



REVIEW

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Agnihotra, The Holistic Energy Sytem Affecting Plant Growth: A Review Report

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ABSTRACT

Agnihotra, the ancient Indian technique used for purifying atmosphere provides a holistic system for plant growth. Through my previous studies I have shown that the effects that the agnihotra vapour brings out in plants are mediated through the hormone like substances. (Limaye, 2013) The vapour has been shown to have positive effect on plant growth through breaking of the dormancy, initiation of new leaf growth, breaking of apical dominance, senescence, faster seed germination etc. The ash has been found to have positive effects on plant growth in terms of making the surface area of leaves larger. Agnihotra vapour has been shown to have a specific brassinolide (a plant steroid involved in light induced expression of genes) type of action on the shoot system of the plants studied (Limaye, 2014). A mango tree which had not borne any fruits in last 5 years has produced fruits in response to agnihotra vapour. The report prepared through review of my earlier published studies along with some new observations and findings, points towards the presence of another component (other than brassinolide) in agnihotra vapour which seems to be heavier; water soluble and involved in the growth of root system in presence of light in the household plants studied.

Keywords: Agnihotra, Agnihotra Ash, Agnihotra Vapour, Agnihotra fumes, Phytohormone, Root-shoot balance, Brassinolides

Introduction

Agnihotra, a Vedic Yaga procedure followed in the ancient times in India, is a process which is known to purify the atmosphere through specially prepared fire.

According to Vedic Science, "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". According to Vedic knowledge, these Agnihotra effects are mediated by changes in atmosphere within some area around the site of its performance [1].

The Yajnyas (ritual, i.e. strictly determined fires, offerings and mantras), as this system of knowledge explains, allows better absorption and transformation of incoming solar/cosmic radiation and its interaction with energies of the Earth, Soil,

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water and living organisms. It is postulated that energies of multiple characteristics ("electricities" in plural) are involved in the mechanism of its action at "a more subtle level". Agnihotra combines the energies of five elements air, water, earth, sun and space to restore the balance in the atmosphere and the person performing it. The important thing about agnihotra is that it combines the energies of setting moon with that of energies of rising sun and the energies of setting sun with the energies of rising moon. By combining these energies Agnihotra restores the balance or equilibrium in the nature and makes the plants happy [2]. And for this; Agnihotra needs to be performed at the exact time of Sunrise and Sunset and exact chanting of mantras.

Since plants extract 70% of nutrition from the atmosphere; hence, the emphasis is on purification of the atmosphere. Agnihotra is a simple process of purification of the atmosphere by specially prepared fire according to Vedic methodology. It has been used successfully in conjunction with Biodynamic methods to produce maximum yields and top-quality produce [3]. Agnihotra farms across countries like India, Germany, Poland, Australia etc. are making use of this ancient procedure. Agnihotra farming is promoted in India by Institute for Vedic Studies based in Shivpuri. [4].



Though the positive effects of Agnihotra on yield of crops have been well documented, and some scientific aspects of Yagna been discussed [5], the scientific rationale behind its effects on plants remains to be explained.

Through my studies reviewed here {Section D: (a to g)}, I am trying to highlight the scientific rationale behind the action of Agnihotra vapour on household plants [6, 7]. This aspect can be related to Agnihotra's effect in restoring the balance in nature and also be helpful in plant and crop production.

How is Agnihotra Performed?

As a Vedic procedure, Agnihotra fire requires three inputs:

1. Specific organic substances (rice grains) burned in a copper pyramid
2. Agnihotra Yaga being performed at exact timings of Sunrise and Sunset
3. And the Vibrational inputs in the form of two short Sanskrit mantras

This ancient Vedic Procedure was revived in India at Shivrपुरi Ashram in 1969 [8]. The fire is lit in a pyramid shaped copper vessel of specific dimensions (Base: 5.25cm*5.25cm; Area at the open end: 14.5cm*14.5 cm and height: 6.5 cm) Cow dung cakes are arranged in the vessel along the 4 sides in a way so as to allow for free passage of air. Cow ghee is applied at the lower surfaces of the cow dung cakes, whereas it is applied on the upper side of cow dung piece to be placed in the centre. A triangular cow dung cake piece on which ghee is applied on both sides is put above the central piece. Fire is lit with the help of camphor. A smoke-less fire should be ready before the Ahuti is performed at the exact Sun rise and Sunset timings. At exact sunrise and sunset time, unbroken grains of rice smeared with little cow ghee are put in the fire along with chanting of Mantras.

