



ORIGINAL ARTICLE

Effect of Gayatri Yajna on Seed Germination and Seedling development of *Trigonella foenum-graecum*

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Study Area: Raipur, India

Coordinates: 21.25°N 81.63°E

Key words: Chemical fertilizers, Fenugreek, Sustainable environment



Seed Preparation and Experimental Design

Abstract

Yajna is an ancient Vedic ritual, been done since ancient times and is performed for favourable conditions related to the various environmental issues. The present study was conducted to reveal the effect of Gayatri Yajna on seed germination and seedling development of *Trigonella foenum-graecum* (fenugreek). The seeds were divided into two groups- group A was treated with Gayatri Yajna and group B was treated with only mango wood smoke, seeds of group A were kept under the environment of Gayatri Yajna for four days and then soaked in sterile water overnight and group B were treated with mango wood smoke for 4 days than soaked in sterile water for overnight. The data were tabulated as on the first day of germination, seed germination rate, last day of germination, final germination percentage, mean germination time, coefficient of the velocity of germination, pseudo leaves appear day, root length and shoot length. Observations revealed notable differences in seed germination and seedling development between the two groups. The present study thus aims in proving a major breakthrough in gaining access to the precious Vedic knowledge, understanding the Vedic science and employing their scientific analysis to enhance the crop quality, decreasing the germination time and increasing the root and shoot development thereby making our environment more sustainable and harmful chemicals free.

Introduction

Since its inception, the followers of ancient Vedic culture have considered the inhabitants of planet Earth (including all planets and plants) as one family (Verma *et al.*, 2018). The Vedic scriptures rely on practising Yajna to attain sustainable development. Yajna involves processes involving different herbs being subjected to fire during which mantras are being chanted continuously (Srivastava, 2013). YAJNA (YAJNA) has now opened new horizons. (Pathik, 2019). The Vedic Yajna (Sacred Rites) of various scientific and spiritual societies have not only confirmed our own belief in ancient Vedic wisdom but also provided a 'system' or an anecdote to combat almost every Problem of modern life. On one hand, Yajna works to clean up the environment and on the other hand, it blesses the one who does so by helping in the proper alignment of his body, mind, and soul (Chaube *et al.*, 2020).

The Green revolution in India has brought economic stability and growth but has also led to varied health issues

(Kaur & Sinha, 2011). Malwa region of Punjab, India has been declared as "Cancer Capital" because of a 3fold rise in cancer cases in the past 10 years. The principal reason for this is the excessive use of chemical fertilizer during farming (Mittal *et al.*, 2012; Kumar *et al.*, 2012). Harmful effects of chemical fertilizer also include mental retardation and reproductive disorder (Ayotte & Giroux, 2001). Considerable amounts of Nitrogen fertilizers are being used for plants. It consists of carcinogenic substances such as nitrosamines, especially in plants such as lettuce and spinach leaves are eaten. There is a harmful accumulation of NO_3 and NO_2 (Sharma & Singhvi, 2017).

Recent research on the assessment of Yajna as well as the smoke of medicinal herbs indicated their potential role in reducing airborne bacteria and toxic air pollutants and purifying air pollution. The plant growth with the treatment of Agnihotra fumes and the number of seeds germinated when treated with Agnihotra ash was higher as

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compared to seedlings not treated with Agnihotra ash and Agnihotra fumes (Pranay *et al.*, 2015; Chandel, 2019). Yajna is a scientific process through which the balance of CO₂ and O₂ is maintained in the atmosphere. In the Yajna ritual, besides, the proper use of wood and herbs, the application of the Mantra is important (Tuneer & Nurul, 2012). The mantra is usually considered as a part of the cultural dimension. However, recent advancements in the field of medicine and science support the therapeutic role of different dimensions of ancient therapies such as Mantras, which were initially considered a part of the cultural tradition. Therefore, it might be argued that the Yajna, considered a ritual, should also have effects on human beings as well as Plants (By *et al.*, 2018).

In the present study, we observed the effect of Yajna with the Gayatri mantra, various herbs for sacrifice in the Yajna fire, and mango wood samidha on seed germination and seedling development..

Materials and Methods

Yajna Kund (Fire Pit): square shape (*Chatushkona*) Yajna Kund has an internal inverted pyramid shape with three Vedi (White colour on top, Red colour in mid, Black colour on bottom) which is measured for 24 aahutis (oblation) being performed by two persons. Yajna Kund (furrow) was procured from local Gayatri Shaktipeeth (Singh & Singh, 2018).

