vysotskii / Kornilova 2003 and Vysotskii / Kornilova 2009*. A short synopsis describing the experiments and results you find in *Vysotskii / Kornilova 2011*.

Possible that with Agnihotra Ash similar processes are at work but working at much higher speed? (The experiments done by Vysotskii and Kornilova were done for 100 days, and radioactivity was not totally neutralized. The radioactive rice soaked in Agnihotra Ash water was neutralized within 10 days only.)

Hypothesis

Neutralization of radioactivity through Agnihotra Ash comes about by isotope transmutation in biological systems. Agnihotra Ash accelerates this process considerably.

Method

Repeat the experiments described in *Vysotskii / Kornilova 2011* as control and then do the same experiments but add Agnihotra Ash. Compare.

9.6 Understanding the different disciplines of Agnihotra in terms of physics

How does the Agnihotra process cause the differences in Agnihotra Ash and Control Ash, and lead to all the effects which we have discussed in previous chapters?

Let us examine the Agnihotra process – first concentrate on the different disciplines of Agnihotra (specific ingredients, a pyramid shaped copper vessel of certain size, and certain mantras, and the exact timings of sunrise and sunset) and then discuss how these disciplines all work together.

The following is about fundamental research which still is at the very beginning. More questions than answers at this stage, and also mostly the subject has to be examined more deeply before experiments can be suggested.

9.6.1 Copper pyramid

The Agnihotra pyramid is of specific size and shape, and it has to be from copper. Some experiments have been done with variations of both the size and shape as well as the material – and the resulting ash was less effective for germination seeds (see *Pathade/Abhang 2014, Abhang et al. 2015*).

Can we understand the reason for these differences in terms of physics?

9.6.1.1 Material of the Agnihotra pyramid

According to ancient Vedic Knowledge the Agnihotra pyramid could either be made from copper or from gold as these two metals are similar in their healing properties. What are these healing properties? Antimicrobial properties of copper are well established by now. This explains why in many countries people use copper bracelets for healing purposes, or they put a copper coin into the water before watering plants, or they keep water in a copper vessel at night and in the morning drink this water from a copper cup.

Understanding about healing properties of copper can give some hint that there is something special about this metal but does not in itself explain why copper is needed in the Agnihotra process.

How does copper interact with the flame and the mantras?

Can the crystal structure of copper give some clue? (Interesting that gold shows similar crystal formation.)

9.6.1.2 Size and shape of the Agnihotra pyramid

Both size and shape of the Agnihotra pyramid are fixed and must not be changed. Some people thought the effect would be more if you take a larger pyramid – but it is not like that. If we assume that Agnihotra is all about vibration and resonance, then this is obvious – similar to a musical instrument: If you make a sitar double the size, for example, you will not get a better sitar but a totally different instrument.

Interesting to measure the vibration of the sides of an Agnihotra pyramid when someone utters the Agnihotra mantras. Is there something special in these vibrations if you have the correct Agnihotra pyramid as compared with vessels of other shapes and sizes?

About pyramids, it is interesting to note that the etymology of the word „pyramid“ indicates that their use as vessels for special fires was the original use (and only later they were put upside down like in the Egyptian pyramids): „Pyr“ means „fire“ in Persian and Greek, and we still have that root in words like „pyromaniac“ and „pyrotechnics“; „mid“ means „middle“ like in English (and similar in German), so „pyramid“ denotes a vessel where you perform a fire in the middle. Later on the usage of pyramids was changed and the main idea was to concentrate some energies in the centre of the pyramids.

This shape of pyramids has some effect on living and non-living matter. There are reports telling that fruits like apples stay fresh much longer if kept in a pyramid, and used razor blades are said to get sharp again when put in a pyramid in the middle at the height of one third of the total height. Not so many scientific studies are known though. In recent years two scientists looked deeper into that matter. Dr. Itagi studies the effect of pyramids on microorganisms (see: *Itagi 2005*), and the Ukrainian physicist Dr. Krasnoholovets suggested a hypothesis for explaining the effects of pyramids (see: *Krasnoholovets n.d.*)

But which role plays the pyramid shape in the Agnihotra process? According to Vedic knowledge the following is said: „*Just at morning Agnihotra time all the electricities, energies, ethers are attracted to the pyramid in its shape. At sunset these energies are thrust out in the same shape.*“ (*Paranjpe 2006*, p. 3)

“The specific frequencies of the different steps of the pyramid could be measured if a scientist wishes to put his mind into it. The most intensive sound waves have their origins at the four sides of the pyramid, forming a small angle.“ (*Paranjpe 2016*, chapter 12)

One further hint is given by a physicist from Eastern Europe, Mato Modric, who mentioned that the Agnihotra pyramid with its three steps resembles a Horn antenna – the question remains which frequencies are received and sent? Modric was trying to find out which frequencies would be amplified and broadcast by such an antenna (*Tompkins/Bird 1989* p. 252) but when he tested this frequencies were outside of the range of the instruments available to him.

9.6.2 Agnihotra fire

Traditionally the element fire is known for its transforming effects. In the Agnihotra process fire turns solid and liquid substances (cow dung, rice, and ghee) into gaseous substances.

9.6.2.1 Temperature of the flame

Substances burn at some specific temperature (provided the flow of oxygen is same).

Cow dung burns at approx. 600° C to 800° C. It is important that the cow dung is arranged in such a way in the pyramid that air can flow freely in the pyramid.

How much does the quantity of ghee added change this temperature?

Only a few grains of rice are added so that should not have a big effect on the temperature of the flame.

Which other physical properties of the flame are influenced by the materials burnt?

There is a science of combustion (partly chemistry, partly physics) which can help to answer these questions. This science of combustion regarding Homa fires is discussed at length in *Narang 2009*. Alas in this treatise (otherwise quite interesting) no Control Fire is considered - but there must be more about the Agnihotra flame. As there is a difference between Agnihotra Ash and Control ash most likely there is a difference between an Agnihotra flame and the flame of a Control Fire – how this difference could be explained otherwise? Not likely the temperature of these two types of fires will differ much as exactly the same ingredients are being burnt.

Besides the differences in the resulting ashes, there are also other different effects (like production of negative ions - provided the hypothesis in 9.2.1.2 can be confirmed). This leads to the next question:

9.6.2.2 *Agnihotra flame - a plasma?*



A candle flame in an electric field between two dissimilarly charged plates will be oriented sideways because a flame is a partially ionized plasma. It therefore responds more strongly to the electric force between the plates than to the thermal convective forces in a gravity field (Graphics: www.thunderbolts.info/wp/2011/10/17/essential-guide-to-the-eu-chapter-2/)

The temperature of the Agnihotra flame (and that of a Control Fire flame) is rather low, approx. 600° to 800° C. This will only lead to a low ionization, but still some plasma properties may be observed.

Possible that the different types of radiations coming from the sun at the time of sunrise lead to a higher degree of ionization? That is just an assumption as it could help to understand some effects of the Agnihotra flame as opposed to a “normal” flame. This leads to the following:

Hypothesis

The Agnihotra flame shows a higher degree of ionization than the flame of Control Fire.

Method

Use a pair of dissimilarly charged plates like in the picture above. Distance should be 20 cm. Prepare a Control Fire and place it between the two plates. Put charge on the plates (one positive, one negative) and see what happens. Note the voltage at which the flame starts to orient towards one side instead of upwards. Also note when the flame is going totally sideways like the flame of the candle in the photo above.

Then do the same thing with Agnihotra Fire (performed correctly at sunrise/sunset time). See which voltage is needed to bend the Agnihotra flame - and which voltage is needed to totally bring the flame in a horizontal direction.

Conclusion

In case this experiment leads to some difference, then the question is whether the energies coming from the sun at that time can cause that difference.

Maybe the plasma of the Agnihotra fire acts as an amplifier for the energies coming from the sun exactly at the time of sunrise?

Advanced

We are told not to use lighters etc. to start the fire: „ Lighter fluid or other ignitable materials should never be used for lighting the Agnihotra fire“ (*Paranjpe 1989* p. 15). Can we – with the methods available to modern science - detect any difference in the fire depending on how you start the fire?

In other Vedic fires like Tretagni or Somayag you cannot use matches either - the fire has to be started by spinning a wooden rod under pressure on top of another piece of wood. Can we detect a difference between fire started this way and fire started with matches?

If it can be established that the Agnihotra flame has plasma properties, then there may be ion acoustic waves.

Is it possible that these ion acoustic waves interact with the sound waves of the Agnihotra mantras? That would be an interesting topic for research.

9.6.3 Exact time of sunrise and sunset

9.6.3.1 What happens at sunrise?

The ancient Vedic knowledge says the following about sunrise and sunset:

“At sunrise the many fires, electricities, ethers and more subtle energies emanating from the sun extend all the way to the Earth and produce a flood effect at those coordinates where the sun is said to rise. It is awesome. The flood enlivens and purifies everything in its path, destroying what is impure in its wake. This torrent of life-sustaining energies

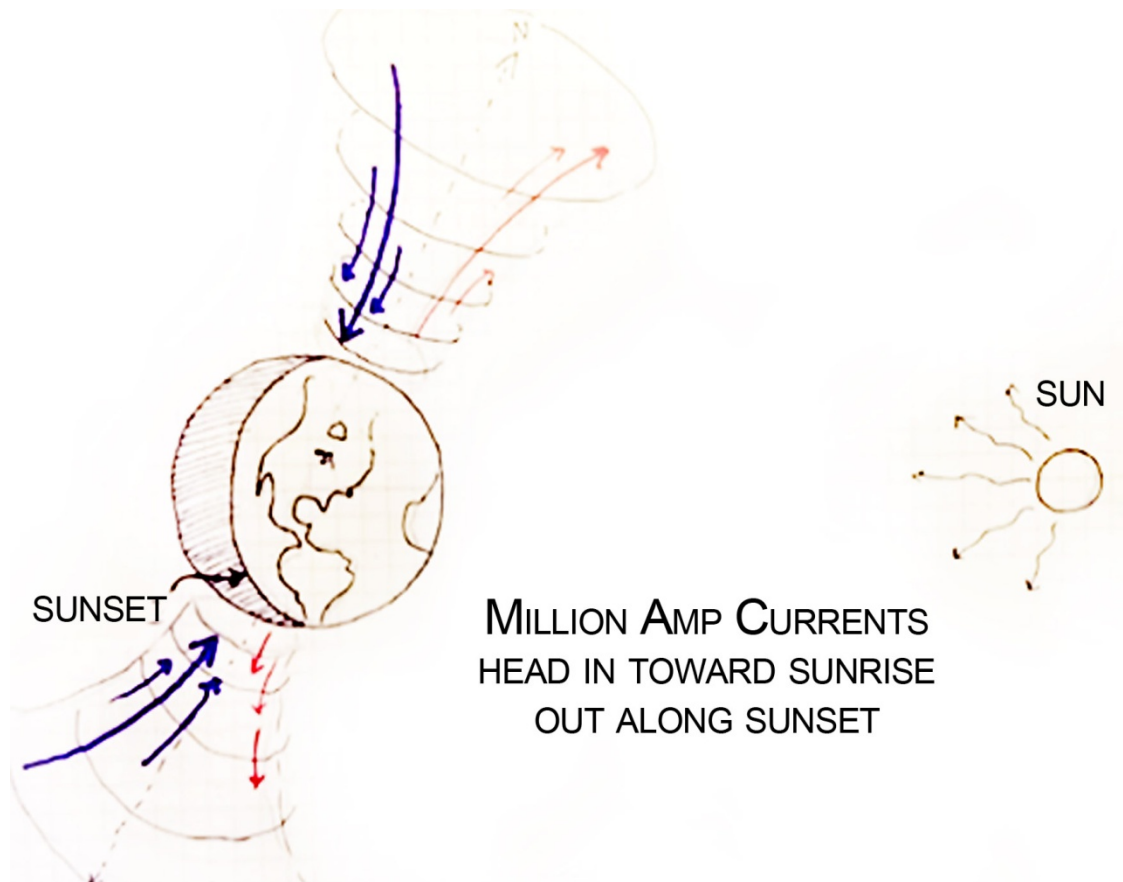
causes all life to rejoice. At sunrise that music can be heard. The morning Agnihotra Mantra is the essence of that music. It is the quintessential sound of that flood. At sunset the flood recedes."

These statements are not easily understood in terms of modern physics. What are those "fires, electricities - mind the plural! - ethers and more subtle energies"?

Difficult to say.

But as I suggested in the Introduction (chapter 1.2) good to have some patience in case we cannot immediately find some interpretation in terms of modern science. And there are some developments which may help us to understand things better.

Only recently astrophysics is paying more attention to the electric properties of space, the stars, and the planets. Some astrophysicists now talk about the "Electric Universe", and some of the new discoveries come close to the Vedic description of sunrise I quoted above.



This graph was taken from the presentation of Dr. Michael Clague: Earth's Electric Environment, Electric Universe Conference Albuquerque, March 20 - 24, 2014, uploaded on YouTube, <https://www.youtube.com/watch?v=z2W5jaxKlgU>.

It shows how the Earth is entering the stream of solar winds at sunrise – and turning out of these in the evening at sunset.

9.6.4 Mantras

In many ancient cultures a crucial role is attributed to sound and vibration for the beginning of the universe.

In the Bible it is said that in the beginning there was the word, means sound. According to Egyptian mythology the universe was created by a song, and in Hindu or Buddhist mythology it was the sound OM which created the world.

But our subject is not the beginning of this universe and also I do not want to go into mythology – still interesting to see that in all these traditions it is assumed that sound has a very powerful role in this world. Good to examine that a little deeper.

According to Vedic Tradition the following is said about mantras. “There are vibrations that exist everywhere. It is only vibrations when you go into it. Where there is vibration there is also sound. When we do these Mantras, the sounds we utter activate these special vibrations that will create certain atmosphere of effects. Then the desired results are realised. These vibrations exist for everything, so anything can be activated, controlled or changed by Mantras.” (Paranjpe 2006, p. 6)

Vedic mantras are in Sanskrit, a language which was never the mother tongue of anybody and from which at least all Indoeuropean languages come. It is said that these mantras carry a certain vibration (which would get lost if you just translate the meaning of the mantras, therefore we always utter the original Sanskrit Agnihotra mantras, not translations).

Sound does have an effect on matter; this is well established:

E.g. soldiers are asked to not march but walk normally when crossing a bridge – as otherwise the bridge might collapse (if the march would resonate with the characteristic frequency of the bridge).

This is just one example, but the effects of sound on matter are much more widespread. Some people even claim that by singing OM a Sri Yantram pattern could be created – but as nobody could replicate that this may be a myth. No myth though is the discipline called cymatics which is dealing with effects of sounds on matter. One method used is that sand is spread on a glass plate and the patterns created by different sounds are studied.

Sound also has an effect on living matter – several studies show that music has a great impact on plants (see *Tompkins/Bird 1973*). It was interesting to see that plants grow better and even lean towards the loudspeakers when classical music is played; their growth is inhibited and they lean away from the loudspeakers when rock music is played. The best result though was when classical ragas were played to the plants. What will happen when Vedic mantras are sung to the plants?

Later the French physicist and musician, Joel Sternheimer, discovered one possible underlying mechanism for how plants respond to the stimulation of sound waves. Sternheimer claims that certain sounds correspond to an amino acid in a protein thus leading to kind of resonance effect which can stimulate the production of this protein (see: *Coghlan 1994*).

A group of scientists lead by Dr. Shirley Telles showed that singing OM for some time had considerable effects on physiological parameters like skin resistance, heart rate, rate of breathing as compared to the control group which concentrated on a neutral word „one“, see *Telles et al. 1994* and *Telles et al. 1998*.

Heisnam/Swamy/Nagendra 2004b reports an interesting analysis: The sound patterns of OM were analysed quantitatively. Two male and two female persons uttered OM, the frequencies were measured and spectrograms representing the peaks of the energy-frequency spectra as a function of time were generated.

It seems this was the first study of its kind, trying to understand mantras in terms of physics. A comparison with the same analysis of „normal“ words would be interesting!

How can we understand the effect of mantras in terms of physics? Dr. Sunil Kulkarni, Fergusson College, Pune, suggested that the bond angle in molecules could be changed by someone singing mantras, which of course would have far reaching consequences for living and non-living matter, and maybe could help to explain the physiological effects of repeating the OM sound just mentioned?

Advanced

It is said that for performing Agnihotra the human component is important – the Agnihotra mantras have to be uttered by a person, not just by a recorded voice.

If in the course of the previous experiments we find a precise method to measure the effects of Agnihotra, an interesting experiment could be done:

Hypothesis

For Agnihotra the mantras have to be uttered by a human being.

Method

- a) Perform Agnihotra
- b) Perform Agnihotra, but use a recorded voice for the mantras.

Collect the ashes and compare (with whatever methods gives the clearest results – e.g. germination, microbiological effects, or infrared absorption, X-ray diffraction, or measuring the particle size).

In case such a difference can be shown – this will be a challenge: Does it mean that mantras have some additional aspect besides the sound waves? Maybe these additional aspects make it possible that Vedic mantras can be heard on other planets as it is said in ancient texts. But until we find such additional aspects, let us treat this statement as Science Fiction for the moment. Sometimes though Science Fiction of today may become normal technology tomorrow.

9.8 Trying to understand how the different disciplines of Agnihotra work together

Even if we would understand the disciplines of Agnihotra fully – the Agnihotra copper pyramid, the fire, the exact times of sunrise and sunset, and the Agnihotra mantras – there is still one important step to go: How do all these disciplines work together to get the full effect of Agnihotra?

9.8.1 What is said in Vedic Knowledge about How Agnihotra Works?

Some hints are derived from Vedic knowledge which may be used heuristically.

“Just at morning Agnihotra time all the electricities, energies, ethers are attracted to the pyramid in its shape. At sunset these energies are thrust out in the same shape.

This flood of energies at sunrise has a strong purifying effect wherever it touches the Earth. Agnihotra amplifies these purifying effects in the following way:

Subtle music accompanies this flood of subtle energies. The morning Agnihotra Mantra is the essence of that music. The combination of exact timings, the copper pyramid of fixed size and shape, the specific materials used for preparing the fire and the power of the mantras used, a channel is created above the pyramid through which Prana energy which connects us with the cosmos flows harmoniously again.

Tremendous amounts of energy are gathered around the Agnihotra copper pyramid just at Agnihotra time. The pyramid is the generator, the fire, the turbine. A magnetic type field is created, one which neutralises negative energies and reinforces positive energies.

When Agnihotra is performed, the Agnihotra smoke gathers particles of harmful radiation in the atmosphere and on a very subtle level neutralises their radioactive effect. Nothing is destroyed, merely changed.” (Paranjpe 1989, p. 21)

„When Agnihotra fire is burnt there is not just energy from the fire but there are subtle energies created by the rhythms and Mantras and these are generated or thrust into the atmosphere by fire. Also consider the quality of materials burnt and there is the full effect of this YAJNYA.“ (Paranjpe 1989 p. 21)

„The specific frequencies of the different steps of the pyramid could be measured if a scientist wishes to put his mind into it. The most intensive sound waves have their origins at the four sides of the pyramid, forming a small angle. From inside the pyramid a standing wave of a certain frequency is sent out.

When these specific Mantras are uttered at the specific times given by the computer based on one specific definition of sunrise / sunset, RESONANCE takes place in the pyramid. The most powerful effect is with the word SWAHA. It is RESONANCE which heals. This is how plant plagues and epidemics go away.

Large areas could be treated for plant disease eradication from one central place which acts like a generator of healing energies. Some special techniques will be performed there based on pyramid fires tuned to full moon / new moon / fourth day after full moon / fourth day after new moon / fourteenth day after full moon etc.

Ancient science states that this resonance invigorates the cells of plants and helps the reproductive cycle. Resonance plays a vital role in nature. WE HAVE TO CONSIDER A HEALING MOLECULAR SPECTRUM FAR BEYOND THE INFRARED, INDEED BEYOND THE WHOLE ELECTROMAGNETIC SPECTRUM (Paranjpe 2016, chapter 11).

In the same book there is the summary of a discussion with some Eastern European physicists:

„The chemical reactions which take place when Agnihotra pyramid fire, mentioned in Homa Therapy burns, are less important. Important is the radiation. We know the chemical aspects of fire. In the end we get H₂O, CO₂ and CO. Then there is a visible light and infrared. This is the classical view today about fire. If you look into the more subtle structure of fire, you find that electrons jump from one atom to another (like a flash of lightning) and this causes some emissions on a very subtle level which hardly fits into modern Quantum Theory.”

Vasant also told them: "If you test Agnihotra with an oscilloscope you will notice a special sound coming from the fire. It is a sound that heals. Other things are there but key is the sound. Fire produces sound but it also reacts to sound. The act of singing special vibrations while the Agnihotra copper pyramid fire burns creates a resonance effect which invigorates the cells of the plants, leading to better reproductive cycles. Resonance plays a vital part in natural phenomena".

Here we are talking about a healing molecular spectrum beyond the whole electromagnetic spectrum. (Paranjpe 2016, chapter 12)

The following quotation is from the book "Secrets of the Soil" by Peter Tompkins and Christopher Bird:

“Mr. Modric, an expert in electromagnetic fields and geopathogenic zones, remarked that the Agnihotra ash could produce disinfectant, anticoagulant and tissue-contracting effects on living matter was well established. He believed Vasant when he claimed the ash had pesticidal and fungicidal properties and that it might ultimately solve the problem of mineral deficiencies. Mr. Modric explained he believed he was dealing with a complex that could potentially affect the whole environment, containing the toxins of modern technology developed over the last century by the industrial revolution and that the process might have enormous implications for our very existence.

*“He added that Agnihotra ceremonies performed at various specifically spaced points on earth, if done exactly at sunrise and sunset, could affect an energy associated within the earth, one such as described by Steiner and Reich, the enhancement of which would have a healing effect on the environment. He said, ‘We believe we can establish the fact of an electromagnetic radiation during the ceremony, but we are in an area of informational transfer through intermolecular and interatomic processes mediated by ultraviolet photons. It is logical to conclude that some kind of energetic mechanism is being activated which can be translated into physical meaning linked to concrete information systems that are as yet unknown but connected to systems of resonance.’”
(Tompkins/Bird 1989 p. 252-253)*

9.8.2 Possible mechanisms which could help to understand the Agnihotra process

It seems a rather complex task to find out how the different disciplines of Agnihotra - the Agnihotra copper pyramid, the fire, the exact times of sunrise and sunset, and the Agnihotra mantras – all work together in order to understand the full Agnihotra process.

Above we have already discussed these disciplines individually. Now let us take one step further and see how two or three of them interact which will in the end hopefully lead to a full understanding of the Agnihotra process.

9.8.2.1 Vibrations of the flame

Some physicists from former Soviet Union examined the vibrations of the Agnihotra flame with a system of rotating mirrors which created interferences on some screen. They thus could see the effect of the Agnihotra mantras. They said „SWAHA“ had the strongest effect.

They could even recognize the brain waves of the person performing Agnihotra in the vibrations of the flame.

Good if such examinations could be repeated!

Now the sensor technology is so much more advanced than 20 or even 30 years ago so probably it will be possible to detect the vibrations of the flame with some sensors instead of the arrangement of rotating mirrors.

9.8.2.2 Sound coming from the fire

"If you test Agnihotra with an oscilloscope you will notice a special sound coming from the fire. It is a sound that heals. Other things are there but key is the sound. Fire produces sound but it also reacts to sound. The act of singing special vibrations while the Agnihotra copper pyramid fire burns creates a resonance effect which invigorates the cells of the plants, leading to better reproductive cycles. Resonance plays a vital part in natural phenomena". (Paranjpe 2016, chapter 11)

Sound does not only affect the receptors of our hearing organs, but also has a direct effect on living cells and molecules as already mentioned (see *Coghlan 1994*). This could explain why plants, animals and humans show positive results in the vicinity of Agnihotra.

Can this sound be detected with a highly sensitive oscilloscope?

Also, how does the fire react to the sound of the Agnihotra mantras?

9.8.2.3 Fire and Sound of the pyramid

„The specific frequencies of the different steps of the pyramid could be measured if a scientist wishes to put his mind into it. The most intensive sound waves have their origins at the four sides of the pyramid, forming a small angle.“ (Paranjpe 2016, chapter 12)

Interesting to see if these sounds can be measured.