“It is known that when specific substances are burnt in a copper pyramid with a specific mantra at the exact time of sunrise/sunset, a specific effect occurs. The fumes, smoke or vapors from the burning components rise high up in space. It gathers the nutritional properties and brings them down to earth benefiting all forms of life. The inverted pyramid pot is known to be a receiver of cosmic energy. Copper is the best conductor of heat and electromagnetic waves. Referred as the mother of all medicines in the ancient times, ghee acts as a carrier of subtle healing energies. Raw unbroken full rice grain is just right to use, it being the most abundant food grain across the globe. The Agnihotra mantras in Sanskrit cause specific vibrations beneficial to the mind and the atmosphere [9].”

Cows in the western countries are not vegetables fed, but meat fed and therefore their cow dung can't be used for producing Vedic Agnihotra.

The Agnihotra Experiments

Traditionally Agnihotra sacrifice requires intact (unbroken) unpolished (unmilled) brown rice, but for want of brown rice, initial studies were performed using unbroken polished rice (bran layer removed by milling) long grained basmati rice. Later when brown unpolished rice was available Agnihotra was performed with that rice. Some studies were also performed using very small grained unpolished (brown) mountain rice. Experimental plants consisted of plant species which are common household plants— money plant, tulsi (Ocimum), rose, croton, chrysanthemum, spinach etc.

The experiments were performed on a double-height closed terrace having walls on East, West and North side. The South side has no wall but is fitted with an iron mesh (1"X 1"). The whole area has good amount of light throughout the year. In the months of Jan-March, direct sunlight is coming from South-west direction. The potted plants were getting direct sunlight and these were kept on a raised platform so as to capture more vapour. Every new experiment was started on a new-moon's day.

In earlier studies the effect of Agnihotra vapour and ash was studied together. But in later experiments; the effect of only Agnihotra vapour was studied that had established brassinolide type of action mechanism for its effect on plant growth.

Review of Findings

A. Breaking of Dormancy

1. Production of two scale leaves in 2 bamboo leaves lying as such for more than 5 years kept on a height of more than 5 feet above the ground.(Figure 1).

Stimulation of new leaf growth in a money plant (After 15 days of exposure) kept in a vase which had shown no growth in last 4 years [6].

Emergence of new Ocimum plants in the pot from the seeds



Figure 1: Appearance of two scale-like leaves



Figure 2: Appearance of new leaves at the base



Figure 3: Appearance of new plants



Figure 4: Mango tree was exposed to the agnihotra vapour through open mesh



Figure 5: A Mango tree bearing fruits

lying dormant for a long time, and appearance of new leaves from the stem almost reduced to wood was observed. These changes were observed with both polished and unpolished rice grains. (Figure 2 & 3).

A mango plant which had not produced any fruits in the last 5-6 years, after an exposure



Figure 6: Proliferation of leaves



Figure 7: Increase of leaf area in new leaves



Figure 8: Lateral bud initiation



Figure 9: Comparison of control and experimental plant

to agnihotra vapour through open mesh not only produced increased inflorescence, but also bore fruits in large number. (Figure 4 & 5).

B. Stimulation of New Growth

Plants like rose, croton (Figure 6) and

money plant family had responded by production and proliferation of new leaves as a response to exposure to Agnihotra fumes. This effect was more pronounced in presence of direct sunlight (Feb, March).

In the absence of any fertilizer; addition of ash of agnihotra to the money plants in the soil had led to increase in the leaf area of newly produced leaves (Figure 7). Positive role of Agnihotra ash through increase of soil phosphorus solubility in organic farming has also been shown through certain scientific studies [10].

Agnihotra vapour had stimulated production of many new leaves in most of the plants studied. This effect of Agnihotra was found to be more pronounced with polished rice grains. **In a controlled experiment, the production of new leaves was observed in more than 50% of bottled money plants exposed to**



Figure 10: Wild Tulsi Plant



Figure 11: Plant after exposure

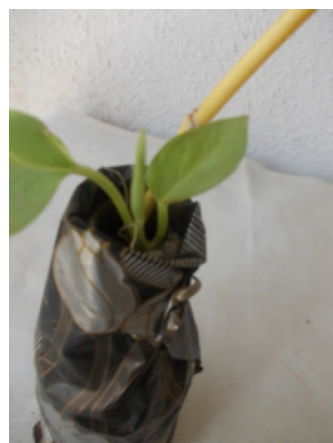


Figure 12: Production of new leaf

Agnihotra vapour [7]. A plant which was growing straight earlier for more than a year had responded by stimulation of lateral buds (Fig 8).