Samidha: Samidha is the wood sticks used as a base material to generate Yajnaagni – the sacrificial fire, preferably wood sticks from mango tree (*Mangifera indica*) are always being used. In the present study also, worm-free Mango wood was used as Samidha. Homemade Desi cow ghee (clarified butter) was used (Abhang & Pathade, 2017).

Herbal mixture for Aahuti: Aahuti is a mixture of many herbs such as *Sanctanum album* (sandalwood), *Tinospora cordifolia* (Giloy), *Cyperus rotundus* (Nagarmoth), *Hedychium spicatum* (Buch-Hem), *Aegle marmeloscorrea* (Bael), *Cedrus deodara* (Deodar), *Nardostachys jatamansi* (Jatamasi) *Sesame indicum* (Black sesame seed), water from river Ganges (Gangajal). For our study, the aahuti (oblation) or *hawan-samagri* used were procured from Shantikunj, Haridwar, Uttarakhand.

Two groups of fenugreek seeds were prepared with an equal number of seeds in each group. Group A seeds were treated with Gayatri Yajna and group B (Control) were treated only with mango wood smoke in the study of the seed germination and seedling development under various parameters as described below (Singh & Singh, 2018):

1. Mean germination time (MGT)
2. First day of germination (FDGS)
3. Last day of germination (LDG)
4. Coefficient of the velocity of germination
5. Germination Rate Index (GRI)
6. Time Spread of Germination
7. Seedling Development (Root and Shoot Development)

The seeds were prepared as described below:

1. The fenugreek seeds were washed 4 times with distilled water.
2. Equal number of seeds had been kept in a bowl with wet tissue paper dampened with distilled water.
3. Further 5 ml of water had been added, making sure seeds do not get submerged in water.
4. Group A seeds were first kept under the environment of Gayatri Yajna for four days and then soaked in sterile water for 12 hours then the effect of Yajna was recorded for given parameters.
5. Similarly, Group B Seed was kept mango wood smoke for 4 days, then soaked in sterile water for 12 hours, and then studied were studied for the given parameters.
6. For the study of seedling development, Yajna was performed for 4 days every week at exactly the same time, and the seedlings were developed in a hydroponic system.
7. The average root length was calculated using formulae as previously described using surface area and the shoot length was calculated using a student's ruler measuring in centimetres (Limaye, 2018).

Procedure to Perform Yajna: Gayatri Yajna was performed under the instruction of Saral Aur Sarvopyogi Gayatri Yajna Vidhi (Srivastava, 2013), with some modifications. Samidha was prepared with clean mango wood without contamination of termite or insect parts, and for oblation (Aahuti) a mixture of herbs as discussed above was prepared. Fresh Aahuti was prepared every day to enhance the effect of the herbs used. The procedure of Yajna was performed at exactly the same time (2:30 pm) after 24 hours continuously for 4 days every week to watch the impact of Yajna on seedling growth. A total of 29 Aahutis were performed with 24 Aahutis with *Gayatri Mantra* and 5 Aahutis with the *Mahamritunjaya mantra* (Saxena *et al.*, 2007).

Results:

Two groups of fenugreek seeds were prepared with an equal number of seeds in each group, the groups were named A and B. Group A seeds were treated with Gayatri Yajna and the B (Control) group seeds were treated with mango tree smoke only. The study for seed germination and seedling development was performed under various parameters as described below:

1. **Effect on Final Germination Percentage-** The germination rate of fenugreek seed was higher in the presence of Yajna as compared to the control condition, the final germination percentage was equal for both conditions, however Group A (with Yajna) seed first day of germination was achieved at 1st day only rather than Group B (Control) needed two days, and Group A seed showed last day of germination on 2nd Day compare than Group B achieved in 5th Day (Table-1).
2. **Effect on Mean Germination Time-** A mean germination time of both groups also showed significant difference Mean Germination Time of Group A was low 1.3 days however Group B was 2.8 days. (Graph-1). First day of germination of Group A seeds which was treated with Yajna was 1st day only, although Group B seeds which were control was 2nd day and in the

same manner last day of germination also showed notable differences it was in group A was 2nd day and for group B was 5th day (Table-1).