If this can be done – can we then see whether there is a difference between a new Agnihotra pyramid and one which has been used for some time for Agnihotra fires?

Also, can the vibrations of the three steps of the Agnihotra pyramid be measured during

Agnihotra?

What happens exactly at the time of uttering mantras?

9.8.2.4 Sound of Agnihotra Ash

*„Test the Agnihotra ash with an oscilloscope. There is a sound that comes from the ash. **It is this sound that heals.** All the other physical things are there, such as nutrients, vitamins, minerals. **But the key is the sound.** One subtle enough to detect can show this.“ (Paranjpe 1989 p. 49).*

For such a test of course the oscilloscope must be very sensitive.

Probably necessary also to do this experiment in an audio studio which is well insulated against any noise from outside. Best also no person is inside the room and either record the measurements or have cables long enough so that the measurements can be followed from outside.

9.8.2.5 Resonance

According to Vedic Knowledge, there is a subtle music in the energies coming from the sun at the time of sunrise. The Agnihotra mantras are the quintessential sound of this music. Therefore a kind of resonance happens. This resonance is said to heal.

How can we find out more about the energies coming from the sun at sunrise besides visible light? Are there instruments subtle enough to record the music in this flood of energies? This would help to understand why the exact timing is so important and why the mantras are crucial (and have to be uttered in Sanskrit – translations would not lead to this resonance). It is well known that when resonance is there small forces can have a very big effect.

9.8.2.6 Standing wave

„From inside the pyramid a standing wave of a certain frequency is sent out.“ (As translated back from German, Paranjpe 2013, p. 72)

It is not said whether it is a sound wave or an electromagnetic wave (or something different from both?), and which frequency the standing wave has.

Possible that a standing wave is created through reflection of a vibration at the three steps of the Agnihotra pyramid?

One thing is interesting though:

If there is a standing wave, the energies coming from the sun at that time are exactly orthogonal to the axis of this standing wave.

The transition times of sunrise and sunset could be compared to situations of instable balance in mechanics (like: two iron balls are sitting on top of each other). Typical for such situations of instability is that small forces are able to lead to big effects.

9.8.2.7 The power of the sun operating in the Agnihotra pyramid?

Some physicist told us after examining the process of Agnihotra it is as if the power of the sun itself would operate in the Agnihotra flame.

Difficult to imagine.

But these energies and particles coming from the sun at the time of sunrise – could it be that because of quantum entanglement there is still a direct connection with the sun?

(Also, the same might be true for the whole planet Earth – as according to certain cosmologies the planets originated from their sun.)

9.8.2.8 Interaction of Agnihotra pyramid and the fire inside

“Tremendous amounts of energy are gathered around the Agnihotra copper pyramid just at Agnihotra time. The pyramid is the generator, the fire, the turbine. (Paranjpe 2006, p. 3)

This suggests that some type of energy is generated by the Agnihotra pyramid and pushed out by the fire. Alas, not clear which type of energy this can be.

9.8.2.9 Magnetic energy field around Agnihotra

“A magnetic type field is created, one which neutralises negative energies and reinforces positive energies.” (Paranjpe 2006, p. 3)

Above it was suggested to do some experiments regarding the magnetic field around trees after performing Agnihotra under the trees.

Now this quote suggests to do measurements of subtle magnetic fields also around the Agnihotra fire itself.

9.8.2.10 Phase Conjugation

Dan Winter, an American physicist, after examining the Agnihotra process said that there is a phase conjugation happening during the Agnihotra process.

Also Dan Winter says there is a standing wave in the pyramid – formed by different waves (those emitted by the Agnihotra flame and the energies coming from the sun?).

At the time of sunrise, sun’s rays are exactly orthogonal to the line from the centre of the planet Earth to the place where we have sunrise, therefore having maximum effect on the standing wave inside the pyramid as they meet it in right angle (perpendicularly).

9.9 Further Studies

Maybe nowadays physics has to be expanded in order to fully understand the process of Agnihotra - in terms of instruments and possibly also in terms of some concepts. Some ideas in this direction you find in the next chapter about Subtle Energies.

10 Prana, Subtle Energies, and modern Physics

This chapter is work in progress, even more than the previous chapters. We are moving in uncharted territory, a big challenge for scientists - but also highly rewarding to work on new paradigms in the evolution of science!

10.1 Prana and Subtle Energies

In the introduction I mentioned that we suggest to treat statements from ancient Vedic Knowledge as hypotheses and then try to examine by means of modern science. Not always though it is easy to understand statements of ancient knowledge in terms of modern science, it is not just a simple translation (see: 1.2).

„Prana“ is one of the words used in Vedic Knowledge a lot – but difficult to find a word from modern terminology. Following some quotes from Paranjpe’s standard reference book on Homa Therapy using the term „prana“:

„YAJNYA is the process of purification of the atmosphere through the agency of fire tuned to a specific rhythm of nature. It is performed for purification of the atmosphere. It is stated that by inducing a change in the atmosphere you bring about change in functioning of Prana (life energy). Prana and mind are like two sides of the same coin and hence the beneficial change is transposed to the realm of the mind.“ (*Paranjpe 1989* p.16)

„Agnihotra creates the basic healing cycle around his physical body, Prana sheath, mental sheath, etc. Prana is life energy that pulsates through us and connects us with the cosmos. (...) Atmosphere, Prana and mind is the nexus to transpose the healing effect of atmosphere to the realm of the mind. Any change induced in the atmosphere automatically affects Prana. Prana and mind may be considered as two sides of the same coin. When atmosphere is polluted there is so much tension and pressure on the mind. If by using the material aid of HOMA fires we can bring about a beneficial change in the atmosphere the benefit goes to the mind.“ (*Paranjpe 1989* p. 27)

„We have to take science to a place now where the scientist can see logically and understand easily that by putting something like medicinal herbs into YAJNYA (HOMA) fires while observing certain disciplines accompanied by certain Mantras, a drastic change takes place in Universal PRANA, thereby creating a healing effect on the mind.“ (*Paranjpe 1989* p.78)

It seems that there is no direct translation of „prana“ in the terminology of modern science. „Prana“ seems to be some kind of energy elusive to present day measurements and instrumentations.

Another concept similarly elusive is that of „subtle energies“. Following some quotes with statements from ancient Vedic Knowledge about subtle energies.

„When Agnihotra fire is burnt there is not just energy from the fire but there are subtle energies created by the rhythms and Mantras and these are generated or thrust into the atmosphere by fire.“ (*Paranjpe 1989* p. 21)

„This book about HOMA Therapy methods of manipulating subtle energy is a step in the direction of the same Vedic knowledge.“ (*Paranjpe 1989* p. 64/65)

„At sunrise the many fires, electricities, ethers and more subtle energies emanating from the sun extend all the way to the Earth and produce a flood effect at those coordinates where the sun is said to rise. It is awesome. The flood enlivens and purifies everything in its path, destroying what is impure in its wake. This torrent of life- sustaining energies causes all life to rejoice. At sunrise that music can be heard The morning Agnihotra Mantra is the essence of that music. It is the quintessential sound of that flood. At sunset the flood recedes.“ (*Paranjpe 1989* p. 13/14).

„Sound“ seems (unlike „prana“ and „subtle energy“) a term easily understood by modern science, a direct translation seems obvious. But when you analyse the following statements from Vedic Knowledge about sound you find that in these statements there are some aspects which are not covered by the present understanding of sound:

In the following discussion I use „subtle energy“ as a general term for all kinds of energies which are not yet generally accepted by modern science. There will be separate paragraph on thought energy which seems to play an important role in understanding the Agnihotra process, and also one on more subtle aspects of sound: „Sound“ seems (unlike „prana“ and „subtle energy“) a term easily understood by modern science, and a direct translation seems obvious. But when you analyse some statements from Vedic Knowledge about sound you find that in these statements there are some aspects which are not covered by the present understanding of sound.

10.2 Different kinds of Subtle Energies

It seems that we are led into an area of more subtle energies which were said to exist in the different ancient cultures and were known under different names like Prana, Ki, Qi or Chi, Orgon, etc. For the moment I am using the term “subtle energies” for all these concepts which may differ a little bit from each other.

The term „subtle energies“ is used in two different ways:

1) Energies are called „subtle“ as they are very weak – but they are of known type. Still, as the magnitude is rather low these energies have often been neglected or disputed.

Examples are electromagnetic energies in plants, animals, humans which play an important role in controlling many processes on the level of cells, e.g. in form of biophotons. Another example is that of paramagnetic properties of soil.

2) Energies not known yet.

But not just fairy tales or mythology: There are some effects which cannot be explained by known types of energy (like gravity, electromagnetic fields, etc.)

Subtle energies – we observe some effects but do not know of which type these energies are. Like e.g. some effects of Agnihotra (see: Energy field of Agnihotra), thought energy, etc. etc.

Strictly speaking, this is not a proof of the existence of such subtle energies as we cannot exclude the possibility of finding some explanation for the phenomena observed in terms of already known types of energy. But such a situation makes it worthwhile to look into this possibility in order to find explanations.

It is obvious that things which cannot be measured today may still exist. (Electricity did exist before it was possible to measure!) What cannot be measured today may well be detectable by instruments of tomorrow.

Ancient knowledge often gives us hints of such subtle energies; we should be grateful for such hints as they may lead us to formulate interesting hypotheses – but we have to be careful not to confuse what ancient knowledge says with results confirmed by modern science.

Anyway, as science proceeds, hopefully more and more of the subtle energies of type II will become of type I as we understand the subtle functioning of Nature better.

10.3 Subtle Energies Type I

Subtle Energies Type I are called „subtle“ as they are very weak – but they are of known type. Still, as the magnitude is rather low these energies have often been neglected or disputed. Now in more and more areas of life sciences the relevance of such subtle energies, mostly electric or magnetic energies, is being discovered, especially in the areas of physiology of plants, animals, and humans.

Quite often processes were studied from a viewpoint of chemistry first, and only later on the relevance of electric, magnetic, and electromagnetic forces were also taken into account.

Already in the nineteen-thirties Harold Saxton Burr examined the “Electric Patterns of Life” (this is the title of his book which describes research he did in this field for many decades, see *Burr 1972*). Burr measured the difference in voltage on the surface of humans, animals, and plants. As such measurements gave replicable results he hypothesized that there must be some electro-dynamic field in living entities which lead to these voltage differences. According to Burr, processes of Life are controlled by “fields of Life”, or “L-fields” as he calls them. Burr states that these L-fields are often neglected as the main concentration is on a chemical analysis. “The chemistry provides the energy, but the electrical phenomena of the electro-dynamic field determine the direction in which energy flows within the living system. Therefore they are of prime importance in understanding the growth and development of all living things.” (*Burr 1972*, p. 107)

Some time later the importance of electric and magnetic forces for healing in animals and humans has been extensively shown in *Becker/Selden 1985*. Still today the prevalent view is that wound healing is governed by chemical processes. Becker showed in a large number of experiments on earthworms, frogs, salamanders, and also on human bones that electric currents a decisive factor in healing. As the electric currents involved are of very low magnitude, they were often not taken into account.

Becker continued this research and showed the important role of electromagnetic energy in the regulation of life processes (see: *Becker/Marino 2010* which is a reprint of a book originally published in 1980).

If electromagnetic energy plays such an important role in controlling life processes – then it seems obvious that artificial electromagnetic energy (which we have a lot nowadays: Radio and TV signals, Wifi, microwave ovens, power transmissions, satellite signals, etc.) can interfere with biological fields and thus create health problems. This is extensively discussed in *Becker 1990*.

Also very interesting is the work of Rivlan and Gravelle which showed that the human body is surrounded by a bio-electromagnetic field, and that on the other hand humans have bio-electric

sensors which perceive such signals (see: *Rivlan/Gravelle 1984*). This is an example of subtle energies like human aura can eventually be (at least partially) understood in terms of modern science – if one takes into account that very small forces still can have important effects.

Another example of processes which were studied from a viewpoint of chemistry first, and only later the relevance of electromagnetic forces became clear, is the functioning of cells.

Electric forces help to form „structured water“, water with higher density and which excludes other molecules (see *Pollack 2013*). This explains a lot of phenomena on cell level, especially cell functions like material transport, motility, division, secretion, communication, contraction (see *Pollack 2001*).

In this respect it is quite interesting that an experiment showed that magnetic properties of water change in Agnihotra atmosphere (see above 9.2.2.1). As Pollack showed the relevance of electric and magnetic forces in water for cell functioning, this change might explain the beneficial effect of Agnihotra on all living cells (of humans, animals, and plants). This is „subtle“ in this first sense.

But how Agnihotra does that, how the changes in magnetic properties of water come about – this is probably due to an energy field of Agnihotra which is „subtle“ in the second sense. See the next paragraph, 10.4.

A very comprehensive study of magnetic and electromagnetic fields on plants, animals, and men was recently published summarizing the work of decades at the Madras Institute of Magnetobiology (*Narayan 2009*). A lot of experiments were done there, and it would be interesting to find out whether Agnihotra would have an influence on the fields involved in so many biological processes.

Other examples of Subtle Energies Type I are:

- Paramagnetic properties of soil (see: *Callahan 1995*)
- Biophotons which are said to play an important role in intercellular communication
Biophotons were first detected by Alexander Gurwitsch in Russia and later on Popp was developing this concept in detail and showed experimentally the effects of biophotons.
- Infrared radiation can have an important role in controlling, e.g., plant growth. Dr. Abhay Shendye examines the role of infrared radiation in the context of Agnihotra and finds that infrared radiation can explain for a number of effects (see: *Shendye 2009*).

10.4 Subtle Energies Type II

Tiller who spent decades in studying subtle energies gives the following description of Subtle Energies Type II (he only uses the term „subtle energies“ for those): „In conventional science, four forces are considered responsible for all observable phenomena in the universe:

The strong nuclear force;

The weak nuclear force;

The electromagnetic force: and

The gravitational force.

These four forces characterize the purely physical domain very well. Thus, "subtle energies" (...) and the subtle forces/effects they generate, are not necessarily weak - but rather constitute that large body of elusive energies and forces beyond the four accepted by today's physical

science.“ (*Tiller n.d*)

Another definition of „Subtle Energy“ (in our terminology: of Type II) is given as follows:

„Subtle energy is defined as, but not limited to the following:

One or more forms of energy, which do not appear to be within the electromagnetic spectrum. Unknown at this time is the interaction or the impact that subtle energies have on measurable electromagnetic forces, nuclear energy and/or atomic bonds, gravitational effects, or mass.

Some described energy forms or systems which furnish partial or limited descriptions of subtle energy are: chi, ki, prana, the force, love, kundalini, orgone, space energy, zero-point energy, aura field energy, energy of thought, energy of consciousness, spiritual energy, life-force energy, ether/aether/eter, vril, energy of intention, and intuition.

Subtle energy appears to be compatible with the theories of Quantum Physics and may not be equated with Newtonian conceptions of ‘force’ and ‘work’.“

Tiller in the same article mentioned above (*Tiller n.d*) describes „Three Experiments In Which Subtle Energy Activity Was Observed“

Experiment A: Some Evidence of Subtle Energies on Photographic Film
One person when being in a special inner states could "energized" the camera which was later used to take photos. As a consequence remarkable optical effects were imprinted on the photographs in addition to the expected physical scenes.

Experiment B: Feedback of Biological Radiation

Test persons were asked to concentrate and to mentally focus their intention on increasing the count rate of a sensitive detector (without touching the detector). This experiment (done with many subjects at different times) showed significant results.

Experiment C: Large Voltages in the Body of an Exceptional Subject

A healer was placed in a room with walls around him covered with copper. These copper walls was attached to electrically isolated electrometers that simultaneously recorded any changes in voltages of the walls. Then th healer attempted to extend energy. The main effect observed was that instead of the usual 10-15 millivolt baseline the healer’s body voltage often plunged 30 to 300 VOLTS, and then returned to baseline in 0.5 to 10 seconds. These voltage changes also appeared on the copper walls.

Interesting in these experiments is that intention (which is part of what we call Subtle Energy II) seems to influence electric and/or electromagnetic fields. The hypothesis that subtle energy fields have an impact on the other energies (electrical, magnetic, or electromagnetic energies) is also elaborated in by John Davidson in his comprehensive book on subtle energies (see: *Davidson 1987*). Mato Modric, a physicist from former Yugoslavia, suggested that in order to understand the process of Agnihotra one has to look into fields and then see how different fields (thought energy fields, electric, magnetic, and electromagnetic fields) work together by interferences and modulations.

If these mechanisms could be examined systematically, it would be a big step towards understanding the role of subtle energies in the functioning of all Nature.

Maybe it could also help to understand a subtle energy effect of type II which was recently shown:

An experiment tested the effect of Agnihotra Atmosphere on polluted water (which was taken from the Narmada River, India): Samples of this polluted water were kept in closed glass bottles in a room where Agnihotra was performed regularly morning and evening.

For control some bottles with same water were brought to a laboratory nearby.

After five days the water quality (COD, DO, pH, total hardness, and count of coliform bacteria) of these two sets of water samples was compared and the result was a clear improvement of the water kept in Agnihotra Atmosphere.

As the bottles were closed there was no interaction of the Agnihotra smoke with the water, and of course also no Agnihotra Ash was added.

The improvement therefore must have been just due to some energy field around Agnihotra.

In order to see which kind of energy field this can be the experiment was repeated, but this time some of the bottles kept in Agnihotra Atmosphere were put in closed metal containers which acted as Faraday Cages.

Surprisingly enough there was practically no difference in the water improvement compared to control between the bottles with or without Faraday Cage. (For details of this experiment, see *Berk/Sharma 2015*.)

This result seems to indicate that the effects of Agnihotra come about at least partly by some energy beyond electromagnetic waves. (Strictly speaking, very high energy radiation like gamma rays would not be stopped by the metal containers used – although it seems rather unlikely that the Agnihotra fire would produce such radiation, we plan to repeat the experiment using some thick lead container also.)

Which kind of energy could this be? This seems to be a kind of Subtle Energy Type II in our terminology suggested above.

Modern science has not done much effort yet to examine such still unknown energies.

It would be a wrong conclusion though to assume that such energies do not exist as modern science has not detected them: Like there was electricity before we could measure it, there may as well be such subtle energies although we do not have the means yet to reliably measure and understand them. It is like walking in an unknown terrain: As you do not have maps you may well get lost. But not going there as there are no maps would mean that you never would have a chance to get to know that land.

Getting lost when walking in unknown terrain is one danger. Another danger is – sticking at concepts from the past when looking at a new subject. This danger is illustrated as follows:

„The astrophysicist Arthur Eddington found a nice example of this situation: ‘A scientist fishes with a net with a 10 cm mesh. As a scientist he concludes: ‘All fish are at least 10 cm long and have fins.’ At this point a passer - by mentions that he has seen fish which are 5 cm long. To this he receives the absurd reply: ‘Anything that my net can’t catch is no fish!’

Every scientific study is designed with its own mesh size. Not everything can be understood and proven scientifically, rather, we have to rely on the basis of our experience to understand the world. For instance, for millennia, man and beast both know that the sun rises in the morning and sets at night, yet science even now cannot prove rigorously and to the last detail why this is so. The reality in which we live is not just dependent on scientific proof. (Cited from

http://www.hese-project.org/hese-uk/en/papers/standard_arguments_whoetc.pdf, accessed on Oct. 29, 2015)

There are different approaches to at least get a glimpse of this vast area – as I said, different routes into the unknown – and some of them I want to mention here, and then see how these approaches could possibly help to understand the process of Agnihotra better.

10.5 Sound

„Sound“ seems (unlike „prana“ and „subtle energy“) a term easily understood by modern science, a direct translation seems obvious. But when you analyse the following statements from Vedic Knowledge about sound you find that in these statements there are some aspects which are not covered by the present understanding of sound:

„Vibrations exist everywhere. Everything is only vibrations, when you look into it. Where there is vibration there is also sound. When we do these Mantras the sounds that we utter activate these special vibrations that will create certain atmosphere or effects. Then the desired results are realized. These vibrations exist for everything. So anything can be activated, controlled, changed by Mantras.“ (*Paranjpe 1989* p.15)

„Ancient science tells us that there is a sound which emanates from Agnihotra pyramid.“ (*Paranjpe 1989* p.46)

„Test the Agnihotra ash with an oscilloscope. There is a sound that comes from the ash. It is this sound that heals. All the other physical things are there, such as nutrients, vitamins, minerals. But the key is the sound. One subtle enough to detect can show this.“

(*Paranjpe 2016*, Chapter Medicine)

"If you test Agnihotra with an oscilloscope you will notice a special sound coming from the fire. It is a sound that heals. Other things are there but key is the sound. Fire produces sound but it also reacts to sound. The act of singing special vibrations while the Agnihotra copper pyramid fire burns creates a resonance effect which invigorates the cells of the plants, leading to better reproductive cycles. Resonance plays a vital part in natural phenomena". (*Paranjpe 2016*, Chapter 11, Agnihotra: A New Dimension)

The sounds in Agnihotra Ash or the sounds coming from Agnihotra fire have not been detected yet – but maybe very sensitive oscilloscopes could measure them. This looks like Subtle Energies of Type I.

But what about mantras charging the atmosphere? If sound is understood as the movement of air particles (or of the particles of any other sound transmitting medium), this concept of charging the atmosphere would not make sense: The movement of air particles is only happening for a short time span.

But „charging the atmosphere“ seems to be an important concept in Vedic Knowledge. For example, in the morning of sixth day of Atiratre Somayag „thousand mantras“ have to be uttered, lasting for two and a half hours, as preparation for the final offering, Purnahuti. But there are several hours between uttering the „thousand mantras“ and the Purnahuti.

With Agnihotra things are little bit simpler: Sound, energies coming from the sun and flame are all there at the same moment. So you could study the effect of all these elements on each other and then try to understand the compound result.

Still, it is said that Agnihotra changes the atmosphere (and the changed – healed – atmosphere would then heal ourselves). This effect again lasts longer than the Agnihotra process.

If we would go back to the old concept of an ether through which all kinds of vibrations are being conducted (light, sound, etc.), then understanding the cumulative effect of sound would be easier. Certain mantras, e.g., could lead to a change in this ether (of course this would imply certain qualities of that ether).

According to modern science sound is a mechanical wave and needs a medium for a particle-to-particle interaction.

But according to Vedic Knowledge certain mantras can be heard on other planets – of course we can discard that idea as science fiction. Still, often science fiction of today will be science of tomorrow. Could it be possible that some kind of „ether“ exists in space which would allow sound to move through to other planets?

And could this „ether“ also be that subtle part of our atmosphere which can be charged by mantras? Maybe we do not know everything yet about sound.

10.6 Thought Energy

Can we understand human thoughts as kind of energy? Experiments done by Cleve Baxter in U.S. (an expert for lie detection, working for the American CIA) showing that human thoughts have measurable effects on plants suggest this hypothesis. (See *Backster 2003*.) Backster's experiments have become known to a larger public through the book *Tompkins/Bird 1973*.

10.6.1 Effects of thoughts on plants

Some simple experiments can be done to examine the possibility that thoughts have effects in the material world.

Hypothesis

Human thoughts have an effect which can be seen with plants.

Method

A simple experiment can be done to demonstrate the effect of thought energy:

Have two groups of students, say six in each group. Every student holds a container filled with water between the hands. First group concentrates on sending negative thoughts to the water; second group sends positive thoughts.

Then water 18 plants – six with the positively charged water, six with the negatively charged water, and six with plain water without any influence of human thoughts. (Of course the person actually watering the plants should not know which water was charged positively/negatively/not at all.)

If this experiment confirms the hypothesis, then maybe the so-called “green thumb” can be understood in terms of positive thoughts which the person has regarding plants?

Interesting also that Emoto could show clearly the effect of human thoughts on water (as you can see in the crystallization photos, see e.g. *Emoto 1999* and *Emoto/Paranjpe/Aranda 2011*). As

plants contain a high percentage of water, then it is no big surprise that effects of thought energy on plants could be demonstrated.

Recently experiments have been done at Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India, showing that thought energy (which they call “metaphysical energy”) has a positive effect on plant growth. Seeds of wheat and chickpea were kept in a room where intensive meditation was practised several hours a day, and then germination of these seeds was observed and compared with seeds without such treatment (but all seeds came from the same source). A clear improvement could be seen in parameters like root length, shoot length, seedling dry weight, and speed of germination. For details see *Chandrashekhara 2015* and *Verma/Pandey 2015*.

