

Phytohormone-mediated Effects of Agnihotra Vapour on Plant Growth in a Field

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ABSTRACT

The present study again highlights the peculiar effects of Agnihotra vapour providing strong evidence for involvement of phytohormones (Brassinolide) for manifestation of these physiological effects at various stages of plant growth. These studies performed in an open field as a sequel to my previous study [1] have once again reaffirmed the mechanism of action of Agnihotra vapour on plant growth mediated through growth regulator substances. The study provides strong evidence for elucidation through observations the effects of agnihotra vapour on plant growth. In a new set of experimentation the observations were made on plants growing in an open field in contrast to my previous studies where observations were done on plants growing on double-height covered terrace of my home. New studies were conducted from 24th October to 6th November 2014, (New moon to Full moon), through performance of Agnihotra in the Eastern corner of an open field. Since the fumes or vapour after the Agnihotra offerings, rise and travel a long distance, the positive effects of agnihotra vapour on plants in a field were observed along a long radius. Most peculiar observation was that it had established **flowering** as the main effect of agnihotra vapour. Leaf proliferation, fruit formation, cell elongation, senescence were also observed along with it confirming the involvement of phytohormones for agnihotra's effect on plants.

Keywords: Agnihotra, agnihotra-vapour, phytohormone, brassinolide, initiation of flowering.

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I. INTRODUCTION

The following study carried out in an open field as a sequel to my previous study [1] has again established the peculiar effects of Agnihotra vapour providing strong evidence of involvement of phytohormone (Brassinolide) for manifestation of these physiological effects. In the previous study an effort was made to highlight the scientific mechanism of action of Agnihotra vapour through observations of effects of agnihotra vapour on plants kept in a closed **double-height terrace** of my home. The terrace is covered on three sides by walls and its open side on South-east which side is fitted with big holed iron mesh.

The second 'set of observations' were however taken during a study conducted **in an open field**. Important thing to mention here is that these observations have again provided the same type of results which were observed in-house on my double-height terrace. These studies were conducted from 24th October to 6th November 2014, (New moon to Full moon), when I got an opportunity to perform Agnihotra in the Eastern corner of an open field surroundings the Jalgaon dairy in Jalgaon Maharashtra, India. Since the fumes or vapour after the Agnihotra offerings, could rise and travel a long distance, the positive effects of agnihotra in a field were observed along a long radius. That, the effects on plants that were observed on my terrace were replicated in an open field is a proof enough of Agnihotra's scientific rationale. Another peculiarity of the observations was that the study had established **flowering** as its main effect of agnihotra vapour as which was observed in number of plants in the field having no flower on these trees before performing agnihotra. The other set of results were almost similar to those observed on my terrace, and therefore could be traced to resemble a particular **class of phytohormones** named as Brassinolides as shown earlier [1].

Another important experiment, third in the series was carried out on a big tree (Indian Black berry; *Eugenia jambolana*) present inside a closed balcony (which helped to retain the vapour around the tree). This peculiar experiment done in monsoon period (month of July in year 2016) has again confirmed the results of my chance study for initiation of new growth. In monsoon season, the effects of Agnihotra vapour had yielded curious results on money plant. Keen observation of these peculiar changes in different physiological conditions of experimental plants has helped me in drawing important conclusions. The consistency of results obtained in different situations and on different plants; conclusively points towards the involvement of plant hormones in the action mechanism of agnihotra vapour.

II. WHAT IS AGNIHOTRA?

Agnihotra is a Vedic Yaga procedure that was followed in the ancient India [2]. It is mentioned in Atharveda and described in detail in Yajurveda Samhita. Agnihotra is also mentioned in Bhagavad Geeta. In the modern times, the Agnihotra ritual was revived in India at the Ashram of Shivpuri(Solapur, Maharashtra) in 1969. [3] Agni means fire and Hotra means healing through fire. This is a process which is known to purify the surrounding atmosphere thorough a specially prepared fire using the cow dung cakes smeared with cow ghee. The fire is lit just 5 minutes prior to exact time of Sun rise and Sun set when a sacrifice of intact, unbroken rice grains coated with little cow ghee in fire is performed along with specific chanting of Mantras. “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. Then yajnyas (ritual, i.e. strictly determined fires, offerings and mantras), as this system of knowledge explains, purify the atmosphere and allow better absorption and transformation of incoming solar/cosmic radiation and its interaction with energies of the earth, soil, water and living organisms”. [4]. This method has been used successfully in conjunction with Biodynamic methods to produce maximum yields and top-quality produce. [5] The most significant aspect of Agnihotrais is that it combines the energies of five elements— sun, space, air, water and earth to produce subtle changes in the living organisms and helps to restore the bio-rhythm.

