

Role of Organic Nutrients on the yield of *Ammi majus* L.

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Abstract

Majority population of developing countries still rely on plant based traditional drugs. Cultivation of medicinal plants for their products is in great demand especially due to high cost of their products. The present work is focused on improving the living standard of poor farmers by introducing most effective and profitable farming of medicinal herbs without discontinuing their traditional farming. *Ammi majus* L. a member of family Apiaceae has several medicinal properties. Its seeds have contraceptive and diuretic properties. It is mainly used in the treatment of vitiligo and psoriasis. It is also used as tonic or in the treatment of asthma and angina. The present demand of its seeds in the world market is worth for about 14 billion US dollars per year. Over exploitation of non-cultivated medicinal plants has become a threat to biodiversity in the forest areas in India. The seeds of *Ammi majus* L. were obtained from Hamdard University, Delhi

were cultivated in farm land as well as Hislop college experimental field with control and treatment of various nutrient types. The present work has proved that this plant can be cultivated from February to May in the Vidarbha region of Maharashtra, India. The organic farming techniques have proven to be better yielding.

Keywords: *Medicinal Plants* | *Ammi majus* L., | *vitiligo* | *psoriasis* | *contraceptive* | diuretic.

Introduction

The plant *Ammi majus* L. is a native of Nile Delta of Egypt. In India, *Ammi majus* L. was introduced in forest research institute, Dehradun in 1955 through the efforts of UNESCO for its medicinal & ornamental value (Bradu & Atal, 1970; Singh, 1963 and Umrao Singh et al. 1982). Since then, its experimental cultivation has been tried in several parts of India including Jammu, Dehradun, Mumbai, Chennai, Delhi and Punjab.

The plant is used for the treatment of leucoderma & psoriasis (Anup Kumar, 1988 and Hansen, 1979). It has been recommended as a diuretic, expectorant & useful in Jaundice (Khan & Rehman, 1985 and Lal, 1977). The

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fruits are used in vitiligo & also in the formation of suntan lotion (Anonymous, 1985, 1986). The essential oil from *Ammi majus* L. seed has been extracted by Ashraf *et al.* in 1972 who also studied its quality compound for the first time.

The seed is contraceptive, diuretic and tonic. An infusion is used to calm the digestive system, whilst it is also used in the treatment of asthma and angina. Its decoction is also used as a gargle in the treatment of toothache. It was an Egyptian professor Abdel Monem. El Mofty, who observed plants used in Egyptian folk medicine (e.g *Ammi majus* L.) and began the development of modern photochemotherapy (PUVA) for vitiligo and psoriasis. Klaber (1942) introduced the term phytophotodermatitis to emphasize the necessity of plants and light to cause the reaction. Duke (1988) have reported that furocoumarins have bactericidal, fungicidal, insecticidal, larvicidal, moluscicidal, nematocidal, ovicidal, virincidal and herbicidal activities.

Ammi majus L. is an important medicinal perennial herb belonging to family – Apiaceae. Its common name is Aatrilal, bishops weed, bullwort, False queen anne’s lace, lace flower or mayweed. It has a striated subglaucous stems, leaves acute, serrulate, alternate, bipinnate & lobes oblong. Inflorescence a compound umbel, flowers bisexual, polygamous, bracteate, calyx teeth small, petals obovate, stamens epigynous, ovary inferior, two locular, stigma capitate. The plant prefers bright light, sandy medium (Loamy) or heavy (Clay) soils. The plant prefers acid, neutral or basic (Alkaline) soils. It can grow in semi shade (Light woodland) or no shade. It requires moist soil.

Material and Methods

Preparation of Experiment Field

The experimental field of Hislop College and a local farm, about 18 km away from the city were selected for the study. The field was ploughed to clear off the weeds and also for solarisation of the underneath soil layer to get rid off the unwanted soil fungal flora. The soil was mixed with organic compost manure. In local farm the field was divided in to 5 plots, each plot 100 ft. long and 5 ft. wide (500 sq. ft.). Due to lack of sufficient area the experimental field of the college was divided in to 5 parts each having length 5 ft. and width 1 ft. Sufficient gap between each plot was given to prevent the influence of a particular treatment to the neighbouring plots.

Seed collection and sowing

The seeds of *Ammi majus* L. were obtained from Hamdard University, Hamdard Nagar, New Delhi. They were cleaned with sieve and weight of 1000 seeds was obtained by digital single pan balance in the laboratory. On the basis of weight, packets of 1000 seeds were made for the convenience in sowing in the farm. 1000 seeds/plot were sown in the farm while 10 seeds/plot were sown in the college experimental field. The seeds are sown at a depth of about 1.5mm-2mm & at a distance of 1 foot between each other. After germination thinning and transplanting of the seedling was carried out in a manner that 500 strong plants were left in each plot while 5 plants/plot remained in the college field. Regular watering was done as per the need to keep the soil with sufficiently moistured. Deweeding and hoeing was done twice a month to avoid the problems created by weeds and also to make the soil soft with sufficient aeration.

