



"ASSESSMENT OF IMPACT OF THREE KINDS OF FERTILIZERS ON THE CROP YIELD OF BRASSICA CAPESTRIS (L.)"

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ABSTRACT Farmers of the western Uttar Pradesh state of the country, applying different kinds of chemical fertilizers into their cropping fields for better crop yield. But continuous use of these fertilizers for a long time period, reduce the fertility power of the soil. Thereby several researchers carried out research work on these lines and proved that as per current requirement, use of chemical fertilizers into the soil system is not suitable for fertile soil. In the present studies, three kinds of fertilizers were used for the better production of *Brassica campestris*. It was assessed and recorded that maximum production of *Brassica* was noticed 2.17 times more in those experimental plots who were treated with the vermicompost, prepared by earthworms, of the genus *Eisenia fetida* than that of plots treated with the market fertilizers (NPK and Urea). Although, Farm Yard Manure (FYM) biocompost also showed better results than the chemical fertilizers and control (without any fertilizers). Hence, these studies concluded that use of chemical fertilizers should be stopped and use of biofertilizers should be accepted and started in the form of vermicompost and FYM into the cropping fields for better crop yield of various crops.

KEYWORDS : *Brassica Campestris*, Chemical Fertilizers, *fym*, *Eisenia Fetida* & Vermicompost.

INTRODUCTION

Our ancestors have no idea about the use of chemical fertilizers into the cropping system for maximum crop yield of various crops. But in the 19th century, several researchers made different kinds of chemical fertilizers in the form of Urea, NPK, DAP *etc.* for better crop yield. Since the beginning of 19th century, to till now, farmers are continuously using these chemical fertilizers into their cropping fields. According to Sunitha (2000), application of recommended dose of fertilizers and vermicompost was significantly superior in increasing growth performance and lower pest incidence in chili nursery. But due to imbalanced concentrations of macro and micronutrients of these fertilizers, changed the texture of soil in various ways and now it is proved that day by day fertile soil continuously loses their fertility power in slow motion. Keeping this in mind, an attempt was made specially for the assessment of Impact of biofertilizers and chemical fertilizers into the cropping fields for production of *Brassica campestris* and the results were discussed under the available literature and emphasis on the use of biofertilizers into the cropping fields.

MATERIALS AND METHODS

The present experiment was conducted at village-Kajarbojhi, Barkhera (Pilibhit), Uttar Pradesh, India, in the growing cropping fields (with known physicochemical parameters, PCPs) of Mr. Kadhay Ram Verma (a farmer of village-Kajarbojhi), during the month of November (winter season), 2020. The PCPs of different experimental and control plots were analysed as per the techniques described by Saxena (1994) and Prakash (2016). The whole experimental field of an area of 02 acre (9680 yards square) was sub divided into twelve small experimental plots (size 806.6 yards square each), in triplicate, and the healthy seeds of *Brassica campestris* were sowed. During seed sowing, 100 kg vermicompost, FYM, NPK (a market chemical fertilizer), respectively, were dusted over the experimental plots series A, B, and C. The control experimental plots (series D) was remain without any kind of fertilizer.

The four Experimental plot series set up as follows:

Experimental plot series - A: A1, A2, A3

Experimental plot series - B: B1, B2, B3

Experimental plot series - C: C1, C2, C3

Experimental plot series - D: D1, D2, D3.

The crop get matured within the 120 days of time. Finally, the fully grown crop was harvested on 15th March, 2021 and the production was calculated.

RESULTS AND DISCUSSION

It is well known that day by day human beings and other domesticated animals loses their immune power against various kinds of diseases, because their 80-90% diet made up of different kinds of cereals and vegetables, grown in the cropping fields. It is interesting to note that most of the farmers of India, using different kinds of poisonous chemicals in the form of chemical fertilizers, pesticides, insecticides, weedicides, herbicides *etc.* into their cropping fields. Some of the content of these poisonous chemicals retained in the cereals also which

are eaten by the human beings and affected their immunity power and different body parts, automatically they easily infected by several diseases like intestinal, heart, respiratory, nervous and skin diseases *etc.* Some of these Chemicals and their products are also responsible for environmental pollution. DDT is a well known pesticide of this category, because it is existing several years into the our environment.