Specific effects of Agnihotra

Some scientific reports [6, 7, 8] have documented the use of Agnihotra for psychological healing. Agnihotra farming has been adopted in countries like, Poland, Germany etc. to increase the yield and improve the quality of the soil. In India Agnihotra farming has been promoted by Institute for Vedic Studies [9]. Positive role of Agnihotra ash in organic farming has also been shown through certain scientific studies [10]. Increase in solubility of Phosphorus and its increased availability to the plants is the explanation offered for the observed increase in yield.

III. POSSIBLE MECHANISM OF ACTION OF AGNIHOTRA

According to Vedic knowledge, Agnihotra effects are mediated by changes in atmosphere within some area around a site of its performance, and by special properties of Agnihotra ash [10]. The homa-farming methods have been used successfully for crops like grapes and rice and other commercial crops. Efforts put by authors like (NVC Swamy, 2004)[11] and (Indira, 2010) [12] are quite good in this regard. However, the scientific rationale behind this heavy growth stimulation had still remained to be answered. It seems that lighting of the fire helps to combine the energies of setting sun with the rising moon and the energy of rising sun with that of setting moon to restore some kind of balance in nature. Keeping this in mind, all the previous experiments and the current experiments were started on a New moon’s day.

IV. AGNIHOTRA AS A VEDIC PROCEDURE

As a Vedic procedure, Agnihotra fire requires three inputs:

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

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 cake 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 in my studies was lit with the help of camphor. A smoke-less fire should be ready before the *Ahuti* (offering) is made at the exact sunrise 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 chanting of a specific mantra at the exact time of sunrise/sunset, specific effect is produced. The fumes, smoke or vapors from the burning components rise high up in space. It gathers the nutritional properties of entities in space 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. Traditionally Agnihotra sacrifice requires intact (unbroken) *unpolished brown rice*, but for want of brown rice, most of my studies were

performed using unbroken polished long grained *basmati* (a type of Indian rice with delicate fragrance) along with chanting of specific Mantras.

V. OBSERVATIONS ON EFFECTS OF AGNIHOTRA VAPOUR

1. Imitation of New Growth

Home Terrace:

Beginning of my research on agnihotra had started after a peculiar observation [Fig 2] in the twin bamboo leaves surviving as such for around more than 2 years in a bottle kept at a height. The twig had two scale like leaf appendages appear it after exposure to agnihotra vapour. A dormant money plant also had new growth appear on it after exposure to agnihotra vapour.

In a closed Balcony



I had another peculiar observation when I was performing agnihotra in the month of monsoons in a closed balcony. On the front side I had curtains to avoid rain. A portion of tree trunk was there along with some of the leaves with no new leaf seen on the tree. (Fig 1)

Fig 1 Part of tree in a closed Balcony

Since I was on a holiday I was there only for 6 days (from July 13, 2016 – 19, 2016). However even after this short exposure to agnihotra vapour two leaf-like appendages however had appeared on the tree just as the bamboo twig. (Fig 2)



Fig 2A: Appearance of two leaf-like appendages on a tree in a balcony



Fig 2B: Appearance of two leaf-like appendages in bamboo twig

2.0 Improvement In The Overall Growth:

Money Plant



In plants exposed to Agnihotra fumes, the distance between nodes had increased, an increase in leaf size compared to control was also observed (Fig3).

Fig 3 Comparison of growth between experimental and control plant

In the scientifically designed experiments; formation of new leaves was seen to be associated with senescence of old leaves, which was however, absent in control plants. Increase in leaf size was also observed and the distance between

the nodes had also increased (Fig 3A). A peculiar observation worth mentioning here is that in the months of July during the monsoon season however, the same plant had very long adventitious roots hanging from it. The growth (cell elongation) was observed here in roots.