Manures

Nutrient solution

An organic nutrient solution was prepared by fermenting fresh cowdung with neem oil cake. 200 liters of water with 5kg cowdung and 250 grams of neem oil cake were kept in a plastic drum. 2 gm of urea was added as a stimulant for bacterial fermentation. The fermentor drum was kept in optimum conditions of temperature i.e. 20-30 °C for 15 days. The medium was stirred regularly for better fermentation. The supernatant liquid was taken as stock solution which was further diluted to 10 times with water before giving to the plants. The stock solution was diluted to 20 times for the use of foliar spray to the plants.

Vermi-compost

Vermi-compost was prepared in the college composting unit. It is of 40 ft. by 20 ft. in size and is divided into 4 compartments by brick partition with holes to connect each other. The degradable garden waste was added to one compartment daily and cowdung occasionally till the compartment became full. Earth worms were introduced into the compartment along with cowdung when the compartment was half full. A layer of about 1 ft. thick cowdung was added at the top and covered with a jute sheet. Required moisture was maintained by spraying water daily. Same process was repeated in each compartment one by one. As after about 70 to 80 days the composting process gets over, the water spraying was stopped so that Earth worms automatically move into the next compartment where moisture and semi degraded organic matter are available.

Inorganic fertilizers

The inorganic fertilizers were purchased from the market. They are Urea, Sterameal and

DAP. Each plot with 480 sq.ft. size was given 100 gm Urea, 10 gm Sterameal and 50 gm DAP twice during the crop period. Each 5 sq. ft. plot in the college was given 10 gm Urea, 1 gm Sterameal and 5 gm DAP twice during the crop period.

Sowing of the seeds was done on 12th Feb 2010. Thinning, hoeing and transplanting was done after about two weeks of sowing (from 25th February to 1st March) in all experimental plots. Out of 5 plots 1st plot was kept as control. While other four plots were given the 1st dose of nutrients after about three weeks of sowing (on 5th March 2010) in the farm land. Different types of nutritional combinations used are: A) Control without any additional nutrition, B) Diluted nutrient solution, C) Vermi-compost, D) Vermi-compost and nutrient solution, E) Inorganic nutrient solution. Similar treatments were also applied in the college experimental field about three weeks after sowing of seed i.e. on 6th March 2010. Foliar spray of nutrient solution was given after four weeks i.e. 10th March 2010 to 'B' compartment only. The second dose of nutrients was given from 2nd and 3rd April 2010 in the same manner after a period of eight weeks since sowing.

About 70% germination was observed both in the farm land and the college field. About 500 plants were maintained in each plot of farm land while only 5 plants each were raised in college field (Plate-1 & 2). The rest were removed by thinning and transplanting. Two doses of manures were given within a gap of four weeks. Flowering occurred after about eight weeks of sowing (7th April 2010, Plate-3 & 4) and fruits were matured after about twelve weeks of sowing (5th May 2010). The fruits were plucked and collected in 5 different polythene bags separately from farm land and college field from each plot. They



Plate - 1
Vegetative Phase (Control)



Plate - 2
Vegetative Phase (Vermicompost+Nutrient)



Plate - 3
Flowering Phase (Control)



Plate - 4
Flowering Phase (Vermicompost+Nutrient)

were allowed to dry in the lab by spreading it over newspaper and covered with net cloth for 15 days. Majority of the fruits were splited and rest were broken by soft grinding by hand. They were cleaned by a sieve and then packed in separate transparent polythene bags. The weight of 1000 seeds and total weight of seeds was measured. The results are depicted in Table: 1 for farmland and Table: 2 for the experimental field.

Result and Discussion

In the present investigation the effectiveness of four different types of manure/ nutrient treatment on the seed yield & seed weight of *Ammi majus* L. was determined. The findings are depicted in Table:1 & Table:2 and figures:1 & 2. On perusal of data given in Table:1 & 2, it becomes obvious that the nutrient type T4 (Vermicompost + nutrient solution) has excelled over other treatment

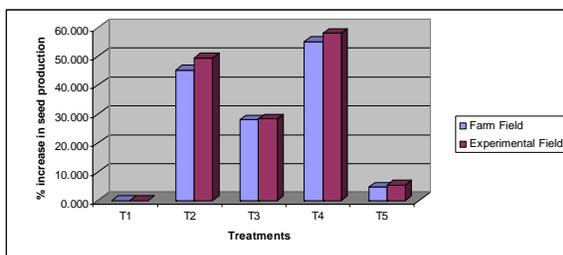


Figure 1: Role of Organic Nutrients on the seed production of *Ammi majus* L.

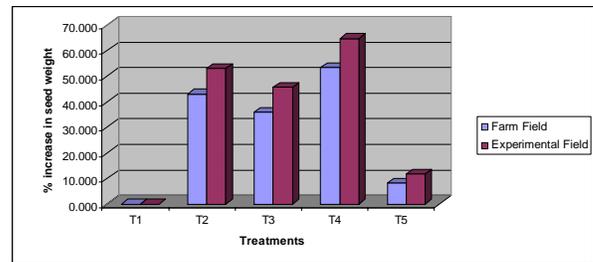


Figure 2: Role of Organic Nutrients on the seed weight of *Ammi majus* L.

type both in terms of seed yield & seed weight. It has exhibited an accretion of about 55% in the seed yield in farm field & about 58% in the Hislop College experimental field. Similarly, an increase of about 53% & 65% is recorded in seed weight from the yield of farm field & Hislop College experimental field respectively.