10.6.2 Effects of thoughts on humans

From these results we can (still with some caution) conclude that thoughts have an effect on plants. But thoughts also have an effect on people. Experiments have been done to measure the effect of meditation on the crime rate in an area, and it could be shown that if a larger group of the population of a city meditate the crime rate in this city comes considerably down. There were several such studies, for an example see: *Hagelin et al. 1999*.

When a whole city like Washington D.C. is affected by the concentrated effort of a few thousand people doing regular meditation – then the hypothesis seems obvious that thoughts form some kind of energy field (which cannot be measured directly though at this moment).

10.6.3 Thought Energy Field

If the existence of such a thought energy field could be established, then we could understand how our thoughts have effects on plants, animals, and humans. But also we could understand that we can somehow receive thoughts of others, a phenomenon which became known to the public in the form of „Remote Viewing“ which was done both in Soviet Union and in U.S. as part of the military surveillance.

In U.S., Targ and Puthoff, both physicists, established an institute with the aim to research remote viewing. which was supported by the CIA, NASA, the Defense Intelligence Agency, and Army and Air Force Intelligence. They had astonishing results (like drawing exact maps of hidden Soviet Army facilities or finding the place where a hostage was kept). For details see *Targ 2012*. If we assume that there is a collective field of thought energy and every thought someone has adds to this field, remote viewing could be explained.

The concept of Thought Energy Field reminds of Rupert Sheldrake’s concept of morphic fields. Sheldrake did some experiments which try to establish the existence of such a morphic field. One experiment was: Someone sits or stands at a place. Others stare at their back (or do not look in that direction), and the test subject has to say whether or not someone was looking at her or him. The result was that with statistical significance the test subject got it right. Sheldrake explains this by a morphic field which connects the test subject with the viewer. But the concept of morphic fields get a wider meaning when we look at another experiment Sheldrake did: He could establish that pets, especially dogs, know when their owner comes home. (In the experiment the normal time when the owners came home was varied, also they came home by different ways of transportation etc.) This example shows that Sheldrake uses “morphic field” not only for a thought field which humans create and sense, but also

animals sense that. (In that experiment the dogs sensed the intention of their owner to get home – not the actual time they left office.) For details, see e.g. *Sheldrake 1981*.

Similar ideas are developed in the “The Global Consciousness Project“, a project created originally in the Princeton Engineering Anomalies Research Lab at Princeton University. The purpose is „to examine subtle correlations that may reflect the presence and activity of consciousness in the world. We hypothesize that there will be structure in what should be random data, associated with major global events that engage our minds and hearts.“ The method is to „collect data continuously from a global network of physical random number generators located in up to 70 host sites around the world at any given time. The data are transmitted to a central archive which now contains more than 15 years of random data in parallel sequences of synchronized 200-bit trials generated every second.“ „When human consciousness becomes coherent, the behavior of random systems may change.“ Random number generators (RNGs) based on quantum tunneling produce completely unpredictable sequences of zeroes and ones. But when a great event synchronizes the feelings of millions of people, our network of RNGs becomes subtly structured. We calculate one in a trillion odds that the effect is due to chance. The evidence suggests an emerging noosphere or the unifying field of consciousness described by sages in all cultures.“

Events which move a lot of people like sports world championships, Princess Diana's funeral in 1997, or the memorial ceremonies for Mother Teresa short after, or catastrophies like 9/11, or recently the crane falling on a big crowd in Mecca or the bomb exploding during a peace gathering in Turkey are examined and all such events show significant deviations in the random systems.

The claim is that „Coherent consciousness creates order in the world. Subtle interactions link us with each other and the Earth.“ (All quotes from <http://noosphere.princeton.edu>.)

A theoretical explanation of the concept of Noosphere you find in *Nelson 2010*. Also consequences are elaborated: „One implication is that our attention matters in a way we have not imagined possible, such that cooperative intent can have real consequences. This is cause for reflection about our responsibilities in an increasingly connected world. Our future holds challenges of planetary scope that will demand cooperative intent. On this we should be of one mind.“ (*Nelson 2010, p. 13*)

This discussion shows that thoughts and emotions have an effect on matter, on plants, animals and humans, and therefore the concept of a field of thought energ is proposed. (Sheldrake’s „morphic field“ and Nelson’s „Noosphere“ lay emphasis on different aspects, but for both share important characteristics of such a thought energy field, and for reasons of simplicity I will now just use this term.)

Do we know of which type this proposed thought energy field is, can we understand it in terms of present physics, e.g.?

Chandrashekhra claims that „all mental activity is electromagnetic“ (*Chandrashekhra 2015, p. 182*). If we accept this statement then the thought energy field would have to be electromagnetic also. Of course we know that all emotional and mental activities are accompanied by some (rather subtle) electric currents which produce (again rather subtle) electromagnetic waves. This is not controversial. But is the energy field of thoughts limited to the electromagnetic spectrum? My hypothesis is that it is not limited to that spectrum. One reason for this assumption is that

electromagnetic forces decreases inversely in proportion to the square distance – and this contradicts the fact that for example the effect of a person on plants does not at all depend on the distance between that person and the plant. Difficult to imagine that 10 to 20 Watts on which our brain operates can produce waves which reach, e.g., from New York to Delhi. Difficult to imagine, yes. But better to get this tested which is quite easy: The experiment done in Pantnagar University – seeds kept for some time in a room where intensive meditation is being practiced and then germination is tested and compared with control – can be replicated, only half of the seeds should be kept in Faraday cages so that electromagnetic waves would be shielded. The other half kept without Faraday cages in the meditation room, and for total control some seeds would be kept in the lab. Then compare germination parameters of these three different batches of seeds. This experiment resembles that described in Berk/Sharma 2015 in which the effect of Agnihotra energy field on water is examined, with and without Faraday cage.

Therefore it seems reasonable to assume that the thought energy field goes beyond the electromagnetic range, it is part of the Subtle Energies Type II according to the distinction suggested above (see: 10.2).

Now, if we assume that some kind of thought energy field exists, how does that relate to Agnihotra? We have seen that the Agnihotra energy field goes beyond the electromagnetic range (see *Berk/Sharma 2015*). Can thought energy be part of the energy field of Agnihotra? According to Vedic Knowledge it is necessary that a human performs Agnihotra. One modus operandi probably is that Agnihotra helps the performer to purify his/her thoughts and thus have a positive effect on the surrounding thought energy field. But maybe in addition to that Agnihotra can directly affect the surrounding thought energy field, reducing negative aspects (like that of anger, envy, lust) and supporting positive aspects (like love and harmony).

In ancient Vedic Knowledge it is said that Agnihotra fire only can be done by a human being. Interesting to do this experiment: Someone performing Agnihotra, and then construct a device which adds the rice while the mantras are played from a music equipment. Compare the ashes you get from these two fires (with the means described in the chapters above, like have germination experiments, effect on bacteria and other microorganisms, chemical analysis, and the different tests which were described in the physics chapter, including testing the sound from the ashes). In case a clear difference can be established, this would lead to the hypothesis that thought energy of the performer of Agnihotra plays an important role.

The next question then is: Does Agnihotra also have an effect on human thoughts? That is suggested by the Agnihotra purifies the atmosphere also on the level of thoughts.

A large field of research, but a very promising one.

10.7 Can Quantum Theory explain Subtle Energies?

Can Quantum Theory help us to understand the process of Agnihotra and the more subtle energies possibly involved in it? Several physicists have suggested this approach.

Often the problem is like Ingo Swann describes it (he uses the term “psi” for what I call “subtle energies”):

„As a philosophical commitment, then, the early modern sciences held that whatever constituted scientific reality had to have a physical basis in matter, in the material. And so the consolidation of the rejection of psi was straightforward and simple: That psi could not be accepted until a quantifiable, material-physical basis for it, or any part of it, was identified.“ (See: *Swann 1996*)

Denying observations which do not have an explanation on the basis of presently accepted scientific knowledge is quite a common practice – normally observations should be the basis for scientific theories. If observations (carefully done of course) do not fit into the present body of scientific knowledge these theories have to be expanded so that the observations are taken care of, or refuted.

One way out of this dilemma may come in the form of quantum physics. Observations which cannot be explained in terms of classical physics may quite well be compatible with quantum physics. This perhaps also is true for certain subtle energy occurrences. But of course it is not enough to state “quantum theory can explain that” which we hear quite often now in the context of subtle energy phenomena. Maybe it can – but the explanation actually has to be elaborated.

A general reference to quantum physics only suffices to counter a crude criticism of that sort: “Science tells us that matter is composed of electrons, protons, neutrons. In case there is no difference in this composition between say water taken from a river and same water kept in Agnihotra Atmosphere for a couple of days – then there can be no difference at all and any effect you observe must just be due to some measuring error.” Actually, often this type of criticism is often brought forward against homeopathic medicine (which at higher dilutions does no longer contain any molecules of the original healing substance, instead it is pure water). Quantum physicists tell us though that it is a misleading model that matter is composed of electrons, protons, and neutrons. Hans-Peter Dürr, a leading German nuclear physicist and the main disciple of Nobel laureate Werner Heisenberg (and his successor as Director of the Heisenberg-Institute in Munich) stated that “matter does not exist”. If you look deep enough you will find waves of probabilities (and only by observing such waves condense and form say an electron).

But how can quantum processes – approximately 30 orders of magnitude smaller than our “normal world” – have an effect in this normal world? Normally such processes will be levelled out by probabilities until we reach our normal world. But there are exceptions – as applications like the laser light show. One important feature here is that constantly energy is added to the system and thus some instable state is constantly preserved. Dürr suggests that similar mechanisms can play an important role in living systems also.

How can that help to understand better how Agnihotra works? The timings of Agnihotra are interesting: Both sunrise and sunset are moments of instability. The sun’s rays are tangential to the surface of the planet (or rectangular to the connecting line between the Agnihotra pyramid and the centre of planet Earth). Then a flame is a system with many instabilities. Generally, in instable states very small forces are sufficient to have a large effect. But these forces have to be exerted in a very precise manner. Maybe this is the reason why it is emphasized that all disciplines of Agnihotra have to be followed rigorously?

Another idea is that possibly entanglement plays a role in the Agnihotra process. It is said that at the time of sunrise a flood of different energies come from the sun. These particles may be entangled with some still in the sun and thus having a connection? This is so far only a speculative hypothesis, hopefully some quantum physicists will get interested and study this subject in detail.

At the end of this paragraph I want to add two quotes which I found in a video on “Vedic theories of the Universe” (see: <https://www.youtube.com/watch?v=hEca1MiE4GA>). Modern physics talks of more than our three dimensions (or four dimensions, including time). If it is true that there are many more dimensions which we cannot access with our senses – but at the same time we could influence these dimensions and they could influence us, then a vast area of future research would open up and maybe some of the hitherto unexplained subtle energy effects could be easily understood.

According to vedic physics , space inside our universe is multidimensional . There are 64 main dimensions and each dimension is further divided into many sub-dimensions . Since the inhabitants of earth can perceive three dimensions , their senses have no access to many other realms of universal reality !!

10.8 Methods to measure subtle energies

There are several methods to measure more subtle energies, some rather subjective and highly depending on the capacity of the person using them (like pendulum or dowsing rod), others more easy to learn. But mostly although instruments are showing some replicable results we still are at the beginning of understanding what kind of energy are actually measured.

One of the early pioneers of measuring subtle energies especially in plants was Acharya Jagadish Chandra Bose who was far ahead of time in many respects. And even now it is mostly uncharted territory, challenging but at the same time very interesting.

10.8.1 Use of pendulum or dowsing rod

Pendulums and dowsing rods are often used in order to detect or measure different kinds of subtle energies. The main objection is that this kind of measurement is not very reliable – different people often get different results. Of course the quality of such measurements depends a lot on the training of the person (especially important is: to let go one’s own preconceptions as these may influence the pendulum or dowsing rod), but that is not different from using any other modern instrumentation. There are some areas where dowsing is widely used and commonly accepted – like finding pipelines hidden under the sands in a desert.

Interesting the following explanation how pendulums and dowsing rods may work: „Did you know that the soles of your feet and the palms of your hands contain minute magnetic receptors and sensors that "recognize" minute and gross changes in local magnetism? Here are the rudiments of dowsing, healing, and various rough forms of psychometry which means psyching-out what something is by merely holding it. Alas, though. If you haven't built neural pathways linking these sensors to your cognitive faculties, you probably won't be able to sense what the receptors in the soles of your feet picking up.“ (*Swann 1996*)

10.8.2 Jagdish Chandra Bose's Crescograph

Really astounding which very subtle changes in plants Sir Jagdish Chandra Bose was able to measure – more than one hundred years ago!

„Sir Jagdish Chandra Bose is one of the most prominent first Indian scientists who proved by experimentation that both animals and plants share much in common. He demonstrated that plants are also sensitive to heat, cold, light, noise and various other external stimuli. Bose contrived a very sophisticated instrument called Crescograph which could record and observe the minute responses because of external stimulants. It was capable of magnifying the motion of plant tissues to about 10,000 times of their actual size, which found many similarities between plants and other living organisms.“ (www.famousscintists.org/jagdish-chandra-bose)

„Nearly a hundred years ago, based on his analysis of the nature of variation of the cell membrane potential of plants under different circumstances, J. C. Bose believed that plants can “feel pain, understand affection etc.” and suggested that a plant treated with care and affection receive a different signal than a plant subjected to torture and give response accordingly.

He found that every plant and every part of a plant appears to have a sensitive nervous system and responds to shock by a spasm just as an animal muscle does. In addition Bose found that plants grow more quickly amidst pleasant music and more slowly amidst loud noise or harsh sounds.

Suppose someone feel like pulling out a leaf of a flower plant to feel it. We think that the plant does not suffer like us. But the plant does suffer. In fact the pulsation of the plant stops where the leaf was plucked. In a short time the pulsation again begins at the spot, but this time very slowly and then it completely stops. That spot is as good as dead for the plant.“ (*Chandrashekhar 2015*, p.182/183)

It took nearly one hundred years after Bose's subtle measurements with the crescograph until another scientist measured reactions which could be interpreted as plants' feelings – that was Cleve Backster from U.S. who used the equipment for lie detection (he was the top expert in this area, working for CIA) to measure subtle reactions of plants on touches or even on thoughts, see *Backster 2003*.

10.8.3 Life energy meter

The Life Energy Meter which was developed recently is said to measure some kind of subtle energy. See the information which the manufacturer, a company named Heliognosis, gives:

„*Life Energy Meter*. This unique device is based on the mysterious Orgone Field Meter of Wilhelm Reich. The phenomena it detects has been known by several names including Orgone, Zero Point Energy and chi. (From: <https://www.heliognosis.com>)

Based on the mysterious Orgone Field Meter of Wilhelm Reich, this unique device detects a new type of energy field known by several names including Orgone, life energy, Chi and Zero-point energy. The original Orgone field meter of Reich required a large high frequency and high voltage power supply which would occasionally shock the user. The output was a simple light bulb whose intensity could be compared subjectively or using an optically coupled

galvanometer. Little is known about the original device beyond Reich's claims that living things yielded higher readings than non-living objects.

At Heliognosis, our engineers have developed the basic operational principle of the Orgone Field Meter into a compact, benchtop monitor. It provides quantitative readings of the energy content of humans, animals, plants, solutions and even space itself. The plate excitation energy has been reduced so direct contact with the skin does not cause any unpleasant sensations. The meter provides five ranges to detect from the strongest fields such as those found in humans to the weakest fields encountered in ambient surroundings. Zero controls are provided to allow the user to "zoom in" and make detailed comparisons between samples as well as to provide the user the possibility of measuring as a field strength meter or as a positive/negative comparison indicator.

How it works

A low frequency "displacement current" is connected unipolarly to a sensor which may be a vacuum tube or an insulated metal plate. The "displacement current" field fills the space surrounding the sensor and permeates all objects in its vicinity. The internal circuitry of the meter returns information about the extent of absorption of the excitation field and displays this as a deflection of the meter. Living things absorb more than non living things. The strength of the excitation field is proportional to the surface area that the plate makes with the surrounding space. Thus, metal objects brought near the sensor will cause the reading to increase. Water, which Reich believed to have a high energy content, also reacts strongly. Tests with other energy fields have shown that the instrument is insensitive to magnetic, electrostatic, electromagnetic and nuclear energies. Simple experiments, such as tests performed on plant leaves, have shown that green healthy leaves yield a high reading where as yellowing leaves show less and brown or dying leaves show only a small reading. Even after all objects are moved away from the sensor, a weak fluctuation may be detected and seen on the highest ranges of the device. It would appear that this fluctuation is due to the local Orgone field flux of space itself and may be a proof of the existence of the elusive "aether" or zero point energy.“ (www.heliognosis.com/specs.html)

A drawback of the Life Energy Meter is that it is not really clear which kind of subtle energy or Prana energy is measured. There may be others which are not detected by this equipment (but that is probably true for all such devices.) Also it does not give an absolute value of some subtle energy. It indicates changes of subtle energies though. Using it to measure the effect of Agnihotra was quite interesting. One could see a strong increase of some energy, and also an increase of the energy of people attending Agnihotra.

10.8.4 PIP (Polycontrast Interference Photography)

„In the late 1980s, using microchip technology, Harry Oldfield developed a scanner which could provide a real time, moving image of the energy field. He believed that the future of analysis lay in finding an effective scanner which can ‘see’ imbalances in the energy field rather than disease in the physical body.

This system became known as Polycontrast Interference Photography or PIP. Harry thought that the human energy field might possibly interfere with photons – ‘energy packets’ of light – or even what might be called ‘subtle energy photons’ in some way. He decided that ambient (surrounding) light would be interfered with by the field both when the incident ray travelled

towards the object and when the reflected ray bounced off the object. In the main, the 'object' of his interest was human beings.

He devised a computer programme which would analyse the different light intensities being reflected from the person or object being scanned. This system is at the same time deceptively simple and enormously accurate in the hands of people who know both how to operate it and what they are looking at.

Harry says: "We believe that we are showing up an energy interaction with light, which is giving us an insight into the energy counter-part, the etheric template on which our physical molecules are strung. On average, every atom in the human body is replaced every seven to nine years. Think of your body not as a physical structure but as a moving fountain of molecules that are constantly being replaced. So what keeps them a coherent recognisable form? We believe it to be an organising template of energy." (www.electrocrystal.com/pip.html)

A further development of this method was done in this century by Dr. Thornton Streeter, Centre for Biofield Sciences, Pune, India. In that institute some studies were done testing people with PIP before and after Agnihotra.



Scan 1 - Before Agnihotra



Scan 2 - After Agnihotra

The explanation given by the PIP experts was: „After Agnihotra the congested pools and bands increase in brightness, vibrancy and improved transference rates. Notice how the overall energy field has expanded and brightened up. This indicates that following the Agnihotra ceremony, this subject's body and head field readings increase in vibrancy and transference rates and corresponds with an improvement in his feeling.“ (From: CHEFR RESEARCH PAPER „The effects of 'Agnihotra' on individuals as shown by PIP Energy Field Imaging“, by Dr. Thornton Streeter, Centre for Biofield Sciences, Pune, India)

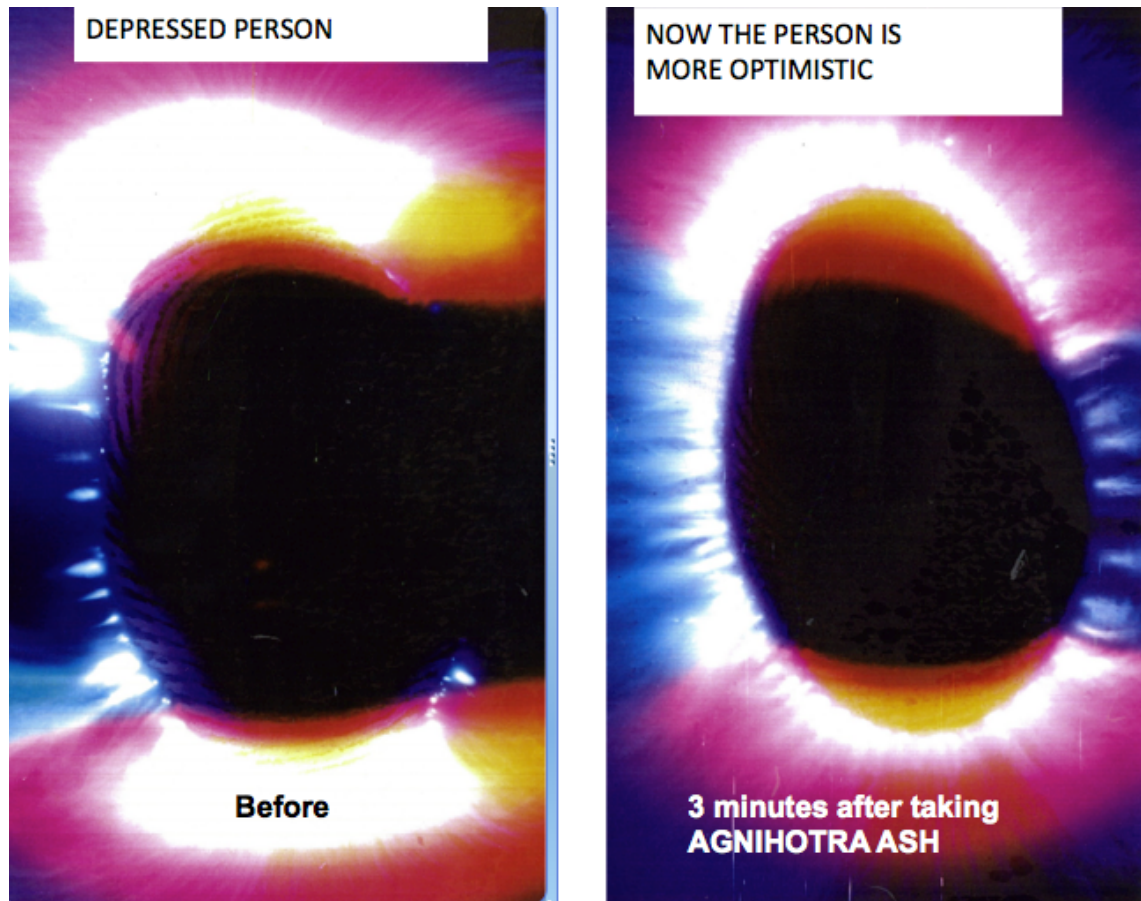
10.8.5 Kirlian Photography

„Kirlian photography is a collection of photographic techniques used to capture the phenomenon of electrical coronal discharges. It is named after Semyon Kirlian, who in 1939 accidentally discovered that if an object on a photographic plate is connected to a high-voltage source, an image is produced on the photographic plate

The Kirlians conducted experiments in which photographic film was placed on top of a conducting plate, and another conductor was attached to a hand, a leaf or other plant material. The conductors were energized by a high-frequency high-voltage power source, producing photographic images typically showing a silhouette of the object surrounded by an aura of light.“

(see: https://en.wikipedia.org/wiki/Kirlian_photography)

The Life Energy Meter and Kirlian photography are based on the same principle, „on the ability of living tissue to differentially absorb and radiate electric displacement currents.“ (www.heliognosis.com/rd04.html#exp04) This seems to indicate that both devices measure subtle energies of type I – those which are of low magnitude but in principal understood by modern science. Below an example of Kirlian photography of a thumb – before and after Agnihotra:



Changes are clear. For an exact interpretation though it needs training. There are doctors in Germany who very successfully use this tool for diagnosis of diseases.

10.8.6 GDV (Gas Discharge Visualisation)

Gas Discharge Visualisation is a method based on Kirlian photography, developed by the physicist Prof. Dr. Konstantin Korotkov, St. Petersburg, Russia, end of last century. On his own webpage he describes the method as follows:

„Gas Discharge Visualization technique (GDV), is a breakthrough beyond Kirlian photography for direct, real-time viewing of the human energy fields. This new technology allows one to capture by a special camera the physical, emotional, mental and spiritual energy emanating to

and from an individual, plants, liquids, powders, inanimate objects and translate this into a computerized model. This allows researcher and client to see imbalances that may be influencing an individual's well-being greatly facilitating the diagnosis of the CAUSE of any existing imbalances showing the area of the body and the organ systems involved. One of the greatest benefits to date is the ability to do "real-time" measurements of a variety of treatments for such conditions as cancer to determine which is the most appropriate for the client."

