➔DOI : 10.15740/HAS/AJBS/14.1&2/1-4
ISSN-0973-4899 | ■ Visit us : *www.researchjournal.co.in*
ASIAN JOURNAL OF BIO SCIENCE
Volume **14** | Issue 1&2 | Apr. & Oct., 2019 | 1-4

RESEARCH **P**APER

Effect of agnihotra and tryambakam homa ash on growth of tomato plants: A novel approach for organic farming

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Article Info : Received : 01.07.2019; Revised : 01.09.2019; Accepted : 15.09.2019

The present experiment is a pilot study designed to know the effect of Agnihotra and Tryambakam homa ash on tomato plant (*Solenum lycopersicum* L.) grown under pot conditions. Agnihotra and Tryambakam homa were performed with chanting of sanskrit mantras. Agnihotra was performed during sunrise and sunset and tryambakam homa was at any time of day and ashes were collected separately from both the homas. These ashes were mixed with coco peat, red soil and cow dung separately and this mixture was filled in pots. Ten days old seedlings of tomato plant were transplanted into the soil mixture and nitrogen, phosphate and potassium (NPK), jeevamruth and consortium were added. After 80 days, the plant growth parameters *viz.*, shoot length, root length, total length, number of leaves, fresh root weight, fresh shoot weight, total weight, dry shoot weight, dry root weight and total dry weight were studied. Most of the parameters showed statistically significant (P>0.05) results however, shoot weight, total fresh weight and dry weights had no significant values. This pilot study suggests that agnihotra and tryambakam homa ash may be a good strategy of organic farming for sustainable agriculture.

Key words : Agnihotra homa ash, Organic farming, Plant growth, Tomato,Tryambakam homa

How to cite this paper : Pavithra, G.V., Chhabra, Deepika, Rajamani, R., Sharma, Prem Prakash and Kochupillai, Vinod (2019). Effect of agnihotra and tryambakam homa ash on growth of tomato plants: A novel approach for organic farming. *Asian J. Bio. Sci.*, **14** (1&2) : 1-4.**DOI : 10.15740/HAS/AJBS/14.1&2/1-4.**

INTRODUCTION

The chemical based agricultural practices have adverse impact on the environment and serious health concerns for humans. To escape from the harmful effects of chemicals, the concept of organic farming has emerged. It is a production system, which favours maximum use of organic materials like crop residues, farm yard manure (FYM), compost, green manure, oil cakes, bio-fertilizers, bio-pesticides, bio-gas slurry and microbial products. One aspect of organic farming is homa and homa ash based farming. This is an ancient Vedic farming technique. The present study was conducted on tomato (*Solenum lycopersicum* L.) plant with the objective to evaluate the effect of Agnihotra and Tryambakam homa ash on different parameters under pot experiment. Tomatoes are rich in vitamins, antioxidants and minerals which are essential for the healthy human body. India is the second largest producer of tomatoes next to china; inorganic fertilizers are used in large scale to prevent diseases and to increase its yield. This in turn poses serious health threats to consumers as well as polluting the ground water thus causing environmental problems (Aktar *et al.*, 2009 and Singh *et al.*, 2016). Homa organic farming is considered to enhance the quality of food and for achieving environmental sustainability.

Agnihotra and Tryambakam homa are the fire rituals

performed to the accompaniment of sanskrit mantras. Agnihotra is performed exactly during sunrise and sunset with the following ingredients; completely dried cow dung cakes, unpolished rice and ghee in a copper pyramid shaped container (Limaye, 2014), whereas Tryambakam homa can be performed during any time of the day. The practice of Agnihotra and Tryambakam homa dates back to vedic period. Homa is performed to remove toxins from the surroundings and create positive atmosphere. It's a process of fumigation through which bacterial count in surrounding air can be controlled (Abhang *et al.*, 2015). Agnihotra homa fumes have been shown to have positive effects on plant growth, to have antibacterial properties and to cleanse the atmospheric air (Abhang *et al.*, 2015). Agnihotra ash also purifies water (Abhang *et al.*, 2015) and both Agnihotra and Tryambakam homa ash have shown to increase the yield of protein content in mushroom and cape gooseberry (Indira *et al.*, 2010 and Gocher *et al.*, 2017). So this study is designed to take up the task of finding growth potential of Agnihotra and Tryambakam homa on tomato plant.

RESEARCH METHODOLOGY

Agnihotra homa: (Limaye, 2017 and Abhang *et al.*, 2015):

Agnihotra homa is performed in a semi pyramid shaped copper vessel. Dried cow dung cake is placed in the vessel and fire is lit. Unpolished and unbroken rice is offered while reciting mantras. The homa is performed exactly at sunrise and sunset.

The following mantra is chanted

At Sunrise:

S ooryaya swáahá, Sooryáya idam na mama|
Prajápataye swáahá, Prajápataye idam na mama||

At Sunset:

Agnaye swaáhá, Agnaye idam na mama|
Prajápataye swaáhá, Prajápataye idam na mama||

Tryambakam homa:

The homa is performed by using dried cowdung, camphor, ghee and fire is lit. A small amount of *Ghee* is offered to the fire after the word "SWAHA" while chanting following mantra

Om Tryambakam Yajamahe, Sugandhim Pushti Vardhanum Urvaarukamiva Bandhanat, Mrityormoksheeya Maamritat, Swaha.

Homa ash was collected separately from both the homas and further used for the experiment.

Substrate preparation:

The following ingredients are mixed:

Coco peat- 2kg, Red soil- 3kg, Cow dung-0.5kg.