The maximum production of *Brassica campestris* was recorded in the experimental plots, treated with the vermicompost and the minimum in control plots, in general (Table-1). The fresh weight of *Brassica* grains was noticed 2.17 times, 1.68 times and 1.46 times, respectively, higher into the experimental plots treated with Vermicompost, FYM and chemical fertilizers, than that of the control plots. However, dry weight of *Brassica* was also noticed in the similar fashion. It was 2.00 times, 1.64 times and 1.41 times, respectively, higher into the experimental plots series-A, B and C than control plots (series-D). In addition, those experimental plots who were treated with Vermicompost prepared through the vermicomposting process using the worm, *E. fetida*, having less weed growth; while those plots, treated with the FYM, chemical fertilizers, even in control plots more weed growth was noticed. It is further noticed that in the experimental plot series-A, *Anagallis arvensis* weed grown in abundant from than other weeds. Due to its short length, this weed do not affect adversely crop yield of *Brassica*. But in experimental plot series-B, C and D, various kinds of larger weeds were grown, simultaneously including *Anagallis arvensis*, which are responsible for lesser crop yield.

Table-1: Showing Production Of *Brassica* In Different Experimental And Control Plots.

Experimental plots/series	Production of <i>Brassica</i> (fresh wt. in kg)	Dry wt. (in kg)
Plots treated with VC (A)	318.98 ± 2.01	263.24 ± 1.34
Plots treated with FYM (B)	247.41 ± 0.98	215.79 ± 2.06
Plots treated with Chemical fertilizers (C)	214.39 ± 1.67	185.61 ± 1.72
Control plots (D)	146.69 ± 2.19	131.16 ± 0.87

FYM = Farm Yard Manure, Wt. = Weight.

Vermicompost serves as a nutrient rich natural fertilizer improves the physical, chemical and biological properties of soil (Ansari and Jaikishun, 2011; Nath *et al.*, 2009; Kale, 1998) and reduces the use of chemical fertilizers (Chanda *et al.*, 2011; Hernandez *et al.*, 2010). Vermicompost added to the soil releases nutrient slowly and consistently and enables the plant to absorb these nutrients more readily. Soils enriched with vermicompost provide additional substances that are not found in the chemicals (Ansari and Ismail, 2001; Kale, 1998). The vermicompost promote growth from 50-100% over conventional compost and 30-40% over chemical fertilizers (Sinha *et al.*, 2010). Meena *et al.* (2007), have reported that the garden pea (*Pisum sativum*) grown by using vermicompost produce higher green pods, higher green grains weight per plant. Ansari (2008), in a study reported that yields of potato and turnip were significantly higher in plots amended with vermicompost @ 6 tonnes per ha, whereas plots

treated with vermicompost@ 4 tonnes per ha. He further reported that the overall production of vegetable crops during the two years of the trial was significantly greater in plots treated with vermicompost@ 6 tonnes per ha. Getnet and Raja (2013), concluded that the application of vermicompost is surely effective alternative nutrient for resource poor farming community to grow their crops without polluting the environment.

Table-2: Showing Initial PCPs Of Used Biomanures And Experimental Plot Soil (EPS).

Parameters	VC	FYM	EPS
% MC	28.89 ± 0.92	32.42 ± 0.49	23.97 ± 0.61
%OM	26.32 ± 0.73	34.91 ± 1.02	1.98 ± 0.03
%WHC	36.84 ± 0.68	40.78 ± 0.96	43.34 ± 0.87
pH	8.59 ± 0.29	8.86 ± 0.19	7.97 ± 0.23
BD (g/cm ³)	0.87 ± 0.09	0.99 ± 0.08	1.27 ± 0.03

MC= moisture content; OM= Organic matter; WHC= Water holding capacity; BD= Bulk density.

CONCLUSION

In the present studies, vermicompost, prepared by the agency of earthworms through vermicomposting process, showed better growth and crop yield of *Brassica* than the other fertilizers, applied into the cropping fields. Although, FYM biofertilizer also effective than chemical fertilizers. In addition, this study also reveals that the soil having neutral to slightly alkaline pH and % organic matter 1.5-2.5 with % moisture content 25-30 is more suitable for the growth of *Brassica campestris*. In short, it may be concluded that use of imbalanced chemical fertilizers and other chemicals should be avoided because continuous use of these chemical fertilizers responsible for increment of a particular element into the soil system on the one hand and decrement of a individual element into the soil on the other hand and soil texture get changed. Finally, the current study advocate to the farmers that they should apply balanced biofertilizers in the form of vermicompost and FYM for better crop yield of various kinds of crops in their cropping fields with avoidation of chemical fertilizers.

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