The method is described in an article available at: www.korotkov.eu/scientific-basis-of-gdv-bioelectrography. Following the first paragraph:

„What does the GDV method measure in physical terms?

The Gas Discharge Visualization (GDV) method is based on the stimulation of photon and electron emissions from the surface of the object whilst transmitting short electrical pulses. In other words, when the object is placed in an electromagnetic field, it is primarily electrons, and to a certain degree photons, which are 'extracted' from the surface of the object. This process is called 'photo-electron emissions' and it has been quite well studied with physical electronic methods. The emitted particles accelerate in the electromagnetic field, generating electronic avalanches on the surface of the dielectric (glass). This process is called 'sliding gas discharge'. The discharge causes glow due to the excitement of molecules in the surrounding gas, and this glow is what is being measured by the GDV method. Therefore, voltage pulses stimulate optoelectronic emission whilst intensifying this emission in the gas discharge, owing to the electric field created." (See: www.korotkov.eu/scientific-basis-of-gdv-bioelectrography)

10.8.7 Resonant Field Imaging (RFI)

RFI is an experimental electromagnetic feedback and imaging process. This new technology gives detailed scientific information and objective interpretations for all Auras and bioenergy fields, and identifies the type and function of all bioenergies present in specific regions of the human brain.

In particular, RFI generates complete psychological profiles that fully reveal the role of a patient's psychology in their health condition. While it is not intended for medical diagnosis of specific illnesses, RFI does give comprehensive information about a patient's health conditions, and provides a detailed and technical level of information that trained medical doctors can use as a factor in their professional decisions.

Perhaps most interestingly, RFI is the first Aura imaging technology that can create full colour bioenergy charts of objects, plants, animals, and even ambient bioenergy or brainwaves in the air, so its use is unlimited. (*Chandrashekar 2015*, p. 182)

10.8.8 Discussion

There are different ways of measuring subtle energies, some of them were described here. The descriptions of how these methods work are mainly based on electromagnetic interactions between say the human energy field and the instrument.

This might mean that all the devices mentioned above are only able to measure subtle energies of type I.

But it might also be that subtle energies of type II have some effects on energies of the electromagnetic type, and these effects can be measured. In this case we could indirectly measure subtle energies of type II.

Anyway, only if some energy not known yet interacts with known types of energies we are able to measure them. Without such interaction these energies would for the moment be beyond the reach of modern science. Advancement of science could of course change things and make these types of subtle energies not understood today part of normal science tomorrow – something which is quite normal in the development of science.

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12 Annexures

12.1 Annexure 1: Homa Farming and Resonance Point Technique

WHAT IS HOMA ORGANIC FARMING?

- HOMA Organic Farming means the application of HOMA Therapy in agriculture.
- HOMA Therapy means healing the environment, the atmosphere, and all of life using the ancient Vedic Science of Yajnya.
- HOMA means Yajnya or Havan. We use these terms synonymously.
- The backbone of this ancient science of HOMA Therapy is Agnihotra.
- Agnihotra is the smallest and basic HOMA which is performed exactly at sunrise and sunset every day.
- Agnihotra and HOMA Therapy can be practised easily by anyone irrespective of caste, religion, gender, age or race.
- In HOMA Organic Farming two more simple Homas are practiced, Vyahruti Homa and Om Tryambakam Homa.
- Homa Organic Farming is holistic healing for agriculture and can be used in conjunction with any good organic farming system.
- By practising Homa Organic Farming one can grow maximum yield in minimum agricultural area and keep the soil fertile, the water pure and the atmosphere nutritious.

HOW HOMA ORGANIC FARMING WORKS

The soil, water, atmosphere, subsoil water are all polluted by metallic, nonmetallic and gaseous toxicants of different types. The soil in large areas of forest is nearly dead.

THE SOIL FIRST NEEDS TO BE REJUVENATED WITH HOMA THERAPY.

In the rejuvenated soil different types of microorganisms, starting from the level of viruses, bacteria, fungi, algae, thrive. Thus, a healthy micro-flora and micro-fauna are created. This gives rise to a micro environment or micro-system which is comparatively less toxic to the growing plants.

The soil which has now become a living soil because of the presence of micro organisms has all the chemical components useful for life in the form of carbon, hydrogen and oxygen. According to modern theory, these three together form life in the form of bacteria. We have e.g. nitrogen fixing bacteria, also bacteria working on phosphorus content of soil.

After the creation of such micro environment, creatures like earthworms thrive. They eat the soil, digest it and again replenish the soil.

It has been found that when Agnihotra ash is added through normal soil it increases the water soluble phosphate content of the soil and the nutrients are absorbed readily by the root hairs of the plant. Absorption of mega nutrients like nitrogen, phosphorus, potash, because of small cells and active transport, is helped by Homa atmosphere.

When you perform Agnihotra and YAJNYA or other HOMAS in a garden, an atmosphere is created that is conducive to growing and therefore attracts the nutrients, insects, microorganisms and animals that would be happy and thrive in that environment. This, of course, is because nature is so wonderful, it automatically benefits the soil and the plant, and the plant thrives. Same thing happens when you put the ash or use Agnihotra ash water but it works more for the plants individually - by putting the ash around the individual plants or in the beds or spraying the plants, those elements that are best for that plant are attracted to it and it thrives.

Of course, we have to use basic operations of farming like weeding, organic composting, spraying with Agnihotra Ash solution, etc. PRACTICE OF HOMA, HOWEVER, IS THE KEY.

12.1.1 WHAT IS AGNIHOTRA?

Agnihotra, the basic healing fire of HOMA Therapy, is a small fire prepared in a copper pyramid exactly at sunrise and sunset each day. Agnihotra can neutralize the effects of pollution on plants, animals and human beings and at the same time give nourishment.

12.1.2 MATERIALS REQUIRED FOR AGNIHOTRA

PYRAMID: For Agnihotra you require a copper pyramid of specific size. Copper is a conductor for subtle energies also.

RICE: Brown rice. Highly polished rice loses nutritional value and hence we use less polished rice. Only unbroken pieces of rice should be used for Agnihotra. If rice is broken the subtle energy structure around the material is disturbed and hence is not fit for Agnihotra healing fire.



DRIED COW DUNG: Take dung from male or female progeny of a cow. Make pancake-like patties and dry them in sun. Agnihotra fire is to be prepared from this dried cow dung. Cow dung is treated as medicine in all ancient cultures whether they be Indians of North or South America, Scandinavians, East or West Europeans, Africans or Asians.

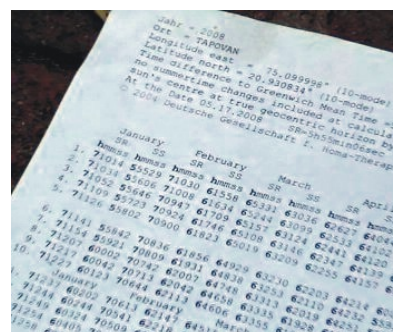
GHEE (clarified butter): Take some butter from cow's milk, which has no additives and is pure. Heat it on low heat. After the water has evaporated and white solids have risen to the top pass the liquid through a fine strainer. What passes through is clarified butter (ghee). This can last without refrigeration for a long time. Ghee is a very special medicinal substance. When used in Agnihotra fire it acts as a carrier agent for subtle energies. Powerful energy is locked up in this material.

TIMINGS: Agnihotra is practised exactly at sunrise and sunset each day. Computer-generated timetables are available for any place using software developed in Germany.

12.1.3 AGNIHOTRA PROCEDURE

A few minutes before the actual time of sunrise and sunset you should start to prepare the Agnihotra fire as follows:

Place a flat piece of dried cow dung at the bottom of the copper pyramid. Arrange pieces of dried cow dung in the pyramid in such a manner as will allow air to pass. Apply a little ghee to a small piece of cow dung and light it. Insert this lighted piece of cow dung in the middle of the pyramid. Soon all the dung in the pyramid will catch fire.



You may use a hand fan to blow the air and help the flame. However, do not blow on the fire so as to avoid bacteria from the mouth affecting the fire. Do not use any mineral oil or similar material to start the fire. At sunrise and sunset the fire should be fully ablaze in the pyramid.

You take a few grains of rice in a dish or your left palm and apply a few drops of ghee to them. Exactly at sunrise utter the first Mantra and after the word SWAHA add a few grains of rice (as little as you can hold in the pinch of your fingers will suffice) to the fire. Utter the second Mantra and after the word SWAHA add a few grains of rice to the fire. This completes morning Agnihotra.

At sunset do the same by using evening Mantras. This completes evening Agnihotra.

If you miss the timing it is not Agnihotra and you will not get the healing effect on the atmosphere or in the ash.

After each Agnihotra try to spare as many minutes as you can for meditation. You can sit at least till the fire extinguishes itself. Agnihotra creates medicinal and healing atmosphere. Just before the next Agnihotra collect the ash and keep it in a glass or earthen container. It can be used for plants or making folk medicines.

12.1.4 MANTRAS FOR HOMA THERAPY

There are vibrations that exist everywhere. It is only vibrations when you go into it. Where there is vibration there is also sound. When we do these Mantras, the sounds we utter activate these special vibrations that will create certain atmosphere of effects. Then the desired results are realised. These vibrations exist for everything, so anything can be activated, controlled or changed by Mantras.

12.1.4.1 SUNRISE AGNIHOTRA MANTRA

sooryáya swáhá sooryáya idam na mama

Add the first portion of rice after swáhá.

prajápataye swáhá prajápataye idam na mama

Add the second portion of rice after swáhá.

12.1.4.2 SUNSET AGNIHOTRA MANTRA

agnaye swáhá agnaye idam na mama

Add the first portion of rice after swáhá.

prajápataye swáhá prajápataye idam na
mama

Add the second portion of rice after swáhá.

Agnihotra should be performed every day at sunrise and sunset.

अग्निहोत्र मंत्र

(सूर्योदय)

सूर्याय स्वाहा सूर्याय इदं न मम ।

प्रजापतये स्वाहा प्रजापतये इदं न मम ॥

(सूर्यास्त)

अग्नये स्वाहा अग्नये इदं न मम ।

प्रजापतये स्वाहा प्रजापतये इदं न मम ॥

12.1.4.3 VYÁHRUTI MANTRA

bhooḥ swáhá agnaye idam na
mama

Add a drop of ghee after swáhá.

bhuwah swáhá wáyawe idam na
mama

Add a drop of ghee after swáhá.

swah swáhá sooryáya idam na
mama

Add a drop of ghee after swáhá.

bhoor bhuwah swah swáhá
prajāpataye idam na mama

Add a spoonful of ghee after swáhá.

12.1.4.4 OM TRYAMBAKAM MANTRA

Om tryambakam yajámahe
sugandhim pushti wardhanam

urwárukamiwa bandhanán
mrutyor muksheeya māmrutát
swáhá

Add a drop of ghee after swáhá.

Vyahrti Homa can be performed at any time except sunrise and sunset. It is also performed when commencing Om Tryambakam Homa.

Om Tryambakam Homa should be performed for 4 hours every day. It should also be performed for 24 hours on full moon and no moon days.

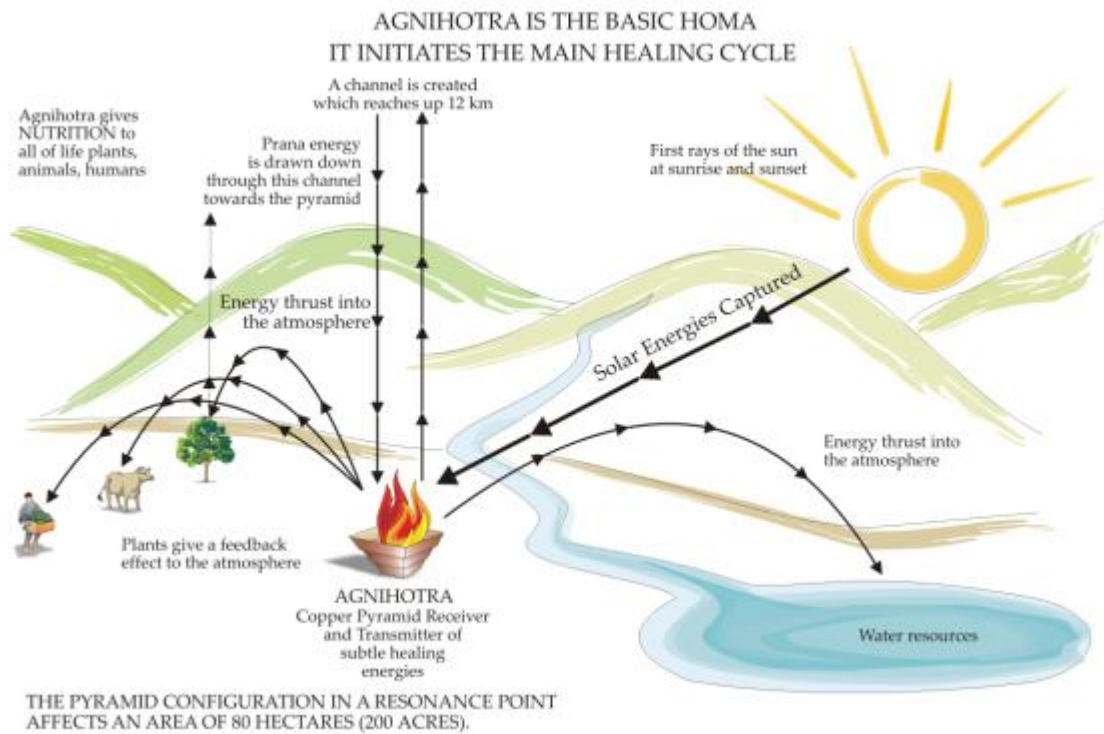
व्याहृति मंत्र

भूः स्वाहा अग्नये इदं न मम ।
भुवः स्वाहा वायवे इदं न मम ।
स्वः स्वाहा सूर्याय इदं न मम ।
भूर्भुवः स्वः स्वाहा प्रजापतये इदं न मम ॥

ॐ त्र्यम्बकम् मंत्र

ॐ त्र्यम्बकं यजामहे सुगन्धिं पुष्टिवर्धनम् ।
उर्वारुकमिव बन्धनान्मृत्योर्मुक्षीय मामृतात् स्वाहा ॥

12.1.5 HOW DOES AGNIHOTRA WORK?



The sun brings or takes the energy, which makes all conditions conducive to an anti-pollutionary change. It calms the world. The pyramid is the generator, the fire, the turbine. Just at morning Agnihotra all the electricities, energies, ethers are attracted to the pyramid in its shape. At sunset these energies are thrust out in same shape. This flood of energies at sunrise creates strong purifying effects on all levels wherever it touches the Earth.

Agnihotra amplifies these purifying effects in the following way:

This flood of subtle energies carries music with it. The morning Agnihotra Mantra is the quintessential sound of that flood. If you then prepare the fire in the prescribed copper pyramid, utter these mantras and offer the rice mixed with ghee to the fire, then a channel is being created through all the atmosphere and PRANA - life energy, is purified.

Tremendous amounts of energy are gathered around the Agnihotra copper pyramid just at Agnihotra time. A magnetic-type field is created, one which neutralises negative energies and reinforces positive energies. When Agnihotra fire is burnt there is not just energy from the fire. The rhythms and Mantras generate subtle energies which are thrust into the atmosphere by fire. Also consider the quality of materials burnt wherein lies the full effect of this healing HOMA. Much healing energy emanates from the Agnihotra pyramid. An aura energy field is created around plants during Agnihotra. Thus plants become stronger and disease resistant. When the flame dies the energy is locked in the resultant ash. This ash is used for preparing various folk medicines. Therefore, by regular performance of morning and evening Agnihotra, you create a positive energy pattern on all levels.

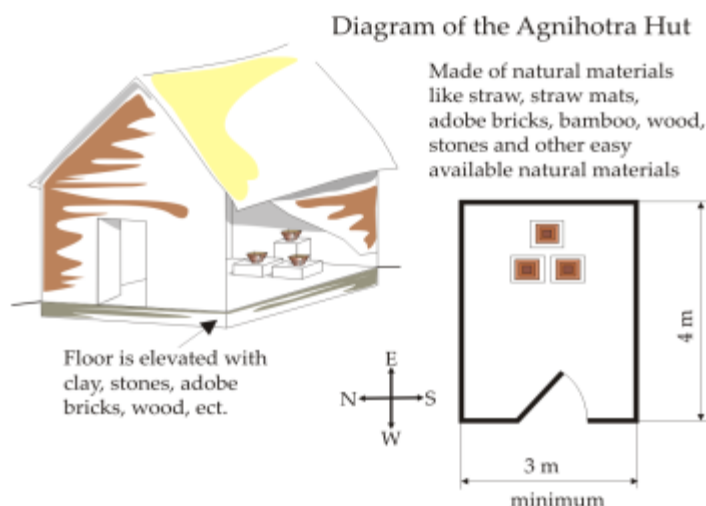
12.1.6 RESONANCE POINT

Resonance Technique is a part of HOMA Therapy where simple practices are used to heal large areas of diseased land in a short time.

The same human effort is required to heal one acre or two hundred acres. One RESONANCE POINT can heal up to 200 acres (80 hectares) of land. For this 10 new pyramids are charged with mantras and placed on the farm in a special configuration by a Homa Therapy volunteer who is authorized to install resonance points. Also two simple huts are needed, built with inexpensive, natural materials, found locally, like wood, adobe bricks, mats, bamboo, stone, cane, etc. Nobody will live there. They are simply to protect the person performing the HOMA healing fires from the sun and rain and to prevent animals like dogs, cats, chickens, etc. from entering.

12.1.6.1 ACTIVATION OF THE TEN RESONANCE PYRAMIDS

Activation of the ten pyramids is done in the Agnihotra hut only once. All pyramids are charged at the same time with fire and Mantra. After cooling, the ash is removed from all the pyramids, mixed with water and given to any sick tree or any other plants in the area.

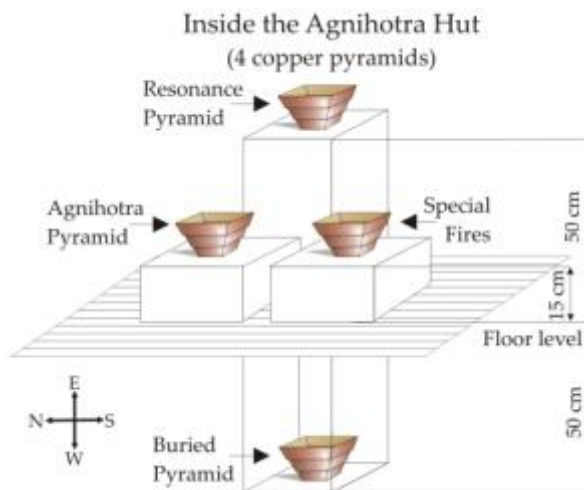


The main pyramid which has been charged first will be buried in the Agnihotra hut, about 50 cm deep. It is important that the pyramid faces exactly the same direction as when it was activated, i.e. the side which was facing east during activation, should remain facing east when buried. The resonance pyramid on top of the column should be placed directly above the buried pyramid and also aligned exactly to the east.

According to ancient science, as the earth rotates, contact is kept between the sun and this particular point. The practice of Agnihotra in this hut has to be started at sunset, not at sunrise. It is like switching on this point at sunset.

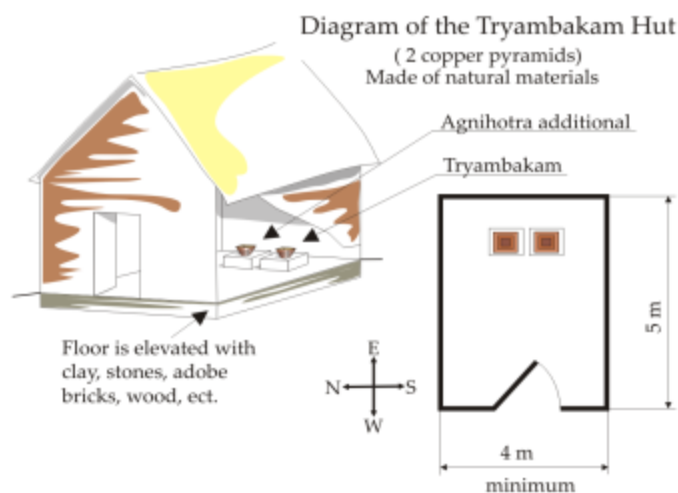
12.1.6.2 AGNIHOTRA HUT

The main hut or Agnihotra hut is where the AGNIHOTRA fire is performed daily at sunrise and sunset. It is ideal to build this hut in the centre of the farm, if possible. Size should be approximately 3 x 4 meters, the longer side aligned with the EAST/WEST axis. Entrance has to be from the WEST and one will sit down facing EAST to do the fires. Near the EAST wall and parallel to it, a hole of approximately 50 cm depth and 30cm x 30cm should be dug. All this should be ready before the Homa Therapy volunteers come to install and activate the resonance point.



After activation, once the main pyramid is buried, a column of mud is built on top of it, to an approximate height of 50cm and another activated pyramid is placed on top of it, directly above the buried pyramid. This way, the pyramid on the column is at heart level of the person sitting on the floor in front of the column. The pyramid on the column will not be used again, but acts as a Resonance Pyramid.

Then two of the other activated pyramids are placed on smaller mud platforms on the right and left hand side in front of the main column. The one on the left is for daily AGNIHOTRA and the one on the right is for the performance of other occasional fires. Altogether we have four pyramids in this hut.



The Agnihotra hut is a place of silence, no words, other than the Mantras, are spoken inside. Thus there is no interference with the subtle healing energies. This hut is the **Generator of Healing energies.**

12.1.6.3 OM TRYAMBAKAM HUT

The OM TRYAMBAKAM hut is to be little larger than the first one (approximately 4x5m). It is also known as the HEALING HUT. Sick people can sit there and they will be healed automatically. It is the fire. We are doing the fires for agriculture, yet

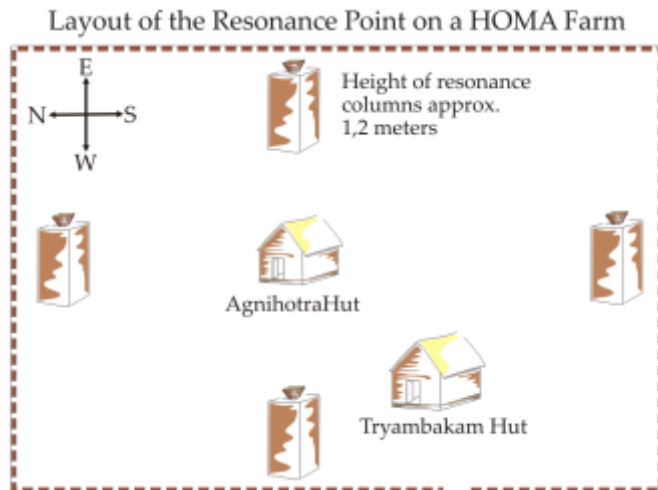
the whole area becomes healing area for sick plants, animals and human beings. You face EAST while doing HOMA.

In this HEALING hut, two pyramids are to be placed on small mud platforms, the one on the right for OM TRYAMBAKAM HOMA and the one on the left for AGNIHOTRA. To get the maximum effect, four hours Om Tryambakam Homa should be performed daily and twenty-four hours on full and no moon days.

It is better to construct this hut near the entrance of the farm so that outsiders can come and go without disturbing the privacy of those who live and/or work on the farm.

RESONANCE PILLARS

The other four pyramids are installed on the boundary of the farm, or at a maximum distance of 500 metres exactly north, south, east and west from the central point of resonance, i.e. the Agnihotra hut.

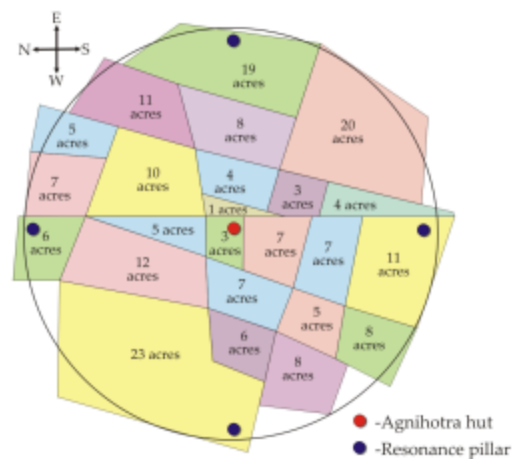


On each point a column of mud is built, the top of which should be at heart level of a person standing (approximately 1.2 metres), and an activated pyramid is placed on top of the column. Small wooden boxes, if necessary with locks, can be built on top of each column, to maintain the pyramids clean and safe, when they are not in use. It is important that no rain or any other material should enter the pyramids.