A comparison of control plants with that of exposed group (all control and experimental twigs removed from the same plant at same time having similar number of leaves and no roots) showed that exposed group had not only started producing new leaves, their roots were longer; the distance with nodes was also more than the control group (Figure 9) [7].

A tulsi (basil) plant which was growing wild and very tall, after pruning; had in response to agnihotra vapour produced side branches and good leaf growth. Earlier; pruning had no such effect on tulsi plant, it continued growing very tall with no leaves at the base. Senescence was more pronounced in experiments carried out with polished rice grains (Figure 10 & Figure 11). Production of inflorescence was observed with both types of grains.

It was observed that the out of the **exposed bottled money plants**, the bottle wrapped in the black plastic sheet was the **first one** to respond to agnihotra fumes by formation of new leaf confirming the role of phytohormone in growth regulation (Figure 12).

Similarly in the **control group** having pre-formed roots; the plant wrapped in black sheet was the only one to produce a new leaf. Repetition of these studies had also showed that stopping of normal root growth in presence of light had somehow helped in the production of shoot.

C. Role of phytohormone: Brassinolide type of action

In plants like rose, chrysanthemum, Ocimum and some other plants producing inflorescence; the agnihotra vapour (fumes) had stimulated production of buds, inflorescence, and increased senescence (yellowing or patches on leaves leading to their falling) (Fig 11). Senescence was observed in money plants in bottles (Fig 16).

In Chrysanthemum, comparison of exposed plant with the control plant had shown that there was change in the curvature of stem. In the exposed group the stem was growing erect and had produced buds, in control plant no bud was produced in the same conditions of light and air. Both the plants were removed from the same mother plant. In chrysanthemum the production of buds was observed only in the direction of light. Initially, as seen in the control plant; the shoot was growing horizontally

in experimental plant also; but when it had an exposure to agnihotra vapour; and, it had started producing buds, and the stem started growing straight. (Figure 13 & Figure 14)

Breaking of apical dominance was also observed; new shoots had erupted from the sides. After around a 10 day exposure, development of a shoot at a very fast rate was observed at the bottom of the plant in a rose plant which became equal to the main branch in 3 days of time. Role of a **brassinolide** (a steroid involved in the light induced action of genes) [11, 12] was established by my previous published study [7].



Figure 13: The control Plant



Figure 14: Production of buds

D. Over production of roots

It was observed that money plants left in bottles with too much of agnihotra ash in them had produced too much of root growth. This had happened in absence of Agnihotra vapour. (No agnihotra was performed for a long period of more than 2 months because of the author going out of station). These were thick long roots without any branching. No new leaf was produced in these plants in absence of agnihotra vapour; the plant was able to produce a new leaf only after an exposure to Agnihotra vapour.

In normal conditions new growth was produced in around 15-20 days time but in this case because of presence of ash and long tap roots; it took around 3 months of exposure to Agnihotra fumes to produce new leaf in the money plant. Along with the production of new leaves, senescence, yellowing of the leaves was also observed (Fig 16). An experiment in earlier studies had also shown the same results [6].

E. Seed germination in Spinach plants (at three different heights)

Spinach seeds were sown in pots and these were kept at three different heights. In normal conditions, spinach seeds took more than 7 days to germinate. It was observed that the seedling appeared at the earliest in the pot kept at the highest point (After 5 days). However, the stem was growing very fast (cell elongation) and was very flimsy. This type of effect was observed with polished as well as unpolished rice grains. Hastening effect of Agnihotra vapour on rice seeds has also been confirmed by a scientific study [13].

F. Narrow Vs Broad mouthed bottles

1. In money plant, the experimental narrow mouthed bottles (used in triplicate) and the opaque flower vase when exposed to agnihotra atmosphere had responded by production of more numbers of leaves, and increased distance between the nodes as compared to the wide mouthed bottles exposed to vapour. At the start of experiment all the plants had equal number of leaves (Figure 18 & 19).

Comparison of roots (Figure 20 & 21) of plants producing more new leaves (shoot production) had shown that plants producing more leaves had a network of roots as compare to the plants which did not produce new leaves. These plants had thick, long roots. Such roots were observed in wide-mouthed bottles (both big & small) [7].

