

## Comparative study of Vermicompost and DAP on the growth of *Coriandrum sativum* seed

Nagaraj Parisara

Department of Environmental Science, Sahyadri Science college,  
Shivamogga-577201 (India)

### Abstract

In this comparative study, the growth rate of coriander seed (*Coriandrum sativum*) is observed by using DAP and vermicompost. In vermicompost soil, the plant height is 5 cm at the interval of 22<sup>nd</sup> day. In DAP, the plant height is 4 cm at the interval of 22<sup>nd</sup> day. Therefore, the growth of coriander seed in vermicompost is highest than the DAP manure. Vermicompost may show the good growth than DAP. Vermicompost soil shows more microbial activity resulting in additional nutrients for plant growth which ultimately resulting in more growth. Similarly, by adding DAP, it increases the soil pH and the plant could not give better growth. By using vermicompost the life of living beings can be saved and also increases the soil fertility.

Vermicompost is derived from a latin term “vermis” method worms. Vermicompost is the made from the decomposition process the usage of numerous species of worms usually *Eisenia fetida*, *Eudrilus eugeniae* and different earthworm to produce an aggregate of decomposing veggies or meals waste bedding substances and vermicompost is referred to as vermicomposting. Vermicompost consists of water-soluble nutrient and is an fantastic nutrient rich organic fertilizers and soil conditioners, that’s used in framing and small scale sustainable natural farming<sup>1</sup>. Vermicomposting is increasingly turning into popular as an organic farming and solid waste management approach and it produces vital bio fertilizers, vermin compost and vermin wash<sup>3</sup>. Vermicompost is an natural manure

produced because the vermicast by way of earthworm feeding on biological waste fabric; plant residues<sup>8</sup> and it’s far one of the quality supply of vitamins improves the bodily and chemical homes of vegetation<sup>10</sup>. The vermicompost is wealthy in NPK and micronutrients<sup>6,9</sup>. Vermicompost and Biofertilizer are also beneficial substitutes to inorganic fertilizers which improves the soil first-rate. Biofertilizers are residing organisms that have an potential to mobilize vitamins from unusable shape via organic manner and these groups of microorganisms may also either restore atmospheric nitrogen or solubilise insoluble phosphorus and lead them to be had for vegetation.

*Coriandrum sativum* L is one of the

maximum important of vegetable, spice and medicinal plant which belongs to the own family Apiaceae (Umbelliferae) is frequently cultivated from its seeds for the duration of the year. India is the predominant manufacturer, purchaser and exporter of coriander inside the international with an annual manufacturing of approximately (a thousand metric tonnes in 2019). This plant may be very an awful lot fragrant and has numerous makes use of in meals and in different industries. Plants have performed a first-rate role in keeping human fitness and civilizing the value of human lifestyles for thousands of years<sup>2</sup>. All elements of plant are safe to eat, sparkling leaves may be used for garnishing and are common component in lots of foods like chutneys and salads. The inexperienced herb is also engaged for the education of both steam distilled critical oil or the solvent extracted oleoresin<sup>6</sup>.

Kumar *et al.*<sup>5</sup> establish a significant increase in plant height, dry matter and primary and secondary branches of coriander due to application of 60 kg of Nitrogen/ ha as compared to lower doses of nitrogen. Prabu *et al.*<sup>7</sup> reported that 25% recommended dose of fertilizer (RDF at the rate of 90:80:50 NPK kg/ha ) and 10 tones of FYM/ha with biofertilizer (*Azotobacter* + VAM) gave significantly higher plant height and root: shoot ratio of coriander as compared to recommended dose of fertilizer at Prabhani of Maharashtra.

This study gives an perception on studies research is on vermicomposting they used solid waste food from rubbish and family substances, flowers and waste meals needs right treatment as it is able to contaminate ground water. They use earthworm that's

biodegradable. They paintings to save plant harm stimulators which inhibit seed germination. Their investigations suggest boom in the parameters like overall Nitrogen (%), available Phosphorous (%) and Exchangeable Potassium (%)<sup>12</sup>.

Usman Ali *et.al.*,<sup>13</sup> worked on solid waste management as a primary ecological vermicomposting, and is defined that it's miles a viable option to manage strong waste in an environmentally pleasant way. This review gives as a preferred overview of viability of vermicomposting procedure as an eco friendly approach. In this have a look at, they proved it is an integrated method of vermicomposting, co-digestion of organic wastes presents higher possibility for each micro-organisms and earthworms to convert the natural fraction of solid waste beneath managed environmental condition<sup>13</sup>.

Agarwal<sup>1</sup> conducted pot test to access the overall performance of live earthworms and vermicompost. She followed diverse remedies, live earthworm + cow dung, vermiculture, chemical fertilizer and to control, organized the end result shows the grown and yield parameter had been discovered superior<sup>1</sup>.

The main aim and objectives of this study is to study the vermicompost techniques and to know the growth rate of plants using vermicompost and DAP. Also to know the micro and macro nutrients of the given soil sample.

The standard methodologies are followed in the comparative study.