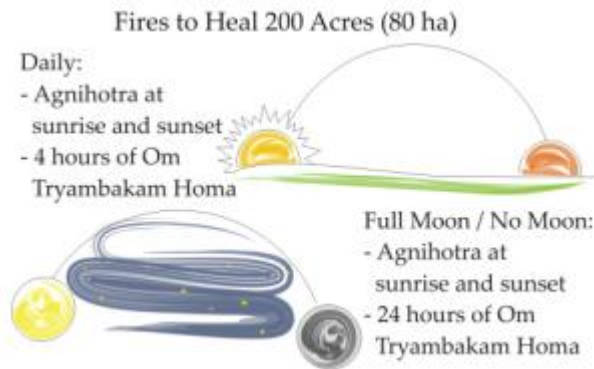
12.1.7 HOMA ORGANIC FARM COMPLEX

The same human effort is required to heal one acre or 200 acres. The following example shows a complex of 24 small farms which could cooperate as a single Resonance Point unit. This results in a sharing of the labour and costs between the farms.

To heal sick plants, to rejuvenate the earth and to improve the quality of the water, **AGNIHOTRA** should be performed daily at exact timings given by computer according to the longitude and latitude of the specific farm.



Also a minimum of 4 hours of **OM TRYAMBAKAM HOMA** should be performed daily. On full moon and new moon, 24 hours or as near as possible to 24 hours of **OM TRYAMBAKAM HOMA** should be performed.



These guidelines are to be followed in order to:

- heal plants from fungi, bacteria, harmful insects, nematodes, weevils, viruses, etc.
- control weeds
- produce abundant and healthy crops.

Along with the healing fires application of Agnihotra ash-water solution, Biosol and compost (e.g. vermicompost) is recommended.

The quality of the production will be superior in quantity, taste, texture, color, nutritional value, disease resistance and reduction of harvesting losses.

This is how the science of Homa Therapy works. Every farmer can become a happy, prosperous farmer again. Poverty and disease can be eradicated from the world.

12.1.8 SOME IMPORTANT POINTS

- For exact calculations of sunrise/sunset Agnihotra timings we use computer software developed in Germany, which uses a certain definition for sunrise/sunset (as given by the Rishis according to Vruksha Ayurveda)
- If Om Tryambakam Homa is being performed and time of sunrise/sunset is coming, it should be interrupted briefly and Agnihotra is performed in the left hand pyramid. Immediately after the Agnihotra Mantra, Om Tryambakam Homa can be resumed.
- Keep Agnihotra ash and Om Tryambakam ash in separate vessels. **Only Agnihotra ash is used as medicine for humans, plants and animals.** Om Tryambakam Homa ash can be added to compost or put directly onto the field.
- Before entering the Agnihotra hut minimum discipline is to wash hands and feet and rinse the mouth.
- The Homa therapy volunteer will come to the farm and set up the Resonance Point. What the farmer has to do afterwards is very simple, that is daily performance of AGNIHOTRA and OM TRYAMBAKAM HOMA.
- Homa Organic Farming is totally AHIMSAK (non-violent). It is important that no animal is killed and that animals should not be bred for slaughter.
- If anyone wants to learn how to set up Resonance Points, he should first practice Agnihotra and Om Tryambakam Homa regularly for at least six months. Then he has to attend special classes for training and get some field experience with an experienced volunteer. Training will be given free.

12.2 Annexure 2: Preparation and Application of Homa Biosol

Mary Lee Weir

Homa Therapy Teacher, Belize



Biosol System of fertilization is composed of processes which lead to the bio-degradation of organic matter developed within Homa atmosphere using Agnihotra Ash and its solution with Yantra.

We can use Biosol liquid for foliar application to nourish plant kingdom as well as we can also rebuild the soil health with Biosol. Biosol is superior to vermiwash because we keep the organic material for bio-degradation in a bio-digester with Agnihotra ash for thirty days. Agnihotra ash will have a significant positive effect on all the materials used and will make the Biosol rich in macronutrients.



12.2.1 MATERIALS USED (for 500 litre tank)

Vermicompost	80 kg
Fresh cow dung	80 kg
Cow urine	10 lt
Agnihotra Ash	250 g
Shree Yantra	1 unit
Water	200 lt

12.2.2 BIO-DIGESTER

The bio-digester tank may be of 500 litres or 1,000 litres in volume. It is filled with organic matter and Agnihotra ash water solution. It may be in the form of cylindrical rigid plastic tank or a cement tank with air valve, liquid outlet and a lid. Care should be taken that after filling the material in proper proportion, the lid should be sealed to avoid air leakage.

The diameter of air valve opening should be one and a half inch (1 1/2"). The air ball valve should be fixed properly. Outlet for Biosol liquid should be of six inches (6") diameter and oriented so as to facilitate easy removal of Biosol. The lid should be sealed with good quality adhesive and teflon tape.

12.2.3 PROCEDURE

1. Put one copper Shree Yantra at the bottom of the tank facing upwards. (Shree Yantra geometrical design is engraved in copper and, according to traditional knowledge, is a powerful energy attractor).
 2. Make two hundred litres Agnihotra ash water solution (i.e. one kg of Agnihotra ash in two hundred litres of water). Let it stand for 3 days before use.
 3. Collect 80kg fresh cow dung, 80kg vermicompost and 10 litres cow urine.
 4. Divide the cow dung and vermicompost into 3 piles each.
 5. Mix one part vermicompost, one part cow dung, about 3 litres of cow urine and about fifty litres of Agnihotra ash water solution and stir to a slurry. This can be done outside the tank. After stirring thoroughly, pour it into the tank. (Make sure the valves are closed before pouring).
 6. Repeat the same process with the second portion of the materials while stirring the material continuously and then add the second slurry to the tank.
 7. Finally repeat the process a third time and add the slurry to the tank.
 8. Add the remaining Agnihotra ash water solution to the tank and again stir.
-

In this way filling of 160kg of organic matter + ten litres cow urine + 200 litres of Agnihotra ash water solution is done. Make sure that all the material is fully stirred. Seal the lid with adhesive and teflon tape. Care should be taken that glue should not fall in the tank while sealing.

At an interval of seven days, release the air valve to release the gas formed in the Bio-digester. In this way for thirty days the biodegradation of organic matter will take place in the presence of Agnihotra Ash.

After thirty days outlet valve is opened to remove the Biosol liquid. It should be filled in air tight plastic cans of suitable sizes. The moist solid material which remains after removing Biosol liquid should be squeezed and more liquid Biosol is collected.

We may get about two hundred litres of Biosol liquid. It should be used for foliar applications with water at a ratio of 1:15 to 1:20 depending on density of plant population. We can spray Biosol liquid on any type of crop at an interval of seven days. Roughly 20 litres is required per acre per month.

If we preserve Biosol liquid in air-tight cans it will last longer, say about six months. Left over solid Biosol which is having maximum macro nutrients should be mixed with any type of organic manure at a ratio of 1:5.

12.3 Annexure 3: The Energy Field of Agnihotra

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Effect of *Agnihotra* energy field on water purification

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Agnihotra is a special fire performed exactly at the time of sunrise and sunset in a copper pyramid. It comes from ancient Vedic Knowledge. *Agnihotra* is said to purify the environment and especially it has been found to have profound impact in mitigating water pollution problem. The present study shows that water will be purified if it is kept in a room where *Agnihotra* is regularly performed. Water purification also happens if water bottles are kept inside a Faraday Cage in the *Agnihotra* room. These results suggest that *Agnihotra* creates an energy field beyond the electromagnetic field which has profound impact.

Keywords: Water purification, *Agnihotra*, Energy field, *Prana*, *Vedas*

IPC Int. Cl.⁸: C02F, F23, F24, F16L55/02, F16H 33/00

Availability of potable drinking water is becoming increasingly a worldwide problem. Dumping of industrial wastes, radiation coming from the bowels of the earth and from a number of human activities, atmospheric pollution, all are affecting availability of water suitable for human consumption and for agricultural use. This, coupled with acid rains further aggravates the situation. Therefore, inexpensive and easily available methods of water purification are becoming more and more important. Some reports suggest that the ancient method of *Agnihotra* may offer a cheap and affordable solution.

Preliminary tests have shown that if *Agnihotra* ash is added to polluted water, it gets purified (Mondkar¹, Gerlecka², Matlander³). Further, Matlander showed that if you not only add *Agnihotra* ash to water but also keep the water in *Agnihotra* atmosphere (in a room where *Agnihotra* is performed regularly), the reduction of pathogenic bacteria is higher. Sharma⁴ then went one step further and did not add *Agnihotra* ash but just kept water bottles next to a *Somayag* (a long lasting process of fire purification - but which is also based on the principles of *Agnihotra*). Observation was that also in this case water was purified. But since the bottles were open, a chemical effect of smoke particles cannot be excluded.

Sharma⁵ also showed that *Agnihotra* atmosphere not just locally purifies water but leads to the purification of a whole river in its vicinity.

The object of the present experiment was to see whether just *Agnihotra* atmosphere without any effect

of *Agnihotra* ash or *Agnihotra* smoke would be able to improve water quality (*Agnihotra* atmosphere has been reported to have a positive effect on the sprouting of seeds, see Devi/Swamy/Nagendra⁶).

A first test showed that after a period of 5 days the count of *Coliform* bacteria was reduced by more than 50% compared to control (same water kept in the laboratory during these 5 days).

As any chemical reaction with either ash or smoke of *Agnihotra* was excluded the effect could only be in terms of physics. This leads to the assumption that regular performance of *Agnihotra* creates some kind of energy field which helps to purify water. But which kind of energy field could this be?

In every day life the most common energy fields are electromagnetic fields. Could it be that electromagnetic fields lead to the purification effect of *Agnihotra* on water?

In order to find out whether electromagnetic fields generated by *Agnihotra* are responsible for the improvement of water quality the following systematic studies were designed. It is well known that Faraday Cages shield electromagnetic waves. Therefore, if the effects of *Agnihotra* on water are (partly) based on some electromagnetic waves, then there would be no (less) change in the parameters of water quality if this water is kept in such Faraday Cages. This was to be tested.

Materials and methods

1) *Agnihotra*

Agnihotra is the smallest and basic Homa healing fire which is performed in a copper pyramid of fixed

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size and shape, tuned to the biorhythm of sunrise/sunset. It comes from the ancient most *Vedic Sciences of Bioenergy, Medicine, Agriculture and Climate Engineering*. This knowledge has been revived by Shree Gajanan Maharaj from Akkalkot, Maharashtra last century and taught worldwide by his disciple Shree Vasant Paranjpe⁷. A compilation of recent research on *Agnihotra* and Homa Therapy is given in Berk/Johnson 2009⁸.

In this ancient tradition sunrise is described as follows:

“At sunrise the many fires, electricities, ethers and more subtle energies emanating from the sun extend all the way to the Earth and produce a flood effect at those coordinates where the sun is said to rise. It is awesome. The flood enlivens and purifies everything in its path, destroying what is impure in its wake. This torrent of life-sustaining energies causes all life to rejoice. At sunrise that music can be heard. The morning *Agnihotra Mantra* is the essence of that music. It is the quintessential sound of that flood. At sunset the flood recedes” (Paranjpe 1989).

1 The materials used for present study consist of following:

A pyramid shaped copper container, 14.5 cm x 14.5 cm at the top, 5.25 x 5.25 cm at the bottom and 6.5 cm in height.

2 Fire prepared with cow dung patties duly smeared with cow's ghee and its offering to fire along with chanting following *Agnihotra Mantras*.

At sunrise:

Sooryáya swáhá, sooryáya idam na mama prajápataye swáhá, prajápataye idam na mama

At sunset:

Agnaye swáhá, agnaye idam na mama prajápataye swáhá, prajápataye idam na mama

2) Conducting the experiment

For the experiment water was taken with a bucket from the Narmada River in Mandleshwar, Madhya Pradesh, India (22° 10' 29" North, 75° 39' 59" East). The water was stirred and then distributed into glass bottles for experimentation.

Three bottles for control were immediately brought to the laboratory of Shri Umia College, Mandleshwar, MP (first two replications) and of AIMS College, Dhamnod, MP (third replication plus several control experiments). The measurements took place between October 2012 and February 2014.

Seventeen bottles were brought to the Homa Therapy Goshala in Maheshwar, MP. Three each of the bottles

filled with water were put in containers made of stainless steel, copper and aluminum, respectively. Care was taken that there was no direct contact between the bottles and the metal containers. At the bottom of the metal containers a piece of dried cow dung was placed and at the sides a distance of one cm was kept. Then, the metal containers were closed with a tightly fitting lid in order to get Faraday Cages.

In addition to these 9 water bottles enclosed in metal containers for comparison, also 8 bottles without metal containers (filled with the same water from Narmada River) were used.

All these bottles were placed in the *Agnihotra* hut at Maheshwar Homa Therapy Goshala where *Agnihotra* has been performed regularly exactly at sunrise and sunset. No other activities are going on in this *Agnihotra* hut, and no words other than mantras related to *Agnihotra* are spoken there.

Figs. 1 & 2 show both shielded and unshielded bottles in the *Agnihotra* hut, and Fig. 3 shows the arrangement of all water bottles for the experiment.



Fig. 1 - Left side: Water bottles in metal containers; Right side: *Agnihotra* is performed in the left-hand pyramid



Fig. 2 - Unshielded bottles

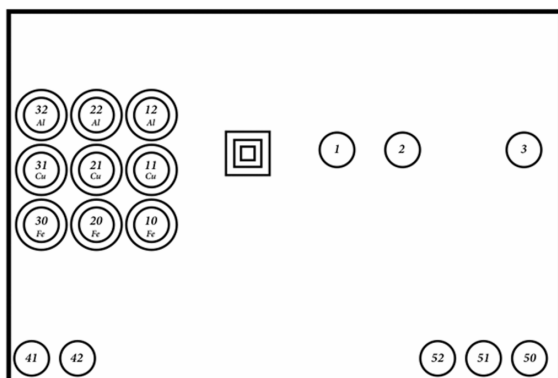


Fig. 3 - Array of shielded and unshielded bottles. One circle - unshielded bottle. Two circles - shielded bottle, metal is indicated

The temperature in the *Agnihotra* hut (where the experimental samples were kept) and the office room of the laboratory (where the control samples were kept) showed only minor differences.

After 5 days all water samples were taken out from the *Agnihotra* hut and brought to the laboratory for testing. These samples plus those kept there for control were examined for the most important physico-chemical parameters of water: Dissolved Oxygen (DO), pH, Chemical Oxygen Demand (COD), hardness, and count of *Coliform* bacteria.

Physico-chemical parameters of water were determined as per standard methods of APHA⁹ and Welch¹⁰.

Parameters like temperature, pH, Dissolved Oxygen (DO), and turbidity were determined at the site, while other parameters like Chemical Oxygen Demand (COD), chloride, phosphate, nitrate, alkalinity, free CO₂, total solids were determined in the laboratory.

The tests were conducted according to single blind protocol: To prevent bias in the results all bottles were marked with numbers only before testing in the laboratory.

Results and discussion

The experiment was done with three replications. All showed considerable improvements in water quality compared to control in all the five parameters tested. Table 1 shows the results in detail, Table 2 shows the percentage changes as compared to control.

Fig. 4 is a graphical representation comparing properties of all the water samples kept in *Agnihotra* atmosphere versus control.

There was a general improvement of water quality in all the parameters measured as compared to

control. These changes are consistent through all three replications.

Although there was some difference between the water samples kept in metal containers and the samples kept in bottles regarding DO, pH, and COD, this difference was rather small compared to the difference with control (Fig. 5).

Also, there were some differences between the different kinds of metal containers - but again these differences were small compared to the difference with control. Further, experiments could look deeper into these differences.

The main results with all three replications and all parameters of water quality are that:

- Agnihotra* atmosphere helps to purify water.
- This effect of purification is there whether or not the water samples are kept in Faraday Cages.

The conclusion seems natural that there is some kind of energy field around *Agnihotra* which is not of the known electromagnetic type and which is not shielded by Faraday Cages.

If someone has some alternative explanation it would be interesting to hear about that.

More detailed discussion

The biggest variation between the samples kept in bottles inside the 3 different metal containers was in Dissolved Oxygen (DO). Water kept in stainless steel showed much pronounced effect, while impact was least in water kept in aluminum container.

Also, there was some difference between the samples just kept in bottles and the samples where the bottles were kept in these metal containers acting as Faraday Cages: samples in Faraday Cages showed less improvement. One possible explanation for that result could be related to temperature. It is known that DO is affected much by the prevailing temperature. Temperature in the *Agnihotra* hut was measured before/after *Agnihotra* (at a distance of appr. 50 cm from the fire). Normally the temperature went up by 1°C after *Agnihotra* and came down to the value before *Agnihotra* within 20 or 30 minutes. Probably this small change of temperature which also lasted for a short time band can be neglected.

Possible that metal containers absorb the infrared radiations from the *Agnihotra* fire and store the heat for longer time so that inside the containers the temperature is increased for longer time than outside. But then one would expect the samples in the containers next to the *Agnihotra* fire to have least Dissolved Oxygen (DO) and those furthest away the

Table 1-Raw Data of three replications of the experiment

	DO [mg/L]			pH			COD [mg/L]			Hardness			Coliform/100 ml		
	R1	R2	R3	P1	P2	P3	C1	C2	C3	H1	H2	H3	C1	C2	C3
Control A	3	2,5	3,5	9	9,5	9	70	90	100	210	300	350	900	1000	1100
Control A	3,4	3	3,9	8,8	8,9	9,5	80	95	110	240	355	365	950	1100	1250
Control A	3,8	2,2	2,8	8,6	9,3	9,8	90	100	120	275	375	380	1100	1250	1350
Average control	3,4	2,57	3,4	8,8	9,23	9,43	80	95,00	110,00	241,67	343,33	365,00	983,33	1116,67	1233,33
Standard Deviation	0,40	0,40	0,55	0,20	0,31	0,40	10,00	5,00	10,00	32,53	38,84	15,00	104,08	125,83	125,83
Unshielded bottles	12,2	11	9,8	7,2	6,2	6,9	30	40	50	135	150	165	369	380	440
Unshielded bottles	14	12	10	7,9	7	7,7	32	36	45	125	135	155	420	430	480
Unshielded bottles	12,4	10	8	7,5	6,8	7,8	28	41	55	130	145	170	320	360	400
Unshielded bottles	9,8	8,5	7,9	7,8	6,9	7,8	20	27	35	110	135	145	250	270	295
Unshielded bottles	10,6	8,8	7,8	7,7	6,2	6,9	28	33	50	125	140	170	290	300	335
Unshielded bottles	8,5	7	6,6	7,5	6,5	7,2	38	45	55	135	150	165	250	295	310
Unshielded bottles	9,8	8,2	8,5	7,4	7	7,9	32	33	45	140	160	185	300	290	315
Unshielded bottles	8,5	7,1	6,9	7,2	6,2	6,8	30	38	50	150	175	195	380	400	410
Bottle in Fe-container	12,8	10,2	9	7,7	6,1	6,8	22	39	50	140	165	180	300	325	355
Bottle in Fe-container	11	9	8,2	8	6,9	7,5	22	32	50	140	170	190	420	435	450
Bottle in Fe-container	12	10,5	9,5	7,8	6,5	7,5	24	42	52	125	140	160	290	310	330
Bottle in Cu-container	9,6	7,5	7,8	7,8	6	6,9	30	37	45	135	155	175	410	425	455
Bottle in Cu-container	9	7	6,5	7,8	6,8	7,2	23	37	40	136	155	165	280	295	355
Bottle in Cu-container	10,4	9,54	8,24	7,5	6,5	7	15	30	39	110	135	155	250	280	300
Bottle in Al-container	8,6	7	7,7	8,2	7,2	7,8	24	35	45	150	165	180	370	395	455
Bottle in Al-container	8,9	7,5	6,5	7,9	6,7	7,2	20	40	50	140	150	180	300	320	350
Bottle in Al-container	9,6	8,2	7,5	8,1	7,5	8	18	25	39	120	130	150	232	285	305
Average Agni atm.	10,45	8,77	8,03	7,71	6,65	7,35	25,65	35,88	46,76	132,12	150,29	169,71	319,47	340,88	372,94
Standard Deviation	1,69	1,56	1,09	0,29	0,42	0,43	6,00	5,37	5,83	11,75	13,52	14,19	63,07	58,18	63,86

highest level of DO. The data are not conclusive in this respect. Still, this hypothesis can be tested in future experiments by putting some temperature sensor inside the metal containers.

The main result though is not affected by these variations between the three replications and between the bottles in different materials used for shielding - the significant improvement of water quality of all parameters which were measured if the water is kept in *Agnihotra* atmosphere.

Containers of metals like copper, steel, or aluminum work well as a Faraday Cage to shield electromagnetic waves of a wide range. But if you go to the end of very high energy radiation (like gamma

rays), these containers used cannot prevent rays from penetrating inside. For further studies, it is suggested to do an experiment in which a container of lead is used instead. One centimetre of wall thickness should be enough to at least make a difference in the effect on water. The present study showed some interesting observations in mitigating water pollution problem. Considering importance further systematic research studies are suggested. The experimental design can be modified in different directions:

a) Have samples at different distances from the *Agnihotra* pyramid (The distances inside the *Agnihotra* hut varied from 50 cm to approximately 3 m - this did not have a clear effect on the results)

Table 2 - Percentage changes as compared to control

	Dissolved Oxygen %				pH %				COD %				Hardness %				Coliform/100 ml %			
	Repl. I	Repl. II	Repl. III	Average Repl. I - III	Repl. I	Repl. II	Repl. III	Average Repl. I - III	Repl. I	Repl. II	Repl. III	Average Repl. I - III	Repl. I	Repl. II	Repl. III	Average Repl. I - III	Repl. I	Repl. II	Repl. III	Average Repl. I - III
Average all	207%	242%	136%	191%	-12%	-28%	-22%	-21%	-68%	-62%	-57%	-62%	-45%	-56%	-54%	-52%	-68%	-69%	-70%	-69%
Average stainless steel	251%	286%	162%	228%	-11%	-30%	-23%	-21%	-72%	-60%	-54%	-61%	-44%	-54%	-52%	-51%	-66%	-68%	-69%	-68%
Average copper	184%	212%	121%	169%	-13%	-30%	-25%	-23%	-72%	-64%	-62%	-65%	-47%	-57%	-55%	-54%	-68%	-70%	-70%	-70%
Average aluminum	166%	195%	113%	154%	-8%	-23%	-19%	-17%	-74%	-65%	-59%	-65%	-43%	-57%	-53%	-52%	-69%	-70%	-70%	-70%
Average shielded bottles	200%	231%	132%	183%	-11%	-28%	-22%	-20%	-73%	-63%	-59%	-64%	-45%	-56%	-53%	-52%	-68%	-69%	-70%	-69%
Average unshielded bottles	215%	254%	141%	200%	-14%	-29%	-22%	-22%	-63%	-61%	-56%	-60%	-46%	-57%	-54%	-53%	-67%	-69%	-70%	-69%

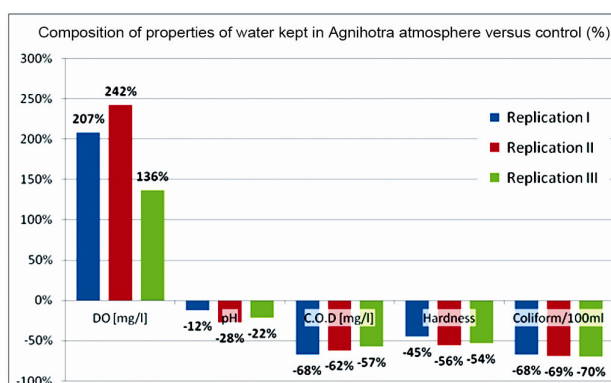


Fig. 4 - Comparison of properties of water kept in *Agnihotra* atmosphere versus control (%)

Samples could be placed outside the *Agnihotra* hut at different distances.