2. It was observed that the twig of the following plant when transferred to a wide-mouthed bottle had a faster and longer root growth. During this time the newly formed leaves which were formed when the twig was in a narrow bottle,

were not been able to open for a long time when the plant was in bottle with a wide mouth.

G. Production of long adventitious roots in monsoon season

In winter months the plants kept on terrace were exposed to direct sunlight. The plants when exposed to agnihotra vapour had responded by increased production of leaves (rose, croton, money plant etc.), induction of more flowering (rose, chrysanthemum).

However in the month of July-August (times of rain); the money plant in the soil, and the money plant in the opaque flower vase responded by production of very long adventitious roots. Production of root at the



Figure 17A, B, C: Germination in spinach seeds at three heights; the first pot was at the highest point



Figure 15: Arrest of shoot growth



Figure 16: Formation of new leaves, senescence of old leaves



Figure 18: More number of leaves and longer internodes



Figure 22: Stimulation of root growth



Figure 23: Arrested aerial growth



Figure 19: Longer roots, internodes shorter



Figure 20: More leaves thinner roots



Figure 21: Thicker roots less leaves



Figure 24: Formation of long adventitious roots



Figure 25: Arrested leaf growth

node was also associated with blackening of opposite leaves at the same nodes at many places in the plant (Figure 25).

Conclusion

Promotion of shoot growth

The experiments carried out with the sacrifice in Agnihotra of polished (bran removed) long grained basmati rice grains using no external fertilizer or agnihotra ash had proved the involvement of a phytohormone in the effects produced by agnihotra fumes or vapour. The experiments (A to E) have

proved that agnihotra vapour has a brassinolide (a plant steroid known to be found in actively dividing meristems) kind of effect on household plants. Brassinolides are the class of plant hormones which are known to promote cell elongation, stimulate flowering, promote cell division and can affect the

tropic curvature [11, 12]. The same type of effect was also observed with unpolished brown rice sacrifice, but it was small grained mountain brown rice.

The effect of Agnihotra vapour for the first time observed in bamboo leaves, which were kept in a black coloured bottle, it was kept at a height of more than 5 feet of height and incidentally had a very small neck. The rose plant and chrysanthemum plants were kept on a raised platform. Mango tree responding to agnihotra vapour is tall enough to capture the rising vapour (Fig 5).

In confirmation to a recent study done on Agnihotra fumes in

the reduction of aeromicroflora [14], microbiological studies done by author had also seen reduction in aeromicroflora in agnihotra atmosphere. However, the microbiological studies had also shown that growth of microbes was observed in plates kept on ground very close to the performance of agnihotra. Whereas no growth was observed in plates kept on window parapet and raised platforms within good reach of agnihotra vapour. All these plates were exposed to air for a short time after 5 minutes of performance of Agnihotra. Which component of the vapour is responsible for this bacterio-static action is yet to be explored and out of the scope of studies done on household plants. However, as the results point out this component is present in high rising vapour.

The spinach experiment has also proved that a lighter component rising high with the vapour may be involved in the breaking of seed dormancy and shoot growth. This is the component which has a brassinolide type of action on shoot system of plants.

Promotion of root growth

Along with brassinolide type of action, the review of studies (D, F & G), also points towards the involvement of another compound which is heavier, soluble in water and is involved in the stimulation of root growth over the shoot growth. (Figure: 22-25) The evidence proves that stimulation of more or excessive root growth is somehow detrimental to the shoot growth.

Root-shoot balance

The action mechanism of Agnihotra probably involves a complex root-shoot balance for its final effects on plants. This way Agnihotra seems to play an important role in the sustenance of vegetation. So, there is no doubt that the Ancient system of Agnihotra offers a holistic energy system for plant growth.

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Authors Column



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Presently, I am engaged in research on Agnihotra which holds good promise in cleansing of the environment. Since it is done at the exact time of sunset and sunrise it helps a great deal in realignment of our Circadian Rhythm. I work as freelancer taking up editing and writing jobs. I have keen interest in Music, Environment, Yoga and Spirituality. Earlier I was working as project associate at Center for Environment Education, India. That time I had prepared a proposal and presentation for Effluent treatment plant for Hospitals in association with biotechnology department at IIT Delhi, India. I had also contributed articles for newsletters on Hospital Waste Management.

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