The mixture was filled into 6 pots; 2 for control, 2 for agnihotra and 2 for tryambakam. 1g of agnihotra and tryambakam ash was added to respective pots except control. Ten days old seedlings were transplanted into the soil mixture and 1 per cent nitrogen, phosphate and potassium (NPK), jeevamruth and consortium were also added. Plants were watered everyday. Eighty days old plants were uprooted for the biomass study. The parameters evaluated to determine the effect of agnihotra and tryambakam homa ash on tomato plants were shoot length, root length, total length, number of leaves, fresh root weight, fresh shoot weight, total weight, dry shoot weight, dry root weight and total dry weight.

RESEARCH FINDINGS AND ANALYSIS

The effect of agnihotra and tryambakam homa ashes on tomato plants with respect to parameters including number of leaves, shoot length, root length, root fresh weight and total length are found to be better than the control and are statistically significant ($P<0.05$). However, shoot weight, total fresh weight and dry weight are found to be statistically non-significant. In absolute figures, comparison between agnihotra and tryambakam indicates that agnihotrahoma ash is more effective in enhancing shoot fresh weight and total fresh weight of plant whereas tryambakam home ash is effective with respect to parameters like number of leaves, root length and total length.

There was no variation within plants in treatment group, so by using two way ANOVA statistical significance was tested and few of the variables as mentioned above were found to be significant but applying non parametric tests no significant difference was observed between treatments.

One of the reasons for positive effect of homa ash on the growth is likely to be its ingredients. It consists of cow dung, rice and cow's *Ghee*. Cow dung from ancient times is well known as natural fertilizer in organic farming (Wisdom *et al.*, 2012). Rest of the ingredients are

considered to provide plant nutrients. The materials used in the homa gets combusted and fumes released remove pollutants in the surrounding air. This reduces the susceptibility of plants to diseases. The explanation for agnihotra and tryambakam treated plants showing enhanced growth compared to control can be given by study conducted by Gocher *et al.* (2017) on the plant cape gooseberry. This study was conducted to compare the effect of homa ash and gibberllic acid (plant growth regulator) on the vegetative growth of the plant. The results obtained indicated that the agnihotra homa ash and growth hormone gibberllic acid have nearly equal effect on the plant growth. The positive effect of plant growth regulators are explained to be achieved by increased cell division, elongation and cell enlargement. Similar conclusion can be drawn from this study to explain the enhanced growth of tomato plants when treated with agnihotra and tryambakam homa ash. In addition, agnihotra and tryambakam homa have physiological effects on plants. Performing the fire ritual while chanting mantras in the surroundings of plant has been demonstrated to be effective in creating a positive healthy environment for plant growth (Devi *et al.*, 2004). The soil fertility can be enhanced with the application of agnihotra ash. Growth promoting microbes like nitrogen fixing and phosphate solubilizing microorganisms were found to be increased because of agnihotra ash. It was also observed that pathogenic fungal growth was inhibited (Berde *et al.*, 2015). In addition, the vibrations created by the utterance of sanskrit mantras have positive effect on human mind as well as on plants (Indira *et al.*, 2010). Devi *et al.* (2004) studied the effect of agnihotra homa on germination of rice and found that fire ritual along with mantras is more effective than just fire ritual (without sanskrit mantras). The combination of vibrations and homa vapours have significant impact on plants. Agnihotra homa performed in an open field enhances the growth and yield of plants. The results obtained in the study by Devi *et al.* (2004) and Limaye (2014) are an evidence for the same. Gocher *et al.* (2017) demonstrated the effect of agnihotra ash on vegetative growth and yield of cape gooseberry. Compared to controls, plants treated with the agnihotra ash showed significant increase in the growth rate. Similarly, Mishra (2016) observed that the bacterial inhibition ability of *Piper nigrum* L., (medicinal plant) got enhanced by the use of agnihotra. Another experiment was conducted to study the effect of agnihotra and tryambakam homa ash on growth parameters and yield of the Okra plant and it showed the similar results (Kumar *et al.*, 2014).

Conclusion:

Considering the results of current experiment with respect to certain parameters, it can be concluded that application of Agnihotra and Tryambakam homa ash have positive effect on growth of tomato plants. Organic homa farming appears to be a promising technique because of its cost effectiveness and environmental friendliness. Moreover, since our study has shown that the application of Tryambakam homa ash increased the root length compared to control and Agnihotra ash treated plants, it would suggest that more studies are required to see the individual and combined effect of Agnihotra and Tryambakam homa ash on the growth of different plants.

Table 1: Effect of agnihotra and tryambakam homa ash on various growth parameters in tomato plants

Parameters	Control (C) (n=2) Mean ±SD (C)	Agnihotra (A) (n=2) Mean ±SD (A)	Tryambakam (T) (n=2) Mean ±SD (T)	p-value*
No. of leaves	77±0	89.5±0.5	101±0	<0.05
Shoot length (cm)	34.37±0.075	36.43±0.135	36.75±0	<0.05
Root length(cm)	22.8±0	23.02±0.08	26.10 ±0	<0.05
Total length(cm)	57.17±0.075	59.45±0.055	62.68±0.17	<0.05
Fresh weight of shoot (g)	28.74±0.74	35.7±3.72	26.61±2.405	NS
Fresh weight of root (g)	8.01±0.13	4.32±0.19	5.53±0.04	<0.05
Total fresh weight (g)	36.74±0.86	39.52±4.41	32.14±2.365	NS
Shoot dry weight (g)	4.05±0.135	4.61±0.465	3.61±0.275	NS
Root dry weight (g)	1.03±0.01	1.13±0.065	0.87±0.17	NS
Total dry weight (g)	5.07±0.145	5.75±0.53	4.48±0.445	NS

* P-value has been calculated using F-test from two way ANOVA. There was no significant difference between plants within each treatment
NS=Non-significant

Acknowledgement:

The authors are thankful to the Ved Vignan Maha Vidya Peeth to provide necessary facility and support to conduct this study.

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