This would also help to see whether the effects of *Agnihotra* energy field inside and outside of the *Agnihotra* hut are same at same distance or not.

b) Put the samples in a room where *Agnihotra* has never been performed before and will be just performed for the 5 days of the experiment. This would help to find out whether the energy field is building up over a period of time.

Possible also to put the samples in an *Agnihotra* hut with continuous *Agnihotra* for several years-but not perform *Agnihotra* during the time of the experiment and see whether the energy field of *Agnihotra* is still present after some time of non-performance.

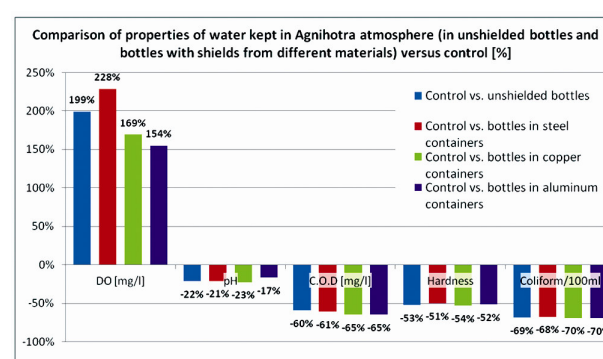


Fig. 5 - Comparison of properties of water kept in *Agnihotra* atmosphere (in unshielded bottles and bottles with shields from different materials) versus control (%)

c) Keep the samples one day only, two days, etc. to see how fast these changes in water quality happen - and also continue for say 30 days to see whether the improvement continues or stops at some point. Most interesting though is the question: which kind of energy field is created by *Agnihotra* and how this type of energy field brings about the changes in water quality (assuming the possibility of high energy electromagnetic waves which can not be shielded by the type of Faraday Cage used can be excluded).

For future studies, two hypotheses are suggested:

1) There are microorganisms in polluted water which are activated by *Agnihotra* energy field and thus help to improve properties of water.

2) *Agnihotra* creates an energy field in the vicinity which is not confined to electromagnetic fields.

The first hypothesis requires further studies in the field of Microbiology, identifying microorganisms which can help improve water quality and examine closely how their activity is influenced by *Agnihotra* atmosphere.

The second hypothesis puts a challenge for physicists. The pyramid shape of the *Agnihotra* vessel probably plays some role – not much researched yet, but there are some preliminary studies in this field¹¹.

An important study would be: which kind of energy field could this be? One possibility is "*Prana*" energy - but then this concept of "*Prana*" has to be translated into the language of modern science, and especially methods of measuring *Prana* energy will be required¹².

A lot of interesting further studies are necessary, and these could help to get a better understanding of such basic Vedic concepts as "*Prana*" in terms of modern Science. All scientists from different disciplines are invited to join forces!

Acknowledgement

Authors are grateful to Fivefold Path Mission for keeping water samples in the *Agnihotra* hut of their *Goshala* in Maheshwar, and to Shri Umia College, Mandleshwar, and AIMS College, Dhamnod, Madhya Pradesh, for testing the water samples of the experiment.

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- 12 Recently there are different methods which seem to do that - like PIP (Polycontrast Interference Photography), GDV (Gas Discharge Visualization technique, developed by K. Korotkov on the basis of Kirlian photography), and Life Energy Meter measurements. More research with these methods is planned for the future.

12.4 Annexure 4: Scientific study of Vedic Knowledge Agnihotra

Pathade/Abhang 2014

Bharatiya Bouddhik Sampada

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Scientific study of Vedic Knowledge Agnihotra

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Objective:

To study effect of Agnihotra fumes on:

1. **Expt No: 1:** Microbial count in the surrounding air
2. **Expt No: 2:** plant growth
3. **Expt No: 3:** NO₂ level
4. **Expt No: 4:** SO₂ level

To study effect of Agnihotra ash on:

1. **Expt No: 5:** Skin disease of animal and humans.
2. **Expt No: 6:** Seed germination
3. **Expt No: 7:** Genotoxic chemicals (colchicine and methyl parathion)
4. **Expt No: 8-11:** Bacterial pathogenecity.
5. **Expt No: 12:** Water purification using Agnihotra ash

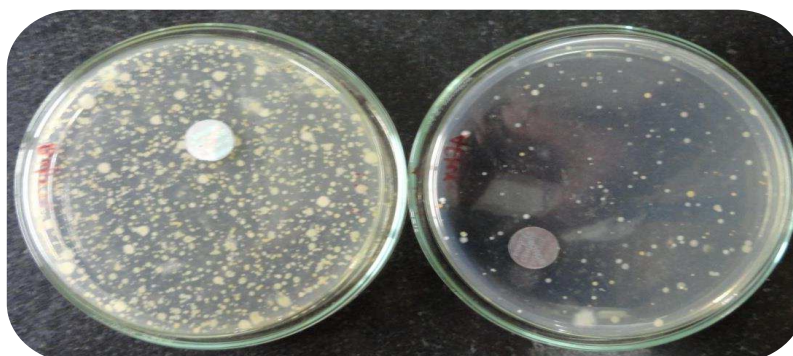
Study of different components in Agnihotra:

1. **Expt No: 13:** Time- sunrise time, sunset time and any time (between sunrise and sunset)
2. **Expt No: 14:** Mantra- with mantra (sunrise and sunset) and without mantra
3. **Expt No: 15:** Rice- brown rice (unpolished) and white rice (polished)
4. **Expt No: 16:** Ghee- cow ghee and buffalo ghee
5. **Expt No: 17:** Pot- copper pot and steel pot of same size and shape

TO STUDY EFFECT OF AGNIHOTRA FUMES

Expt No: 1: Microbial count in the surrounding air

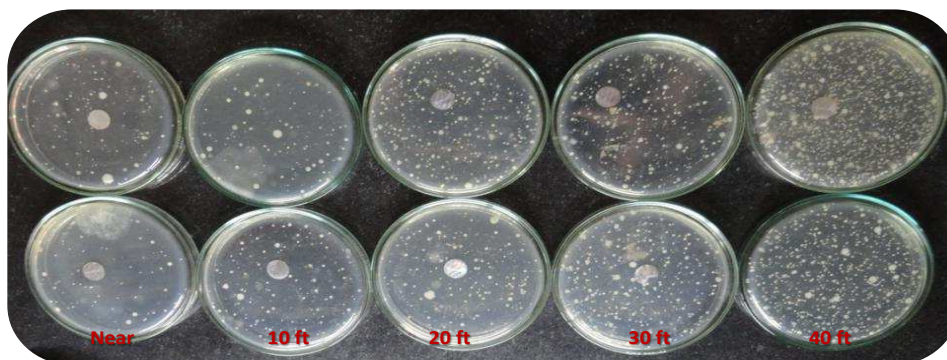
- Medium (nutrient agar) plates were open in room before and after Agnihotra and incubated for 24 hr at room temperature to grow bacterial colonies.
- Also plates were opened 0, 10, 20, 30, 40 feet apart from Agnihotra and colony count was taken after 24 hr incubation at room temperature.



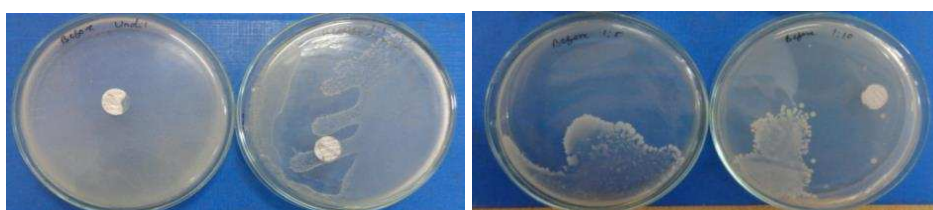
Before

After

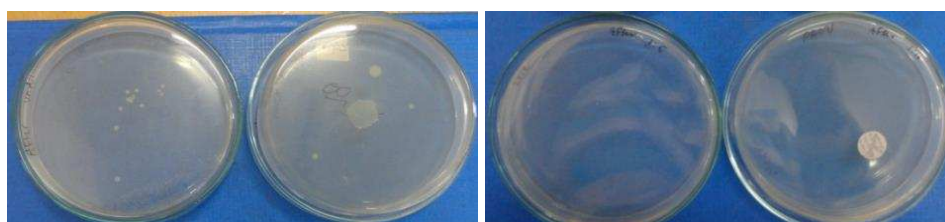




- Known amount of air sample is collected in sterile 35 ml nutrient medium, before and after Agnihotra. Sample was diluted as undiluted, 1:1, 1:5 and 1:10. Diluted sample were spread on nutrient agar plates and incubated for 30 hr. to grow bacterial colonies.



Before Agnihotra



After Agnihotra

Conclusion-

As per results obtained, Agnihotra fumes decreases microbial load in air. Up to 30 feet microbial load in the air can be control by performing Agnihotra.

Expt No: 2: To study effect of Agnihotra fumes on plant growth

2 plants were maintained providing same amount of water, light and other environmental conditions. One is kept in separate room where Agnihotra is performed and another is kept in normal room where Agnihotra is not performed.

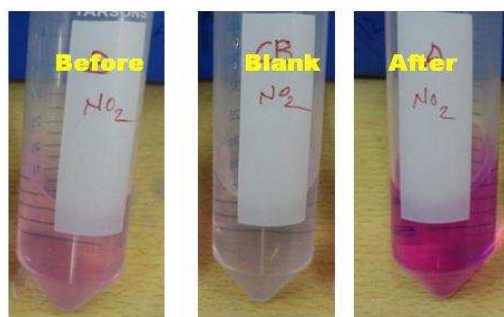


Conclusion-

It shows that due to Agnihotra fumes plant growth is more as compare to normal plant.

Expt No: 3: Effect of Agnihotra fumes on NO₂ level

NO₂ in air is collected by scrubbing a known volume of air through an alkaline solution of arsenite. The nitrite ions thus formed is reacted with sulfanilamide and N-(1-naphthyl) ethylenediamine (NEDA) in phosphoric acid to form the colored azo dye, which can be measured on spectrophotometer at 540 nm. The method is standardized statistically by using NaNO₂ standards. Standardization is based upon the empirical observation that 0.74 mole of NaNO₂ produces same color as 1 mole of NO₂. SO₂ can be removed using H₂O₂.



Calculations for sample before Agnihotra-

- O.D. at 540 nm = 0.104
- μg of NO₂/ml from graph = 0.1644 μg /ml
- volume of air sampled
 $V = (F_1 + F_2) / 2 \times T \times 10^{-3}$
 Flow rate = 1.5 ml/min
 Time of sampling = 2 hr = 120 min
 $V = (1.5 + 1.5) / 2 \times 120 \times 10^{-3}$
 $V = 0.18 \text{ m}^3$
- level of NO₂
 $= (\mu\text{g of NO}_2/\text{ml} \times \text{volume of absorbing reagent}) / 0.85 \times V$
 $= (0.1644 \times 15) / 0.85 \times 0.18$
 $= \mathbf{16.1152 \mu\text{g} / \text{m}^3}$
- NO₂ in ppm = level of NO₂ $\times 5.32 \times 10^{-4}$
 $= \mathbf{0.00857 \text{ ppm}}$

Calculations for sample after Agnihotra-

- O.D. at 540 nm = 0.122
- μg of NO₂/ml from graph = 0.1928 μg /ml
- volume of air sampled
 $V = (F_1 + F_2) / 2 \times T \times 10^{-3}$
 Flow rate = 1.5 ml/min
 Time of sampling = 2 hr = 120 min
 $V = (1.5 + 1.5) / 2 \times 120 \times 10^{-3}$
 $V = 0.18 \text{ m}^3$
- level of NO₂
 $= (\mu\text{g of NO}_2/\text{ml} \times \text{volume of absorbing reagent}) / 0.85 \times V$
 $= (0.1928 \times 15) / 0.85 \times 0.18$

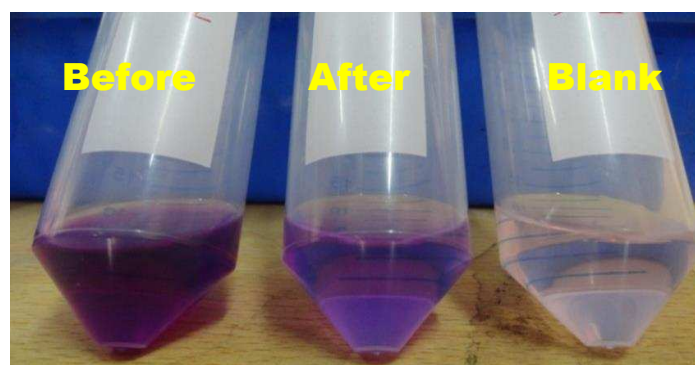
$$= 17.6471 \mu\text{g}/\text{m}^3$$

$$5. \text{NO}_2 \text{ in ppm} = \text{level of NO}_2 \times 5.32 \times 10^{-4}$$

$$= 0.00939 \text{ ppm}$$

Expt No: 4: Effect of Agnihotra fumes on SO₂ level

SO₂ from the air stream is absorbed in a sodium tetra-chloromercurate solution, it forms a stable dichloro sulpho mercurate complex, which then behaves effectively as fixed SO₃⁻² in solution. The amount of SO₂ is then estimated by the color produced when p-rosaline-hydrochloride and formaldehyde is added in solution, which can be measured on spectrophotometer at 560 nm.



Calculations for sample before Agnihotra-

- O.D. at 560 nm = 0.203
- μg of SO₂/ml from graph = 0.2589 μg /ml
- volume of air sampled
 $V = (F1+F2)/2 \times T \times 10^{-3}$
 Flow rate = 1.5 ml/min
 Time of sampling = 2 hr = 120 min
 $V = (1.5+1.5)/2 \times 120 \times 10^{-3}$
 $V = 0.18 \text{ m}^3$
- SO₂ in ppm = (μg of SO₂ per ml from graph) / volume of air sampled
 $= 0.2589 / 0.18$
 $= 1.4381 \text{ ppm}$
- $\mu\text{g}/\text{m}^3$ of SO₂ = (ppm of SO₂ $\times 64 \times 10^6$) / 24470
 $= 3761.34$
- SO₂ ($\mu\text{g}/\text{m}^3$) at 25 °C and 760 mm(Hg) = $\mu\text{g}/\text{m}^3$ of SO₂ \times volume of absorbing reagent
 $= 3761.34 \times 15$
 $= 5.642 \times 10^4 \mu\text{g}/\text{m}^3$

Calculations for sample after Agnihotra-

- O.D. at 560 nm = 0.079
- μg of SO₂/ml from graph = 0.1007 μg /ml
- volume of air sampled
 $V = (F1+F2)/2 \times T \times 10^{-3}$
 Flow rate = 1.5 ml/min
 Time of sampling = 4 hr = 120 min
 $V = (1.5+1.5)/2 \times 120 \times 10^{-3}$
 $V = 0.18 \text{ m}^3$
- SO₂ in ppm = (μg of SO₂ per ml from graph) / volume of air sampled

$$= 0.1007 / 0.18$$

$$= \mathbf{0.5597 \text{ ppm}}$$

$$5. \mu\text{g} / \text{m}^3 \text{ of SO}_2 = (\text{ppm of SO}_2 \times 64 \times 10^6) / 24470 \\ = 1463.77$$

$$6. \text{SO}_2 (\mu\text{g} / \text{m}^3) \text{ at } 25^\circ \text{C and } 760 \text{ mm(Hg)} = \mu\text{g} / \text{m}^3 \text{ of SO}_2 \times \text{volume of absorbing reagent} \\ = 1463.77 \times 15 \\ = \mathbf{2.1957 \times 10^4 \mu\text{g} / \text{m}^3}$$

Results-

NO₂ level in the surrounding atmosphere is increased from 0.0086 ppm to 0.0094 ppm due to Agnihotra fumes (performed at sunset).

SO₂ level in atmosphere reduces from 1.44 ppm to 0.56 ppm due to Agnihotra fumes (performed at sunset).

To study effect of Agnihotra ash on

Expt No: 5: Effect of Agnihotra ash on skin disease of animal and humans.

Agnihotra ash was mixed with pure ghee to make an ointment which was applied to the infected ear (showing red rashes) of pet cat as well as to the infected thumb (showing peeled off skin with wound) of a lady, whose hand comes in touch with detergent and water everyday because of washing and cleaning the vessels and the clothes.

After one month of treatment (3times/day) with the above mixture cat's ear became totally normal in comparison with the control (only ghee), whereas the thumb infection did not disappear totally but appears to be recovered compared to the control.



Conclusion: Agnihotra ash can be used to make ointment to treat skin diseases.

Expt No: 6: Effect of Agnihotra ash on seed germination-

To study effect of Agnihotra ash on germination of seeds, following water were used-

- tap water,
- control ash water (1 gm normal ash + 100 ml water) and
- Agnihotra ash water (1 gm Agnihotra ash + 100 ml water)

Seeds of *Vigna aconitifolia* and *Vigna unguiculata* were taken as experimental material. Seeds were allowed to germinate and germination was observed every after 24 hrs.

Observations-



Tap water

control ash

Agnihotra ash

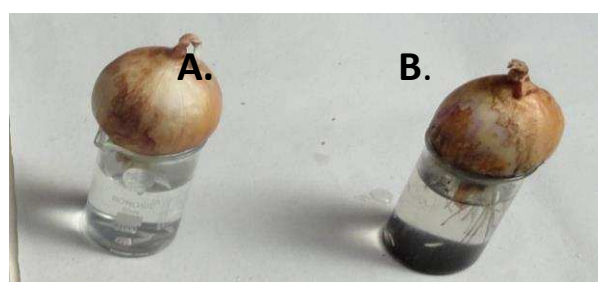
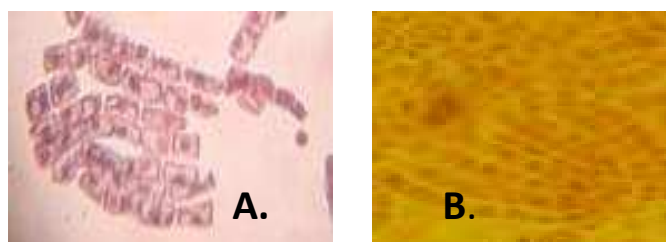
Conclusion-

From results obtained it can be concluded that Agnihotra ash promoted the process of germination probably by increasing its nutrient content and hence can be used as **fertilizer**.

Expt No: 7: To study neutralization of genotoxic effect by Agnihotra ash-

To study neutralization of genotoxic effect by agnihotra ash onion root tips were used. The Onion roots were allowed to grow separately in

- tap water,
 - water containing Agnihotra ash,
 - water containing control ash,
 - water containing Colchicine
 - Water containing Colchicine and agnihotra ash.
 - water containing Methyl Parathion
 - Water containing Methyl Parathion and agnihotra ash.
- Growth of roots was measured in cm. after 7 days. Root tips from each sample were taken and different stages of Mitosis were observed.
- Arresting of mitosis (no spindle formation) and small growth (rigorous) of root tips were taken as toxic effect, while normal mitosis and elongated root tip taken as normal growth or non-toxic.



- A. Containing genotoxic chemical (colchicine)
B. Containing genotoxic chemical (colchicine) + Agnihotra ash.

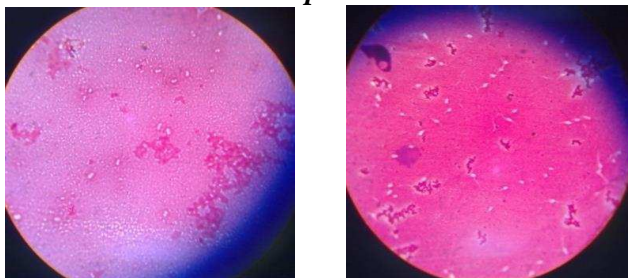
Conclusion-

Agnihotra ash showed activating effect on cell division and also neutralises toxic effect of Colchicine and Methyl Parathion.

Expt No: 8-11: Effect of Agnihotra ash on bacteria.

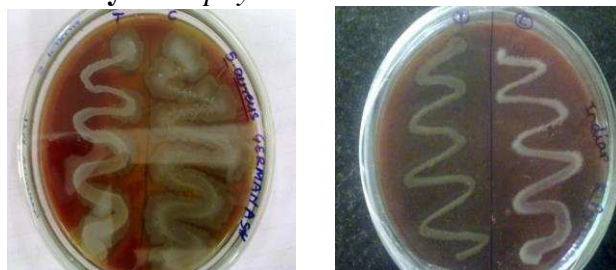
The Bacteria selected were Pathogenic as well as some commensal and non pathogenic, were exposed to Agnihotra Ash and observed for changes in the properties like

Expt No: 8: Loss of Capsule formation in *Klebsiella pneumonia*



It is evident from Table that upon exposure to Agnihotra ash the capsule forming ability of *Klebsiella pneumoniae* was reduced.

Expt No: 9: Loss of haemolytic activity in *Staphylococcus aureus* and *Klebsiella pneumonia*

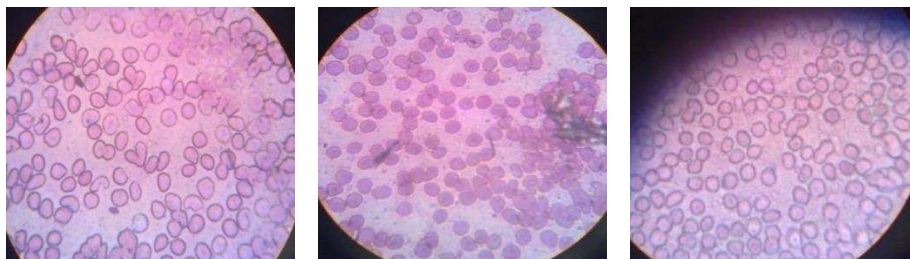


Haemolytic ability of *K. pneumoniae* and *S. aureus* was reduced upon exposure to Agnihotra ash.

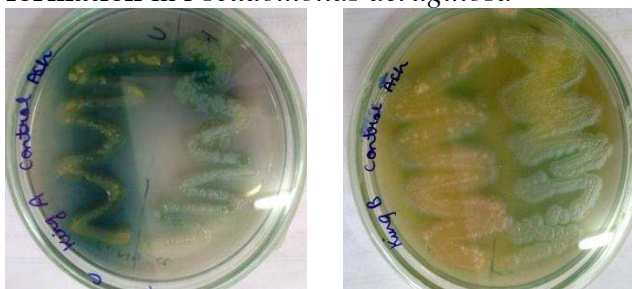
Expt No: 10: Decreased resistance to phagocytosis,

Human blood 5ml + 0.5 ml bacterial suspension, incubate at 37^oC for 1 hr and blood stain it observe cell no engulfed (use direct bacteria and also exposed to Agnihotra ash for 1 hr)

Decreased resistance to phagocytosis (more no of bacteria engulfed by phagocytes) was observed for all the four Bacterial isolates used.



Expt No: 11: Loss of pigment formation in *Pseudomonas aeruginosa*



Pigment production ability of *Pseudomonas aeruginosa* was reduced upon exposure (use direct bacteria and also exposed to Agnihotra ash for 1 hr)to Agnihotra Ash.

Expt No: 12: Water Purification using Agnihotra ash:

1. 1 L tap water + 10ml sewage (for coliform contamination) (positive control) : sample A
2. 1 L tap water (negative control)
3. sample A water 100 ml + 5 gm Agnihotra ash, incubate at overnight at RT and then perform MPN

Results- Sample A showed MPN positive, while tap water and ash treated sewage mixed water showed MPN negative

Conclusion- Agnihotra ash removes water pathogens and purifies it.