3. **Effect on Coefficient of the velocity of germination-** It shows the rapidity of germination, that means total no of seed germination is in high rate in less time, in these parameter Group A has high CVG as comparable as Group B (Table-1).
4. **Effect on Germination rate index (GRI)-** Calculation of GI considers both the percentage of germination and its speed. A higher GI value denotes a higher percentage and rate of germination (20), in that parameter also Group A seeds which were treated with Yajna was showing higher value compares than Group B Seeds (Table-1).
5. **Effect on Time spread of germination (TSG)-** It decides the germination speed between the 'fast' and 'slow' germinating group. In the present study TSG was day 1 for the Group A in the presence of Yajna while it was day 2 in the absence of Yajna, indicating the effect of Yajna on faster germination (Table-1).
6. **Effect of Yajna on Seedling Development-** Yajna was done in every week for the same time for Group A seeds, and seedling was developed in a hydroponic system. Group B Seeds were in the control condition without a Yajna environment but kept in the same hydroponic system. The root and shoot lengths were high in the presence of Yajna compared to that of controlled conditions to the seedling. It has been found that the average length of root of Seeds with Yajna treatment was 11.875 cm on the 7th day and the average shot length was 9.78 cm (Graph-1).

Table 1: Observation table for fenugreek seed measurement of germination parameters in presence of Gayatri Yajna.

Measurement Parameter	Control B	Experiment A
Mean germination time (MGT)	2.8 Days	1.3 Days
First day of germination (FDG)	2nd Day	1st Day
Last day of germination (LDG)		
Coeff. velocity of germination (CVG)	35.018%	78.037%
Germination rate index (GRI)	49.8%	87.7%
Timespread of germination	2	1

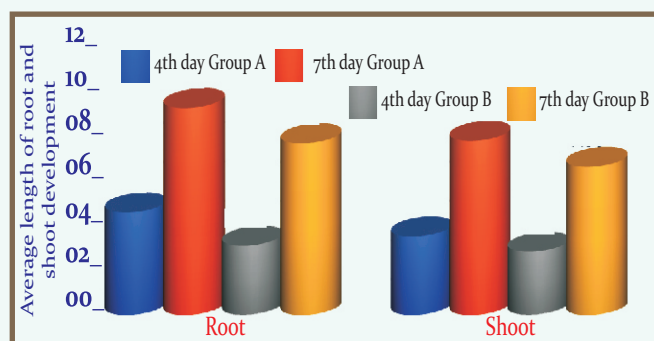


Figure-1 Seedling Development Group A and Group B Seeds on 4th and 7th Day. Group A-Seed treated with Gayatri Yajna. Group B (Control) - Seed treated with only Mango Wood Smoke

Discussion

Disease in plants develops only when a susceptible plant, a virulent pathogen and an unfavourable environment create together for a critical period. On the other hand, Yajna

Therapy is an ethnobotanical inhalation therapy derived from the ancient Medical Science of India, which is described to influence the environment in a very vast way in our Vedas (Shivhare & Gour, 2019). The multiple benefits of Yajna experiments include purification of the atmospheric environment and fertility of the soil. The scientific validity and technical evaluation of this Vedic ritual in recent times indicate its enormous potential for reducing air-water pollution and for agricultural and therapeutic applications. Homa Organic Farming is the application of Yajna (Homa) Therapy in agriculture, which means healing the environment, the atmosphere and all of life using the Vedic science of Yajna. By practising Homa Therapy for farming one can grow maximum yield in a minimum agricultural area and keep the soil fertile, the water pure and the atmosphere nutritious (Nair, 2017). No chemical fertilizers or chemical pesticides are used in the complete process. Only the Yajna (Agnihotra) atmosphere and ash are used as manure and for pest control or curing the diseases of plants (Singh & Singh, 2018). Yajna symbolizes noble deeds and an altruistic mode of life that generates and expands benevolence in all forms of Nature. In simple terms, it means giving, distributing and thus expanding the good. The oceans evaporate their water to form clouds; the clouds shower distilled water in return everything in the natural system works on this principle (Pathik, 2019).

Our present studies explore the benefits of our Vedic ritual Yajna and the effect on seed germination and seedling growth. Two groups of fenugreek seeds were studied in different conditions group A was studied Yajna environment and Group B was studied in a control condition, studies give such a notable difference in various parameters of seed germination and seedling development.

Practices of Yajna or Homa fires done according to specific rules in order to get the desired results are still well known in India, they are based on Vedic knowledge of mankind. Several types of research have been done worldwide for Yajna (Kumar *et al.*, 2017) Yajna and Agnihotra practices are a sustainable solution for the earth from pollution and also get healthy food. Agnihotra and Gayatri Yajna reported many overwhelming results, Homa Farming will prove as holistic healing for agriculture and it can be added to any organic farming, even Homa farming will be a new sustainable option for forming systems in agricultural practice (Ram & Pathak, 2016). These significant differences opened a new door for agriculture toward to sustainable development. This authentic and ancient ritual method will give a new revolution without damage to the environment and animal health.

Acknowledgement

The authors are immensely thankful to the Chancellor, MATS University, Raipur for providing laboratory facilities.

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