*Collection of soil :*

Three kg of soil was collected from the surrounding of Sahyadri Science College during 2020-21 and given for estimation of Physico-chemical characteristics. The soil was fine clay mixed having good texture before introducing in to the treatment the soil was analyzed for micro and macro nutrients.



Figure 1: Soil collection for the analysis of micro and macro nutrients

For the comparative study 2 trays with size (2.3 cm length / 18 cm width) were taken both trays were filled with 1.5 kg of soil for each tray . For one tray, vermicompost was added and marked as treatment 1.

Another tray was filled with some

amount of soil (cleaned debris were removed) and added DAP with the concentration of 1:10 after 10 days .

Sample - 1	Sample -2
Soil	Soil
Vermicompost	DAP
Water	Water
Coriander seed	Coriander seed

To both the trays coriander seeds were sown and with intervals of 7 days observation.

After the treatment both the soil samples were analysed for the micro and macro nutrients which are mentioned below on the interval of every 10 days the plants growth is observed and measured.

Soil sample is collected from different sites and weighed. The collected sample was analysed for micro-nutrients , macro-nutrients and other parameter. Macro-nutrients are mineral elements that are used in large quantities for healthy plant growth and crop yield. Macro-nutrients are essential plant nutrient. That are found in trace amounts in tissue which play an important role in development.

The micro-nutrients (Iron-5.51(ppm), Magnesium-10.13(ppm), Zinc-0.38(ppm), Copper-1.54 (ppm)).

The macro-nutrients (Calcium-2349.68 (ppm), Magnesium-472.8 (ppm), Boron-0.12(ppm), Nitrogen-219.28 (kg/hectare),  $P_2O_5$ -9.70 (kg/hectare),  $K_2O$ -246.75 (kg/hectare). The pH is 7.28.

Table-1. Value of soil sample analysed

Micro-nutrients	Macro – Nutrients	PH
Iron – 5.51 (ppm)	Calcium – 2349.68 (ppm)	7.28
Manganese – 10.13 (ppm)	Magnesium – 472.81 (ppm)	
Zinc – 0.38 (ppm)	Boron – 0.12 (ppm)	
Copper – 1.54 (ppm)	Nitrogen – 219.28 (kg/hectare) P <sub>2</sub> O <sub>5</sub> -9.70(kg/hectare) K <sub>2</sub> O-246.75 (kg/hectare)	

These micro, macro and neutral P<sup>H</sup> are essential for coriander plant growth. In this comparative study we used 2 trays. Tray 1 is filled with soil sample (1.5 kg) and DAP(10 granules). 10 grams of DAP is diluted in 100ml of water *i.e.* is the ratio of 10:100, In both trays coriander seeds were sown uniformly and regular observation is done germination took place on 10<sup>th</sup> day in Tray 1. After 12 days seed germination is observed in Tray 2.

On 15<sup>th</sup> day in tray 1 plant growth was measured it showed 3 cm height at the same time/day in the tray 2, plant growth in the tray 2 was 2cm. This experiment was carried out for 1 month for the comparative study between vermicompost and DAP.

Composition of DAP	Composition of vermicompost
Nitrogen – 18% Phosphorus-46%	Organic Carbon-9.5-17.98% Nitrogen-0.5-1.50% Phosphorus-0.1-0.30% Potassium-0.15-0.56% Sodium-0.06-0.30%

Table-2. Tray-1 Plant growth rate in tray 1 with vermicompost

Sl. No	Days	Growth Rate
1	7 <sup>th</sup> day	Germination takes place
2	15 <sup>th</sup> day	3 cm
3	22 <sup>nd</sup> day	5cm
4	29 <sup>th</sup> day	7cm

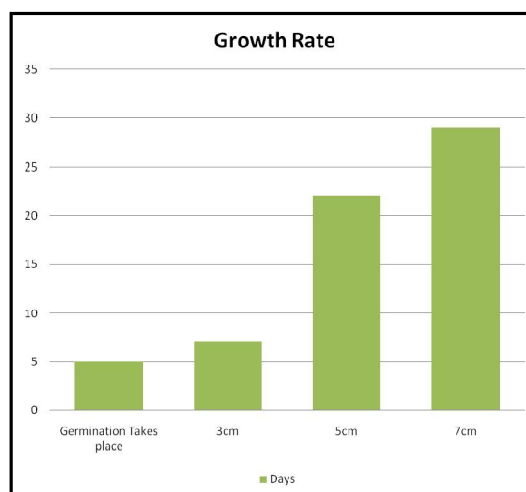


Figure 2: Plant growth rate in tray 1 with vermicompost

Table-3. Plant growth rate in tray 2 with DAP

Sl No	Days	Growth rate
1	7 <sup>th</sup> day	No Germination takes place
2	12 <sup>th</sup> day	Germination takes place
3	15 <sup>th</sup> day	2cm
4	22 <sup>nd</sup> day	4cm
5	29 <sup>th</sup> day	5cm