Study of different ingredients in Agnihotra-

To study the effect of time, mantra, rice, ghee and pot on Agnihotra ash we used following parameters-

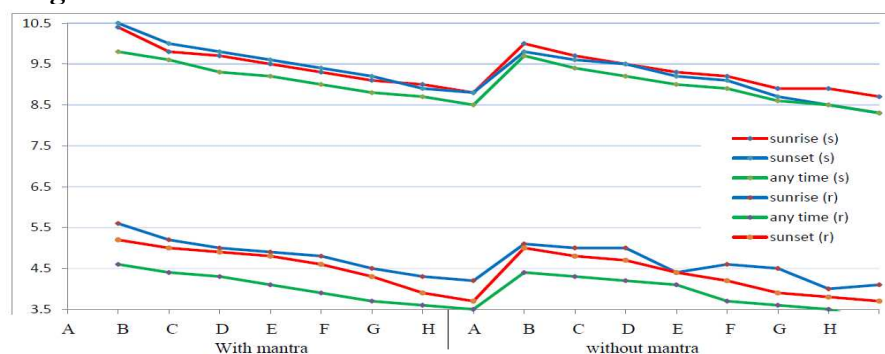
1. **Expt No: 13:** Time- sunrise time, sunset time and any time (between sunrise and sunset)
2. **Expt No: 14:** Mantra- with mantra (sunrise and sunset) and without mantra
3. **Expt No: 15:** Rice- brown rice (unpolished) and white rice (polished)
4. **Expt No: 16:** Ghee- cow ghee and buffalo ghee
5. **Expt No: 17:** Pot- copper pot and steel pot of same size and shape

We prepare 48 ashes with combinations of different parameters such as time, mantra, rice, ghee and pot. Moong (*Vigna aconitifolia*) seeds were allowed to grow in respective 48 ashes, providing same environmental conditions and after 2 weeks plant growth was measured by considering shoot and root length.

- Plant growth in all 48 ashes is **more** as compare to control.
- Graphs for different parameters are created using following A to H ashes-
 - A. Brown rice, cow ghee, copper pot
 - B. Brown rice, cow ghee, steel pot
 - C. Brown rice, buffalo ghee, copper pot
 - D. Brown rice, buffalo ghee, steel pot
 - E. white rice, cow ghee, copper pot
 - F. white rice, cow ghee, steel pot
 - G. white rice, buffalo ghee, copper pot
 - H. white rice, buffalo ghee, steel pot

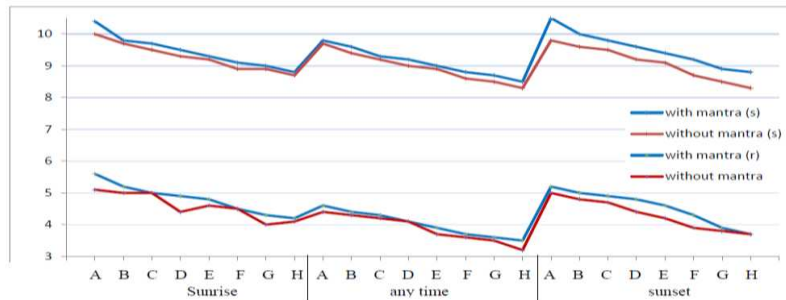
Results-

1. Effect of time on Agnihotra



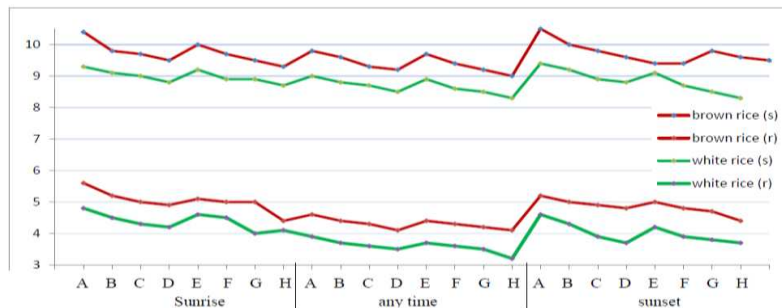
Plant growth is more in sunrise (blue line) and sunset (red line) ashes as compare to any time (green line) ashes. Also root growth is more in sunrise ashes than in sunset ashes.

2. Effect of mantra on Agnihotra-



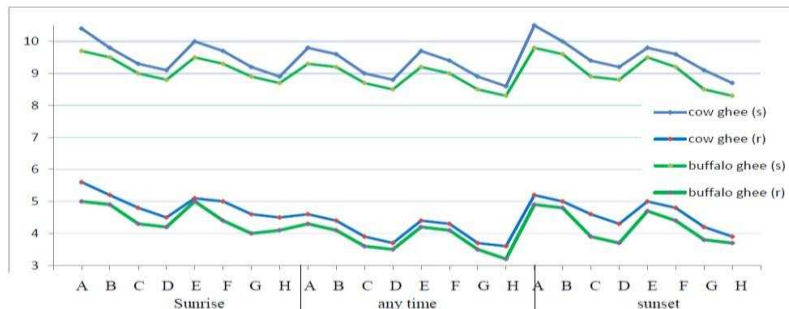
As per graph, we can conclude that plant growth in ashes with mantra (blue lines) is more as compare to plant growth in ashes without mantra (red lines).

3. Effect of rice on Agnihotra-



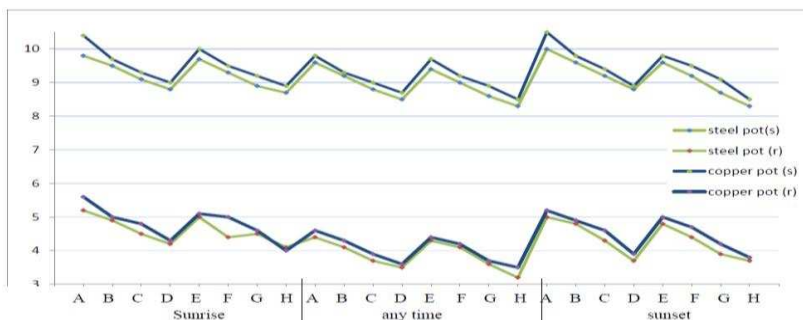
As per graph, we can conclude that plant growth in ashes with brown or unpolished rice (red lines) is more as compare to plant growth in ashes with white or polished rice (green lines).

4. Effect of ghee on Agnihotra-



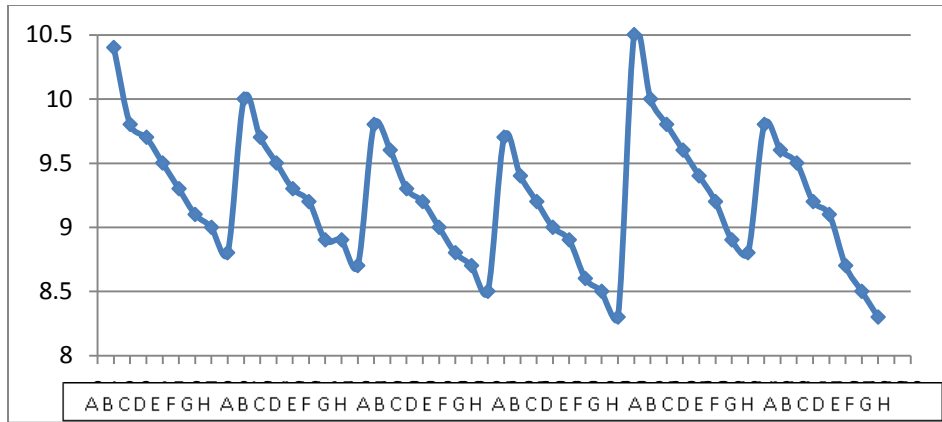
Plant growth in ashes with cow ghee (blue lines) is more as compare to plant growth in ashes with buffalo ghee (green lines).

5. Effect of pot on Agnihotra-



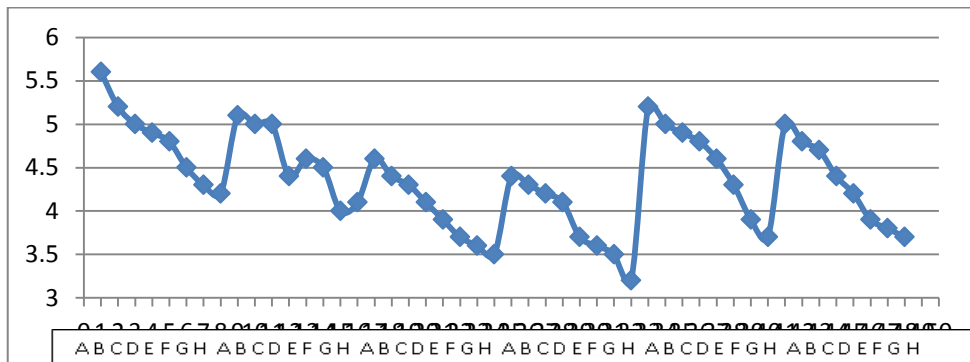
Plant growth in ashes prepared in copper pot (blue lines) is more as compare to plant growth in ashes prepared in steel pot (green lines).

6. Combine effect of rice, ghee and pot on shoot length-



As per graph combine effect of brown rice, cow ghee and copper pot (points A) shows more shoot growth as compare to other (i.e. B to H). It shows peak at ‘A’ point.

7. Combine effect of rice, ghee and pot on root length-



As per graph combine effect of brown rice, cow ghee and copper pot (points A) shows more root growth as compare to other (i.e. B to H). It shows peak at ‘A’ point.

Conclusion-

Plant growth is better observed in ashes prepared with brown rice, cow ghee, copper pot, with mantra and at sunrise, sunset timings.

The combination of brown rice, cow ghee and copper pot shows good plant growth.

Higher plant growth is observed in ashes prepared in copper pot, with brown rice and cow ghee, with mantra and performed at sunrise and sunset timings (Ash no. - 1 and 33).

12.5 Annexure 5: Effects of Agnihotra on Environment and Agriculture

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BENEFICIAL EFFECTS OF AGNIHOTRA ON ENVIRONMENT AND AGRICULTURE

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ABSTRACT

Agnihotra is a type of sacrifice, which consists of making four offerings per day, two at sunrise and two at sunset of brown rice mixed with cow ghee to the fire, accompanied by chanting of mantras. Though Agnihotra is a Vedic ritual, it has scientific background and therefore we studied the effects of Agnihotra and its ash on the environment and plant growth. Experiments were performed to study the effects of Agnihotra fumes on microbial load, SO_x and NO_x levels in ambient air and plant growth. Experiments were also conducted to check the effects of Agnihotra ash on seed germination, plant growth, plant genotoxicity and water purification. From the study it was observed that Agnihotra resulted in reduction in microbial load and SO_x levels but slight increase in NO_x levels in surrounding air. There was significant increase in seed germination and plant growth as well as genotoxicity was neutralized due to Agnihotra ash. Our results suggest that Agnihotra ash can be used to purify waste water. It can be seen that Agnihotra is beneficial for environment and agriculture.

KEYWORDS: Agnihotra, Vedic Ritual, Sox Level, Nox Level, Plant Growth, Genotoxicity, Water Purification

INTRODUCTION

Agnihotra Yajna is performed daily, at sunrise and sunset. Pieces of dried cow dung cakes are piled up in an inverted copper pyramid with specific dimensions and lighted; oblation of brown rice mixed with cow ghee is given while chanting specific mantra. Different mantras are chanted for sunrise and sunset. Although it is a simple vedic ritual, it emerges many questions about specific materials used in Yajna and its uses. These questions can be resolved by studying overall process of Agnihotra, fumes generated during process which spread in ambient air and ash generated after Yajna. Effects of Agnihotra on microbial content of air (Purandare V. R. and Prasad N. B, 2012; Mondkar A. G., 1982), germination of rice seeds (Heisnam J. Devi et al, 2004), growth of mushroom (V. Indira et al, 2010), scabies in rabbits (Mondkar A. G., 1982), skin wounds (Rao D V K, 1987) and radioactivity in air (Matela Leszek, 1988) have been reported.

Work done on Somyag Yajna fumes (Abhang Pranay, 2015) showed reduction in sulfur oxides (SO_x) and microbial load in the air. Somyag Yajna differs from Agnihotra in terms of oblations used in it. *Somawali*, stalks of Ephedra (Wojciech Puchalski, 2009), twigs of Banyan, Pimpal, Mango and many more plants are used in Somyag Yajna. Somyag Yajna as well as Agnihotra is performed to regulate seasonal cycle and maintain equilibrium, but both Yajnas differs in terms of time period, number of people chanting the mantra at a time and the cost of materials required for the Yajna.

Air contains pollutants like oxides of nitrogen and sulfur, hydrocarbons and pathogenic microorganisms (Richa Rai et al., 2011). There is impact of these air pollutants on plant growth (Richa Rai et al., 2011 and S. Tiwari et. al., 2006). Sustainable agriculture and ambient environment are correlated with each other (L. Horrigan et al. 2001). In agriculture, there are problems like delay in seed germination, slow growth of plants and adverse effects due to toxicity of insecticides and fertilizers used. Study was done to check if Agnihotra can be implemented to overcome all these problems. The purpose of the study was to find out the effect of Agnihotra fumes and Agnihotra ash on the different aspects of environment and agriculture. The experiments were carried out in New English School, Ramanbaug, Pune and Biotechnology Department, Fergusson College, Pune.

MATERIALS AND METHODS

Agnihotra was performed as mentioned by V. Indira et al (2010), using known amount of materials. About 100 gm of dried cow dung was arranged in an inverted pyramidal copper pot of dimensions 14.5 x 14.5 cm at the top 5.25 x 5.25 cm at the bottom and 6.5 cm in height. Fire was lit using 18 ml purified cow ghee and offerings of 2 gm brown rice mixed with 2 ml of purified cow ghee was given by chanting following mantras,

At Sunrise -

Sooryaya swááhá, Sooryáya idam na mamal

Prajápataye swááhá, Prajápataye idam na mamall

At Sunset -

Agnaye swaááhá, Agnaye idam na mamal

Prajápataye swaááhá, Prajápataye idam na mamall

To study effect of Agnihotra fumes, experiment was performed during sunrise in a closed room and the ash was collected for experimentation to find out its effect.

Study the Effects of Agnihotra Fumes

Estimation of Microbial Load in Ambient Air

To study the effect of Agnihotra fumes on microbial load in the surrounding air, passive monitoring of air samples was done by settle plate method which was used by Pathade G. and Abhang Pranay (2014) (Acquarella C., 2000). In this method, sterile nutrient agar plates were kept open 5 min. before and 5 min. after the Agnihotra, at the distance of 10 feet from the Yadnya. Plates were incubated at 37°C and colony count was taken after 30 hours.

Estimation of SO_x and NO_x

SO_x and NO_x in the ambient air was collected by using air handy sampler (Spectralab, HDS -8). Methods used by Abhang P. (2015) were employed to estimate oxides of sulfur and nitrogen. SO_x was estimated by improved P. West - Gaeke method (1956) and NO_x was estimated by modified Jacobs - Hochheiser method (J. Blacker and R. Brief, 1972). Samples of SO_x and NO_x were collected 30 min. before, during and 30 min after Agnihotra, at 10 feet away from Yadnya. Control samples were collected from the area where Yadnya was not performed.

Effect of Agnihotra Fumes on Plant Growth

Two pots of 20 germinated seeds of moong (*Vigna radiata*) were maintained for 5 days by providing same amount of water, light and other environmental conditions. 10 seedlings with same shoot and root length were selected and planted in two separate pots. One was kept in room where Agnihotra was performed and another was kept in normal room where Agnihotra was not performed. Plant growth was measured in terms of shoot and root length within 5 days by providing same amount of water, light and other environmental conditions.

Study the Effects of Agnihotra Ash

Analysis of materials used in Agnihotra

Analysis of Cow dung cakes, Brown rice, cow ghee, cow dung ash, brown rice ash and Agnihotra ash was done using atomic mass spectroscopy in Kulkarni Laboratory and Quality Management Services, Pune (Accredited by ISO & NABL).

Effect of Agnihotra Ash on Seed Germination and Plant Growth

To study the effects of Agnihotra ash on seed germination and plant growth, soaked seeds of chickpea (*Cicer arietinum*) were used. The seeds were allowed to germinate separately in A. distilled water; B. Agnihotra ash; C. cow dung ash and D. rice ash. The number of germinated seeds was counted after 36 hours. To check the effect on plant growth, length of shoots and roots were measured (in cm) after 5 days.

Genotoxicity Neutralization Assay

To check neutralization effect of Agnihotra ash, onion root tip assay for genotoxicity was performed (Matsumoto et al. 2006). Seeds of onion were treated with A. Distilled water; B. Agnihotra ash; C. Cow dung ash and D. Rise ash. To check the effects of genotoxicity neutralization, 0.5 mg/ml colchicine was used and seeds were treated with E. Only Colchicine; F. Colchicine + Agnihotra ash; G. Colchicine + Cow dung ash and H. Colchicine + Rise ash. Mitotic index of all samples were calculated and compared.

Water Purification

To study the effect of ash on raw water, a column of about 100 gm of tightly packed Agnihotra ash with 20 cm of height and 2.7 cm of diameter was prepared. Before experimentation, the column was washed with distilled water and then 500 ml of raw water collected from Mula – Mutha River, Pune, MH, India (a source at which municipal waste water is mixed with river) was passed and collected for analysis. Following parameters were considered to check potability of water pH, Color, Odor, Conductivity, Total solids, Total dissolved solids, Total suspended solids, Total hardness, Biochemical oxygen demand, Chemical oxygen demand, Most probable number and Standard plate count (Table 2).

Water sampling, storage, analysis and estimation of parameters were done according to the guidelines given by Central Pollution Control Board (CPCB), Delhi (2007-2008).

RESULTS AND DISCUSSIONS

Effect of Agnihotra Fumes on Microbial Load in Surrounding Air

The average microbial colony count after Agnihotra was 52 CFU/m³/min which were 70% less than the colony count before Agnihotra 171 CFU/m³/min (Graph 1).

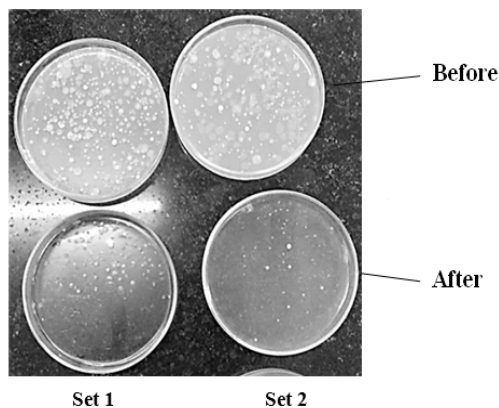
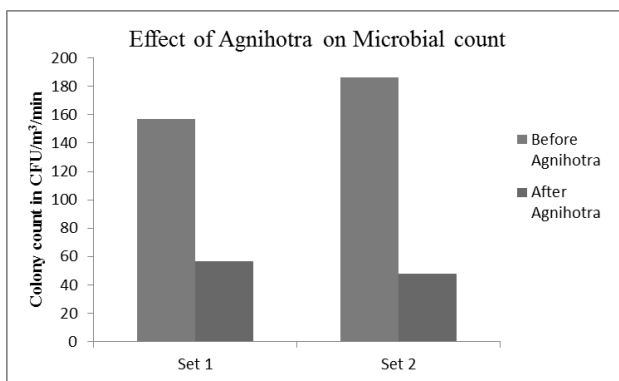


Figure 1: Nutrient Agar Plates Opened Before and After Agnihotra



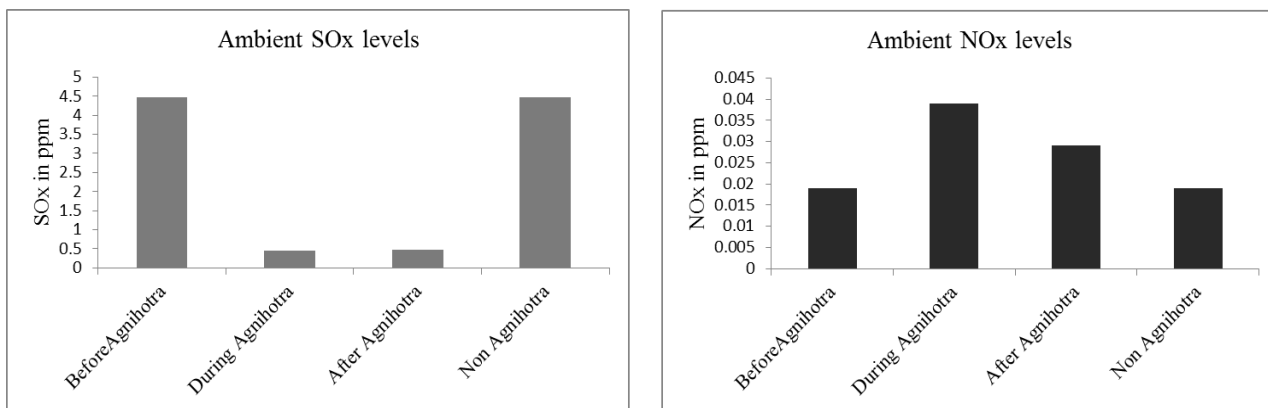
Graph 1: Effect of Agnihotra Fumes on Microbial Count in Surrounding Air

From the result (Figure 1) it was seen that microbial count after Agnihotra was significantly reduced that the microbial count before Agnihotra. This suggests that Agnihotra fumes may have anti-microbial properties.

Effect on SOx Level and NOx Levels

SOx level reduces by 89.37% during Agnihotra as compared to initial levels (from 4.4729 ppm to 0.4758 ppm), and remains lower than initial levels after Agnihotra (Graph 2, SOx levels).

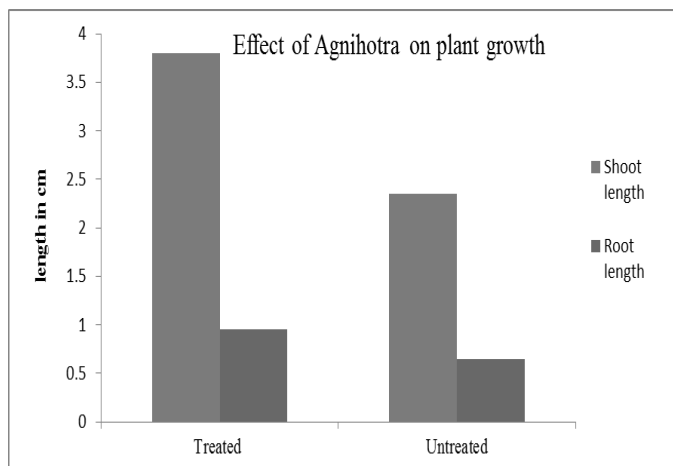
NOx level increases up to 50% (from 0.019 ppm to 0.039 ppm) that of initial levels during Agnihotra. After Agnihotra, NOx level decreases up to 25% i.e. from 0.039 ppm to 0.029 ppm (Graph 2, NOx levels).



Graph 2: Effect of Agnihotra on SOx and NOx Level in Ambient Air

Effect Agnihotra on Plant Growth

The average shoot and root length of the seedlings treated with Agnihotra fumes was 3.8 cm and 0.95 cm respectively whereas the shoot and root length without Agnihotra treatment was 2.35 cm and 0.65cm respectively. The result shows 38% and 31% more growth in shoot length and root length in the seedling treated with Agnihotra fumes (Graph 3).



Graph 3: Effect of Agnihotra on Plant Growth, Graph Shows Shoot and Root Length of Seedlings Treated with Agnihotra and Control as Untreated I. E. without Agnihotra

Analysis of Materials Used in Agnihotra

Analysis of Agnihotra material and ash is recorded in following Table 1.

Table 1: Analysis of Brown Rice, Brown Rice Ash, Cow Dung, Cow Dung Ash, Cow Ghee and Agnihotra Ash

Sr. No.	Test Parameter in Percent	Sample					
		Brown Rice	Brown Rice Ash	Cow Dung	Cow Dung Ash	Cow Ghee	Agnihotra Ash
1	Volatile matter	0.1	0.02	0.2	0.05	-	0.04
2	Ash content	0.34	86.3	14.7	1.4	0.003	84.7
3	Iron (as Fe)	0.02	0.12	0.05	0.09	-	0.13
4	Aluminum (as Al)	-	1.5	-	-	-	1.2
5	Copper (as Cu)	-	-	-	-	-	-
6	Zinc (as Zn)	-	-	0.01	-	-	-
7	Calcium (as Ca)	0.1	1.4	1.1	0.35	0.0025	0.6
8	Magnesium (as Mg)	0.05	0.12	1.2	0.22	-	0.2
9	Potassium (as K)	0.053	2.5	0.19	0.28	5.1×10^{-4}	2.7
10	Manganese (as Mn)	8.9×10^{-4}	0.03	33×10^{-4}	0.0045	-	0.023
11	Silica	0.07	-	-	-	-	-

Iron, Potassium and Manganese content was increased after burning of brown rice and cow dung, which contributes as iron (Fe), Potassium (K) and Manganese (Mn) in Agnihotra ash. Presence of aluminum in Agnihotra ash is due to burning of brown rice.