The overall pattern of effectiveness of different nutrient/manuring combinations in descending order can be expressed as follows:

T4 > T2 > T3 > T5 > T1 where,

T1 stands for Control, T2 for Nutrient Solution, T3 for Vermicompost, T4 for Vermicompost + Nutrient & T5 for Inorganic solution.

It is worth mentioning that better seed yield & seed weight has comparatively been recorded from Hislop College experimental field. This could be attributed to soil quality (garden soil) & moisture availability at this experimental site.

Many scholars have worked on the cultivation techniques of *Ammi majus* L. (Bradu *et al.*, 1970; Kumar, A. 1988; Singh V.P., 1963; Sobti *et al.*, 1978.) The present experiments were carried out during the month of February to May 2010. Many research workers have suggested different sowing timing for *Ammi majus* L. cultivation in India.

Panda (2002) has stated that an ideal time for direct sowing of *Ammi majus* L. in the field is

September whereas Singh & co-workers 1963 had recommended 30th October as the most suitable date for sowing of *Ammi majus* L. at Chakroli (Jammu). They have observed that

sowing beyond this date cause significant reduction in the seed yield. These findings are in concurrence with the timing of Duhan and co-workers cf. Panda (2004).

S. No.	Treatment	Average Yield Per Plant	Total Weight of Crop (Seeds)	Percent Increase in Seed Production	Weight of 1000 Seeds	Percent Accretion in Seed Weight
1	Control (T1)	8.140 gm	4070.10 gm	-----	0.3650 gm	----
2	Nutrient solution(T2)	11.822 gm	5911.20 gm	45.235%	0.5220 gm	43.013%
3	Vermicompost(T3)	10.413 gm	5206.80 gm	27.98%	0.4960 gm	35.89%
4	Vermicompost + Nutrient (T4)	12.625 gm	6312.60 gm	55.096%	0.5600 gm	53.424%
5	Inorganic (T5)	8.520 gm	4260.20 gm	4.67%	0.3950 gm	8.219%

Table 1: Role of Organic Nutrients on the yield of *Ammi majus* L. (Farm Field)

S. No.	Treatment	Average Yield Per Plant	Total Weight of Crop (Seeds)	Percent Increase in Seed Production	Weight of 1000 Seeds	Percent Accretion in Seed Weight
1	Control (T1)	0.776 gm	3.880 gm	-----	0.340 gm	----
2	Nutrient solution(T2)	1.16 gm	5.800 gm	49.484%	0.520 gm	52.941%
3	Vermicompost(T3)	0.996 gm	4.980 gm	28.350%	0.495 gm	45.58%
4	Vermicompost + Nutrient (T4)	1.226 gm	6.130 gm	57.989%	0.560 gm	64.705%
5	Inorganic (T5)	0.818 gm	4.090 gm	5.412%	0.380 gm	11.764%

Table 2: Role of Organic Nutrients on the yield of *Ammi majus* L. (Experimental Field)

As per Panda (2002) the crop of *Ammi majus* L. on an average yield 12 q/ha of dry seeds. A yield of 1375 kg/ha has been obtained under experimental conditions & 900-1200 kgs/ha under large scale cultivation under Jammu Condition. In Palampur Baijnath area the yield of just 600 kg/ha has been obtained. In the present study a maximum yield of 600 kg/ha has been recorded using organic farming technique during off season months. A better yield could be expected during the optimum growing season between October-May as suggested by various worker (Duke 1988; Panda 2002, 2004; Singh 1963-1983).

As mentioned earlier, the combination treatment of nutrient solution and vermicompost together gives the best possible yield. Thus, one can very rightly go for organic farming in the cultivation of *Ammi majus* L. in Vidarbha region of Maharashtra state where maximum number of farmers suicides occurred due to failure of other crop & economic hardship.

The yield obtained from this research during February to May 2010 that too from the control indicates that the crop of *Ammi majus* L. can be used as a summer crop in the local climatic conditions after the harvesting of the regular crop. The organic farming methods

tried can be used to increase the yield remarkably and at the same time maintaining the fertility of the soil. It will definitely boost the economic condition of our poor farmers in Vidarbha region.

Conclusion

The present research work on cultivation of *Ammi majus* L. indicates that this medicinal herb can be grown as an additional summer crop after the harvesting of regular crops which will be over by February. The present study has revealed the importance of nutrients to enhance the production of this crop. Thus, it can be concluded that the organic farming will help to increase the productivity of this crop without compromising quality. Total organic farming of *Ammi majus* L. can yield better result in production without affecting the health of the soil. The production of about 600 kg. per acre will fetch between Rs.10 lacs to 11 lacs in the open market. This will boost the economy, help to improve earning potential of the farmers & enhance their living conditions alongwith earning valuable foreign exchange for the country.

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