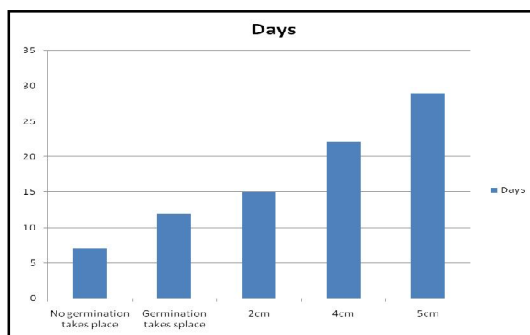


Figure 3. Plant growth rate in tray 2 with DAP



Figure 4. Germination of Coriander seeds



Figure 6. Vermicompost preparation

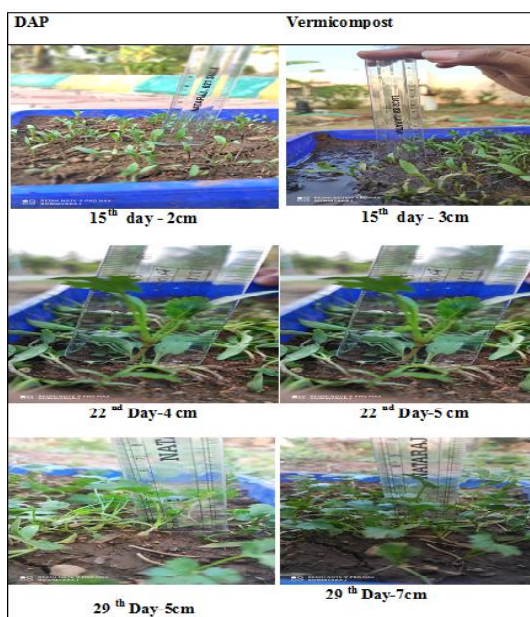


Figure 5. Growth of Coriander plant in different days by using DAP and vermicompost

In this comparative study, I have determined the growth of coriander seed. Tray 1 containing soil and vermicompost and the plant height is 5 cm on the period of 22<sup>nd</sup> day. The Tray 2 containing soil and DAP and plant height is 4 cm on the 22<sup>nd</sup> day. Therefore, the plant growth of coriander seed in vermicompost is maximum than the DAP manure serves as a great supply of natural modification for the improvement of coriander seed. Vermicompost can also show the good increase than DAP. Vermicompost in soil develops soil microbial activity resulting in extra addition of nutrients for plant growth which in the end effects greater growth. Similarly, by including DAP to soil, it will increase the pH of soil. Due to this, plant could not supply higher increase. By averting chemical fertilizer (DAP) and the usage of vermicompost will

store the lifestyles of living beings and additionally will increase the soil fertility.

#### References :

1. Agarwal, Sunitha (2010). *International Journal of Global Environmental issues* 10(3): DOI:10.1504/IJGENVI:2010.037277.
2. Ahlam, M.A.U., M.E. Hoque, and Laily, U.K. Khalum (2017). Growth and yield performance of different of combination of vermicompost and fertilizer.
3. Dhankar, S., R. Kaur, S. Ruhil, M. Balhara, S. Dhankhar, and A. K. Chhillar, (2011). *African Journal of Plant Science*, 5(11): 620-627.
4. Kaur, P., M. Bhardwaj, and I. Babbar, (2015). *Research Journal of Animal, Veterinary and Fishery Sciences*, 3(4): 9-12.
5. Kumar, S., A.C. Choudhary and S. Kumar (2002). *Annals of Agricultural Research*, 23 : 634-637.
6. Mhemdi, H., E. Rodier, N. Kechaou, and J. Fages, (2011). *Journal of Food Engineering*, 105(4): 609-616.
7. Palanichamy, V., B. Mitra, N. Reddy, M. Katiyar, R.B. Rajkumari, C. Ramalingam, and C. Aranganthan (2011). *International Journal of Chemical and Analytical Science*, 1241-1246.
8. Prabu, T., P.R. Narwadkar, A.K. Sajindranath and N.G. Rathod, (2002). *South Indian Horticulture*, 50 (4-6) : 680-684.
9. Rathore, MS., M. Singh, D. Panwar, and N.S. Shekhawat, (2007). *Green Farming*, 1(1): 28-30.
10. Sakthivel, P., Alice R. P. Sujeetha, G Ravi, A. G. Girish and P. Punnam Chander, (2020). *Int. J. Curr. Microbiol. App. Sci.* 9(08): 613-622. doi: <https://doi.org/10.20546/ijemas.2020.908.068>
11. Sinha, R.K., S. Agarwal, K. Chaudhan, and D. Valani, (2010). *Agricultural Science*, 1(2): 76-94.
12. Sunil. J. Kulkarni (Datta Meghe College of engineering Airoli, Navi Mumbai, Maharashtra, India) (Issue; 2 Febuary 2017, Page no: 79).
13. Usman Ali, Nida Sajid and Riffat Naseen Malik. (2015) (*Environmental biology and ecotoxicology laboratory Department of environmental science*, Feb 17, 2015).