Calcium and Magnesium content increases in brown rice and decreases in cow dung after burning. Cow ghee contributes as calcium and potassium source to Agnihotra ash.

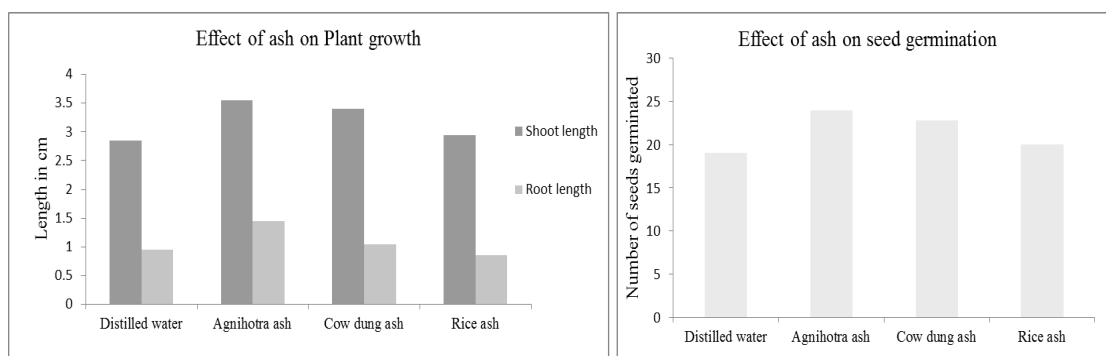
Our result shows that copper, zinc, and silica are absent in Agnihotra ash though there is presence of zinc and silica in cow dung and brown rice respectively.

Iron and potassium content of Agnihotra ash was higher as compared to ash from brown rice and cow dung. On the other hand, Calcium, magnesium, manganese content of Agnihotra ash was lower that of brown rice ash and cow dung ash.

Effect of Agnihotra Ash on Plant Growth and Seed Germination

Seedlings treated with Agnihotra ash showed more growth as compared to others i.e. treated with cow dung ash, rice ash and control (water). There is 24% increase in plant growth when treated with Agnihotra ash as compare to control (distilled water). (Graph 4, plant growth).

The number of germinated chickpea seeds treated with Agnihotra ash was more than that of seeds treated with rice ash and cow dung ash. Seed germination increased by 24 %, 5% and 20% due to Agnihotra ash as compare to control (distilled water), cow dung ash and rice ash respectively (Graph 4. seed germination).

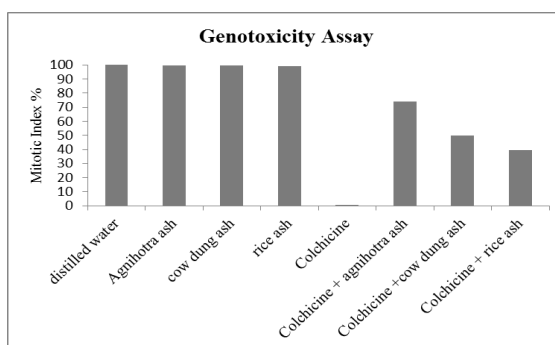


Graph 4: Effect of Agnihotra Ash on Seed Germination and Plant Growth, Graph Shows Comparison between Agnihotra Ash with Distilled Water, Cow Dung Ash and Rice Ash

Analysis of Agnihotra ash has shown presence of potassium, calcium and magnesium, Iron. These nutrients are essential for plant growth. Therefore the study suggests that Agnihotra ash must have supplied these essential nutrients and resulted in increased growth of the seedlings.

Neutralization of Genotoxicity

Agnihotra ash neutralizes genotoxicity due to harmful chemicals. Results (Graph 5) show that, 74%, 50% and 40% mitotic index due to Agnihotra ash, Cow dung ash and Rise ash respectively.



Graph 5: Genotoxicity Assay to Study Neutralization Effect

Water Purification

Polluted water when passed through a column of Agnihotra ash, there is significant reduction in conductivity (reduces 48.28%), total solid content (reduces about 90%), hardness (reduces 83.75%), Biological oxygen demand (reduces up to 48.4%) and chemical oxygen demand (reduces up to 7.15%) which is mentioned in Table 2.

Agnihotra ash shows antimicrobial properties, as microbial (especially pathogenic bacteria) count reduces up to 95% (Sr. No. 11 and 12 in Table 2). pH of treated water become neutral, color and odor was acceptable after the treatment of Agnihotra ash.

Raw water (non-potable) becomes potable (results matches with standards given by WHO Guidelines for Drinking-water Quality) after the treatment with Agnihotra ash, hence our study suggests that Agnihotra ash can be used in the process of water purification.

Table 2: Purification of Polluted Water by Using Agnihotra Ash, Table Showing Estimation of Polluted Water Parameters Before and After Treatment of Agnihotra Ash

Sr. No.	Parameters	Sample	Sample Treated with Agnihotra Ash
1.	pH	6.1	7.1
2.	Color	whitish	colorless
3.	Odor	Unacceptable	Acceptable
4.	Conductivity	406 μ s/cm	210 μ s/cm
5.	Total solids	1432.05 mg/l	165 mg/l
6.	Total dissolved solids	1426.5 mg/l	161 mg/l
7.	Total suspended solids	5.55 mg/l	0 mg/l
8.	Total hardness	160 mg/l	26 mg/l
9.	Biochemical oxygen demand	9.3 mg/l	4.8 mg/l
10.	Chemical oxygen demand	11.2 mg/l	10.4 mg/l
11.	Most probable number	75 CFU/ml	1 CFU/ml
12.	Standard plate count	45 CFU/ml	3 CFU/ml

CONCLUSIONS

From the study, it was seen that the microbial load, SO_x levels in the air were reduced by performance of Agnihotra. NO_x levels though increased after Agnihotra, but were still below the threshold limit of 0.053 ppm as per the guidelines of National ambient air quality standards (NAAQS) and Maharashtra pollution control board. The plant growth with treatment of Agnihotra fumes and the number of seeds germinated when treated with Agnihotra ash was higher as compared to seedlings not treated with Agnihotra ash and Agnihotra fumes. As per our results, it can be seen that raw water when treated with Agnihotra ash, there is notable decrease in biological oxygen demand and microbial load along with solid content in water and hardness. This suggests that waste water becomes potable and can be reused in fields. From the above results, it can be seen that if Agnihotra is performed and its ash is used in agriculture, it may result in reduction of pollution and increase the growth of the crops.

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12.6 Annexure 6: Application of Agnihotra ash for enhancing soil fertility

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Application of Agnihotra ash for enhancing soil fertility

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Abstract - The effect of addition of Agnihotra ash to farm soil was analysed. Four farm soil samples and one soil sample from newly purchased land were selected for the study. Initial microbial count was taken before addition of ash. Ash supplemented soil was analysed after incubation of one week. The microbial count of soil before and after ash addition was enumerated. A marked difference in the count was observed. Addition of ash results in increase in the overall bacterial flora, including the effective bacteria *i.e* nitrogen fixers and phosphate solubilisers while reduction in the fungal flora was seen.

Index terms – Agnihotra, ash, phosphate solubilisers, nitrogen fixers, soil, fertility

I. INTRODUCTION

Homa or Yajnya is a pyramid fire technique passed down from the ancient Vedas. Yajnya means a process of removing the toxic conditions of the atmosphere through the agency of fire. The resultant purified atmosphere then has positive effects on man, plants and animals [1]. The ash produced by the fire is also accredited with having healing properties. The application of Agnihotra ash for healing purposes have been described (www.homahealth.com). The ash when dissolved in water can be used as a spray on plants. The ash acts as a pesticide and fertiliser. It is also known to promote plant growth and reproduction. Furthermore, a stimulation of photosynthesis and plant respiration, which improves the entire oxygen cycle, is attributed to this atmosphere [1-5].

With regard to soil quality, an improved water holding capacity, an increase in amount and solubility (plant availability) of macro nutrients and trace elements and a stimulation of earth worm activity are postulated as a direct

result of Homa treatment [1]. Studies on germination of rice seeds were done for three seasons, autumn, winter and summer. The four parameters *i.e.* root length, shoot length; fresh weight and dry weight were checked during the studies. The results showed that Agnihotra had a significant effect on the germination process [6]. The potential of Homa farming and Agnihotra ash in particular to improve the solubility and thus the plant availability of soil P was studied by Kratz and Schnug [7].

The effects of Agnihotra and its ash on the environment and plant growth were studied. The effects of Agnihotra fumes on microbial load, SO_x and NO_x levels in ambient air and plant growth were analysed. Experiments were also conducted to check the effects of Agnihotra ash on seed germination, plant growth, plant genotoxicity and water purification. A decrease in microbial count and SO_x levels but slight increase in NO_x levels in surrounding air was observed. There was significant increase in seed germination and plant growth as well as genotoxicity was neutralized due to Agnihotra ash [8]. In another study, seeds of *Vigna aconitifolia* and *Vigna unguiculata* were taken as experimental material. Agnihotra ash promoted the process of germination [9].

In the present study, the effect of Agnihotra ash on the effective and negative microbial flora of soil was analysed. This study supports the view that Agnihotra ash can be used in increasing the soil fertility.

II. MATERIALS AND METHODS

Collection of soil samples - Farm soil was collected from 4 sites of Shri Chaitanya Mala (Dahagaon, Thane), a Homa organic farm.

- i) Soil sample kitchen garden near slurry tank, Survey no. 46/6B
- ii) Soil sample of Papaya farm Survey no.46/7

- iii) Soil sample of Mango farm Survey no. 46/7
- iv) Soil sample of Chikoo farm Survey no. 46/6B
- v) Soil sample of newly purchased land Survey no. 46/5A

Preparation of soil suspension- 10 gms of soil sample was weighed and added to 100 ml of sterile distilled water. The flask was shaken well to mix the soil properly. The flask was left standing for 10 minutes. The settled clear suspension was then used for analysis.

Total viable count- Serial dilutions of the soil suspension were prepared using sterile saline. Dilutions were done upto 10^{-4} . 0.1ml of the last three dilutions was spread plated on the nutrient agar plates. The plates were incubated and the number of colonies obtained was counted.

Fungal growth - To find the types of fungi present in the soil samples, 0.1 ml of the undiluted soil suspensions were plated on Sabouraud's agar plates. The plates were incubated and the types of colonies obtained were observed.

Effective or positive bacterial flora - 0.1ml of 10^{-4} was plated on Ashby's medium for nitrogen fixers and on Pikovaskaya's agar medium for phosphate solubilisers. The plates were incubated at room temperature and number of colonies obtained were counted.

Effect of Agnihotra ash on microbial composition of the soil - The soil samples were treated with Agnihotra ash at 1% concentration and allowed to stand for a week. Soil samples 2 and 4 were mixed together as the amount of soil for microbial and chemical analysis was less. Therefore, this sample is indicated as mixture. The microbial analysis was carried out as described above.

III. RESULTS AND DISCUSSION

The count of the microorganisms in the soil samples and soil samples mixed with ash, was taken by inoculating the soil suspensions on nutrient rich media like Nutrient agar and Sabouraud's agar media. Normal soil bacteria such as *Bacillus* sp., *Pseudomonas* sp., *Staphylococcus* sp., *Micrococcus* sp. are usually found in soil.

Two of the effective bacteria were studied i.e nitrogen fixer and phosphate solubilisers. These were isolated on Ashby's agar and Pikovaskaya's agar. Nitrogen fixers include the genus *Acetobacter* sp, *Azotobacter* sp, etc while the phosphate solubilisers belong to genus *Bacillus* sp., *Pseudomonas* sp., etc. The presence of effective bacteria in the soil that help in increasing the soil fertility by their activity were analysed. The groups analysed comprises of nitrogen fixers and phosphate solubilisers.

Table 1. Viable count of flora of soil sample 1 on different media

Media	Viable count cfu/ml
Nutrient agar	3.2×10^6
Ashby's agar	2.0×10^6
Pikovaskaya's agar	0.9×10^5
Sabouraud's agar	White cottony fungi Pink fungi Yeast colonies

All bacteria grow on nutrient agar media as it is a rich in nutrients. The total count in the soil (sample 1) was 3.2×10^6 (Table 1). Amongst these bacteria, majority is of the nitrogen fixers as count obtained is 2.0×10^6 , followed by the phosphate solubilisers. Indicates that the soil is very fertile with high count of effective bacteria. In the total bacterial composition, the nitrogen fixers and phosphate solubilising bacteria dominate. The fungi found in the soil are *Aspergillus* sp., *Neurospora* sp. and yeast. Normally found in soil and on fruits and vegetables.

In soil sample 2, the count of nitrogen fixers and phosphate solubilisers is very high (Table 2). This indicates that the soil is very fertile with high count of effective bacteria. The fungal types encountered are yeast and *Aspergillus* sp. These are the normal cultures found in soil. A similar observation was seen in case of soil sample 3 (Table 3)

Table 2. Viable count of flora of soil sample 2 on different media

Media	Viable count cfu/ml
Nutrient agar	2.5×10^6
Ashby's agar	2.8×10^6
Pikovaskaya's agar	4.6×10^5
Sabouraud's agar	Same as soil sample 1

Table 3. Viable count of flora of soil sample 3 on different media

Media	Viable count cfu/ml
Nutrient agar	5.0×10^5
Ashby's agar	3.0×10^5
Pikovaskaya's agar	1.0×10^5
Sabauraud's agar	White cottony growth with black spores; Yeast colonies

The analysis of soil sample 4 also showed result similar to soil samples 2 and 3. The count of nitrogen fixers and phosphate solubilisers is very high (Table 4). This indicates that the soil is very fertile with high count of effective bacteria. In the total bacterial composition, the nitrogen fixers and phosphate solubilising bacteria dominate. The fungal types encountered are yeast, *Penicillium* sp., *Rhizopus* sp. and *Aspergillus* sp. These are the normal cultures found in soil and decaying plant material.

Table 4. Viable count of flora of soil sample 4 on different media

Media	Viable count cfu/ml
Nutrient agar	3.2×10^5
Ashby's agar	4.0×10^6
Pikovaskaya's agar	3.6×10^6
Sabauraud's agar	White cottony growth with black spores Growth with green spores Yeast colonies Growth with grey colonies

In the total bacterial count of control soil, there was incidence of normal soil bacteria. The count of nitrogen fixers and phosphate solubilisers is high. The fungal types encountered are yeast. These are the normal cultures found in soil and decaying plant material.

Table 5. Viable count of flora of soil sample 5 on different media

Media	Viable count cfu/ml
Nutrient agar	1×10^6 Yellow colonies innumerable
Ashby's agar	1.2×10^5
Pikovaskaya's agar	2×10^5
Sabauraud's agar	Yeast colonies

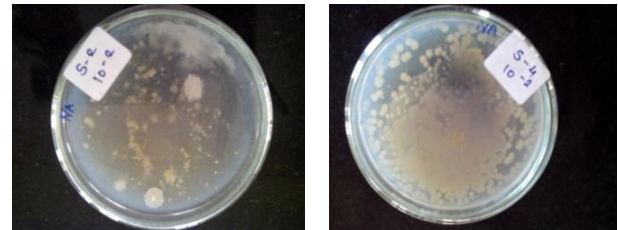
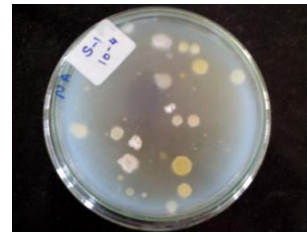


Fig. 1 Growth of bacterial cells obtained from soil on nutrient agar



Fig. 2 Growth of bacterial cells obtained from soil on Ashby's agar



Fig. 3 Growth of bacterial cells obtained from soil on Pikovaskaya's agar

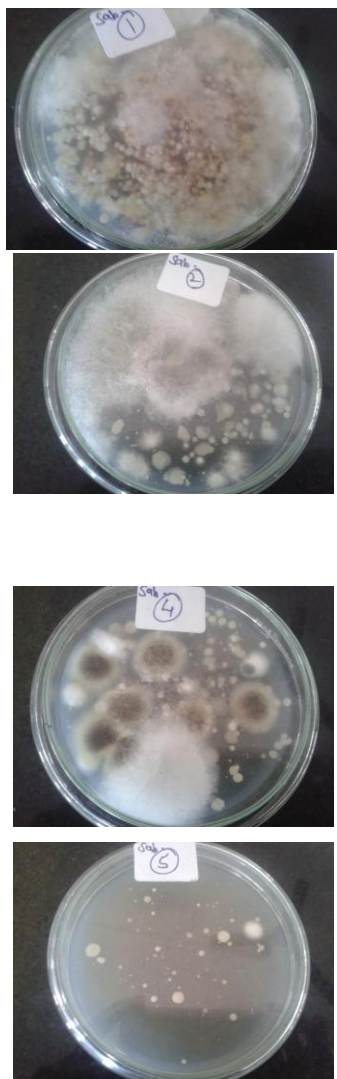


Fig. 4 Growth of fungal cultures obtained from soil on Sabouraud's agar

Soil was supplemented with ash and incubated for a week. The microbial flora encountered was higher in numbers. The effects of addition of ash are seen very distinctly in the results depicted below.

Table 6. Viable count of flora of Soil sample 1 with ash on different media

Media	Viable count cfu/ml
Nutrient agar	5.9×10^7
Ashby's agar	1.0×10^7
Pikovaskaya's agar	2.6×10^7
Sabouraud's agar	No growth

After addition of 1% Agnihotra ash, an overall increase in the bacterial count is observed from 3.2×10^6 to 5.9×10^7 , in case of soil sample 1. Among these, the nitrogen fixers and the phosphate solubilisers are major contributors and their number is also seen to increase significantly. The count of nitrogen fixer was seen to increase 100 fold while that of phosphate solubilisers was 1000 fold. Thus, after addition of Agnihotra ash, the soil fertility of sample 1, in terms of the nitrogen fixers and phosphate solubilisers is found to increase immensely.

Another significant observation is the inhibition of fungal growth. No growth was observed on the Sabouraud's media.

Table 7. Viable count of flora of Soil sample 3 with ash on different media

Media	Viable count cfu/ml
Nutrient agar	1.0×10^7
Ashby's agar	1.0×10^6
Pikovaskaya's agar	1.09×10^7
Sabouraud's agar	No growth

The observations for soil sample 3 after addition of Agnihotra ash were similar to the results obtained in case of soil sample 1, above. The count of phosphate solubilisers is found to increase greatly (Table 7). Growth of fungi is inhibited. Thus, after addition of Agnihotra ash, the soil fertility of sample 3, in terms of the nitrogen fixers and phosphate solubilisers is found to increase.

Table 8. Viable count of flora of Soil mixture with ash on different media

Media	Viable count cfu/ml
Nutrient agar	1.2×10^7
Ashby's agar	2.2×10^6
Pikovaskaya's agar	4.8×10^6
Sabouraud's agar	No growth

On comparing the results of soil sample 2 and 4 (before ash addition) to the mixture of the two soil samples (2 & 4), to which Agnihotra ash was added, increase in bacterial count is obtained (Table 8). As in the above cases, the count of phosphate solubilisers is seen to increase. Thus, after addition of Agnihotra ash, the soil fertility of mixture, in

terms of the nitrogen fixers and phosphate solubilisers is found to increase.

Table 9. Viable count of flora of soil sample 5 with ash on different media

Media	Viable count cfu/ml
Nutrient agar	1.2×10^7
Ashby's agar	3.8×10^6
Pikovaskaya's agar	7.2×10^6
Sabauroud's agar	No growth

A 100- fold increase in the numbers of nitrogen fixers as well as phosphate solubilisers is observed. It was also observed that the pinpoint yellow coloured culture seen in untreated soil was reduced drastically. Secondly, the growth of fungi is inhibited. Thus, after addition of Agnihotra ash, the soil fertility of sample 5, in terms of the nitrogen fixers and phosphate solubilisers is also found to increase.

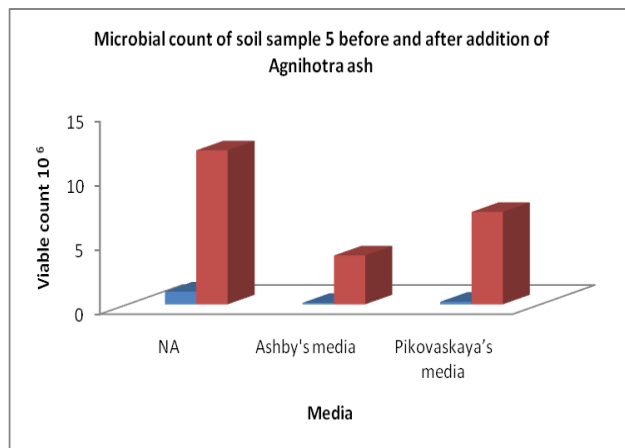


Fig. 7. Microbial count of soil sample 5 before and after addition of Agnihotra ash

Comparing the results of the three soil samples, it can be concluded that:

- Soil samples 1-4 showed good effective microbial composition, prior to addition of Agnihotra ash. This is indicative of good soil fertility, it being an organic farm.
- A further increase in nitrogen fixing, phosphate solubilisers and overall bacterial count, after addition of Agnihotra ash, is seen in all soil samples.
- Addition of ash increases the phosphate solubilisers more than the nitrogen fixers.
- Thus, addition of Agnihotra ash to the soil positively increases the number of effective organisms while suppressing the fungal growth.

In all the sample, the ratio of positive to negative microorganisms is 100:0. *i.e* the soil contains 100 % positive or effective microorganisms upon treatment with Agnihotra ash

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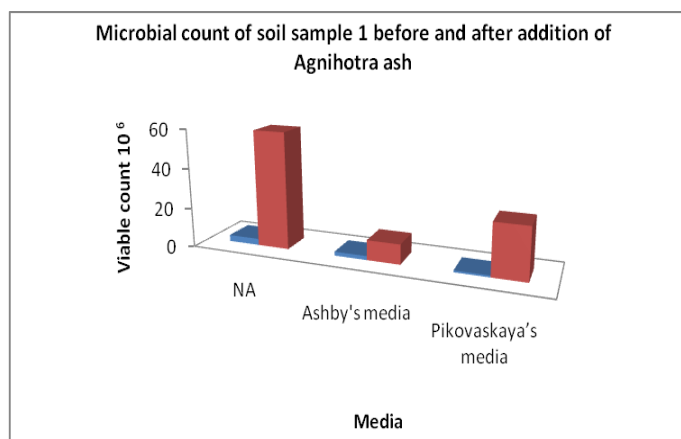


Fig. 5. Microbial count of soil sample 1 before and after addition of Agnihotra ash

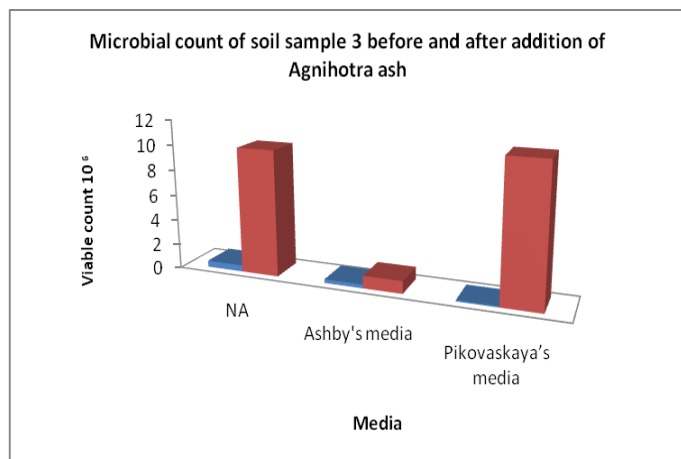


Fig. 6. Microbial count of soil sample 3 before and after addition of Agnihotra ash

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12.7 Annexure 7: Germination Experiment done on School Level

(Done by Bhumika Patil from Amalner, Maharashtra, India, for a school exhibition where she won the first prize.)

Mung beans were germinated for only one day (then the exhibition took place).

Left: Only water for watering

Right: Agnihotra water for watering.

Alas, no control ash water was used.

Colour difference due to the Agnihotra ash.

Would be good to continue for more days and see what happens.