Fig3A: Plant in dry season



Fig 3B: Plant in the rainy season

3. Proliferation of Leaves

Terrace: In most of the plants exposed to agnihotra vapour formation of the leaves was enhanced. Proliferation was found to be more pronounced in the months of winter when terrace received direct sun rays.

In Field

In field also the proliferation of leaves was observed in a number of plants including rose, mango and number of plants, red tinged leaves were seen on a number of plants.



Fig 4 Leaf-proliferation on terrace



Fig 5: (Leaf-proliferation in field) 5A: Rose plant



5B: Mango plant

4.0 Flowering

Most of the flowering plants kept on my terrace had flowering induced in them after agnihotra exposure. [1] In some of the plants, onset of inflorescence formation in the plants had led to shedding of all the leaves below, (Fig 9) possibly because of a sink being provided for all the nutrients to be directed at the site of flower formation.

Among the flowering plants kept on the terrace, the rose plant had increased bud formation, the same results were observed in the field plants. In both the cases, the plants were exposed to direct sunlight. The red colored leaves (Fig 5AB) had appeared in large numbers on the top.



Fig 6A: Increased bud formation on terrace



Fig 6B: Increased bud formation in field



Fig 7: Induction of flowering in field



Fig 8: Flowering stimulated in tree laden with lemons

A yellow rose plant had increased bud formation and flower formation after exposure to Agnihotra having no bud prior to Agnihotra. In the field flowering was initiated in number of plants including a plant which had just been shifted to a new place and no flower on it (Fig 7). The number of flowers it produced had increased with increased exposure. A lemon tree which was in the fruiting stage with no flower had flowering initiated on it after exposure (Fig 8).

5.0 Senescence

In some of the flowering plants, speedy formation of inflorescence was seen to be associated with increased senescence. After senescence, when the complete inflorescence was formed, the new leaves had started emerging **at the bottom**. (Fig 9) In the field however, this senescence was not much pronounced. However senescence was observed in a plant having horizontal leaf.



6. New Shoot Formation at the Base

There were many rose plants growing in the field. All had flowering induced in them, however, a very peculiar thing had happened at both places.



Fig 10: Formation of a new shoot at the bottom (on terrace)



Fig 11: Formation of a new shoot at the bottom (in field)

The rose plants getting the direct rays of sun earlier in the morning responded by producing a large number of buds. Most plants growing in the field including rose had responded by proliferation of leaves. In the rose plant including some other plants it was observed that at the base a new twig was formed (*breaking of apical dominance*) after some time of exposure which became very tall in 2-3 days of time (*Cell elongation*). The twig had red coloured leaves. The same results were observed on my terrace (Fig 10, 11).

7.0 Formation Of Fruits

Production of fruits was also observed in a creeper after 7-8 days agnihotra exposure in field. A mango tree outside my terrace which did not bear fruits for many years started bearing fruits after being exposed to Agnihotra vapour. This plant did not have any flowers till the beginning of March 20, but had flowers on it after exposure to Agnihotra vapour. (Fig 12) Earlier, very few flowers were formed on the tree, and though some fruit formation took place, these were shed when very small. After exposure to fumes fruits in large number were formed on the tree.



Fig 12A: Induction of flowering and formation of fruits near the terrace.



Fig 12B: In the field

V. RESULTS AND DISCUSSION

Possible Role of Phytohormone

The observations and results of previous study[1] had conclusively proved that the effects on plants caused by agnihotra fumes generated by offering of polished rice grains into the sacred fire of Agnihotra resemble the plant regulator substances or the hormones which are light-dependent. Almost similar observations in a field point towards the fact some kind of chemical substances are involved for producing these effects which are triggered in plants through exposure to agnihotra vapour. These effects produced particularly resembled that of phytohormones **Brassinolides**, which are known to promote *cell elongation, stimulate flowering, promote cell division, senescence and can affect the tropic curvature* [13] are plant **steroids** that may be involved in the light-induced expression of genes and hold good promise in agriculture [14] & [15]. Brassinolides are in fact are extensively used in agriculture. This also explains the scientific rationale of Agnihotra farming.

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