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Production potential of sesamum (*Sesamum indicum* L.) influence by organic manure cum organic liquids fertilization under irrigated conditions

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Abstract

*The field experiment entitled "Production potential of sesamum (*Sesamum indicum *L.) influence by organic manure cum organic liquids fertilization under irrigated conditions"was conducted at Campus for Research and Advanced Studies, G.S.S.D.G.S. Khalsa College, Patiala during the summer season of 2021-2022. The experiment was conducted in randomized block design with eleven treatments and three replications. The result revealed that application of 15 t FYM ha^{-1}*fb*5% Panchagavya + 3% Vermiwash + 5% Jeevamrut significantly increased plant growth including plant height (81.93 cm), number of leaves plant^{-1} (46.73), number of branches plant^{-1}(7.88), dry weight plant^{-1} (22.55 g) and crop growth rate (6.27 g m^{-2} day^{-1}) at harvest, yield parameters such asnumber of capsules plant^{-1} (30.02), number of seeds capsule^{-1} (47.81), test weight (3.22 g), grain yield (12.78 q ha^{-1}), biological yield (75.15 q ha^{-1}) and harvest index (17.04%).*

Keywords: organic manure, organic liquids fertilization, sesamum, growth, yield parameters

Introduction

Sesamum is one of the important edible oilseed crop in India. India is major producer and occupies well over 38% of total acreage and contributes about 26% of the total production. Sesamum (*Sesamum indicum* L.) is flowering herbaceous annual plant in the genus *Sesamum* having chromosome No. 2n = 26. It belongs to the family Pedaliaceae and origin South-Western Africa. It is also known as gingelly, til, benne seed and popularly as 'Queen of Oilseeds' due to its stabilized keeping quality contributed by high degree of resistance to oxidation and rancidity. It is rich in oil (50%) and protein (18-20%).

India accounts for the lion's share of39% area, 27% production and 40% export of sesamum in the world. In India its cultivation is mostly confined to Uttar Pradesh, Rajasthan, Madhya Pradesh, Andhra Pradesh, Orissa, Gujarat, Tamil Nadu and Karnataka. In Punjab it is cultivated on 2.6 mha with production of 1 mt during 2019-20 with an average yield of 3.82q ha^{-1}.

Sesame oil is also sometimes referred to as "poor man's substitute for ghee". Sesame cake obtained as a byproduct of oil milling industry is rich in protein, carbohydrates, vitamin (Niacin) and minerals (Ca & P). The cake contains 6.0-6.2% N, 2.0-2.2% P and 1.0-1.2% K and can also be used as manure.

Application of organic manure on soils is improve their quality. Organic materials are a major source of organic matter and plant nutrients. Incorporating organic materials into soil results in

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improved soil physical attributes namely: soil structure, soil aggregates stability, water holding capacity, soil drainage, soil aeration and root penetration and soil chemical attributes namely: soil nutrients content and composition and soil pH (Singh *et al*. 2007).

Liquid formulations that are used in organic agriculture like panchagvya, vermi wash and jeevamrutare the fermented products which are used as plant growth enhancing substances prepared with material available with farmers. They are the rich sources of beneficial micro flora which support, stimulate the plant growth and help in getting better vegetative growth and also good quality yield. Formulations prepared on agricultural by- products viz.,bran of grains, oil cakes, farmyard manure etc., which are found to support excellent growth carrier and storage media (Devakumar *et al*. 2011).

Material and Methods

The experiment was carried at Campus for Research and Advanced studies, Dhablan, P.G. Department of Agriculture, G.S.S.D.G.S. Khalsa College, Patiala. The soil of experimental field was clayey in texture with pH (8.45), medium in organic carbon (0.79 %), low in available nitrogen (217.9 kg ha^{-1}), medium in available phosphorus (20.8 kg ha^{-1}) and medium in available potassium (159.32 kg ha^{-1}). Theexperimental was laid out in Randomized Block Design with eleven treatments and replicated three times. The treatments were $T-_0$ (Control), T_1 (10t FYM ha^{-1}), T_2 (15t FYM ha^{-1}), T_3(3t Poultry manure ha^{-1}), T_4 (2.5 t Vermicompost ha^{-1}), T_5 (10t FYM ha^{-1}*fb* 3% Panchagavya solution), T_6 (10t FYM ha^{-1}*fb* 5% Panchagavya solution), T_7 (15t FYM ha^{-1}*fb* 3% Panchagavya solution + 3% Vermiwash), T_8 (15t FYM ha^{-1}*fb* 5% Panchagavya solution + 3% Vermiwash), T_9 (10t FYM ha^{-1}*fb* 3% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut), T_{10} (15t FYM ha^{-1}*fb* 5% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut). A popular sesamum variety in the region, Punjab Til No. 2 was used in the study. The sowing was done with hand seed drill in plots keeping with row to row spacing is 30 cm and plant to plant spacing is 10 cm. The sowing was done on 17th of March, 2022.

The experimental site is situated at about 24-26^0 North Latitude and 76-24^0 East Longitude at an altitude of about 250 m above the mean sea level. It is located in south eastern direction in Punjab state and North West India.The maximum weekly mean temperature 36.0! recorded at 23th SMWs of the crop season 2022 and minimum temperature 25.0! recorded at 11th SMWs of crop period.

Organic manure such as FYM, poultry manure and vermiwash applied as per treatment and organic liquids fertilization with panchagavya solution, vermiwash and jeevamrut also applied as per treatment. Various intercultural operations and plant protection measures were undertaken to improve the growth and yield of crops. Crop was harvested on 26th June, 2022 with the help of sickle and tied in bundles and it was threshed manually after 15 days of air drying.

Results and discussion

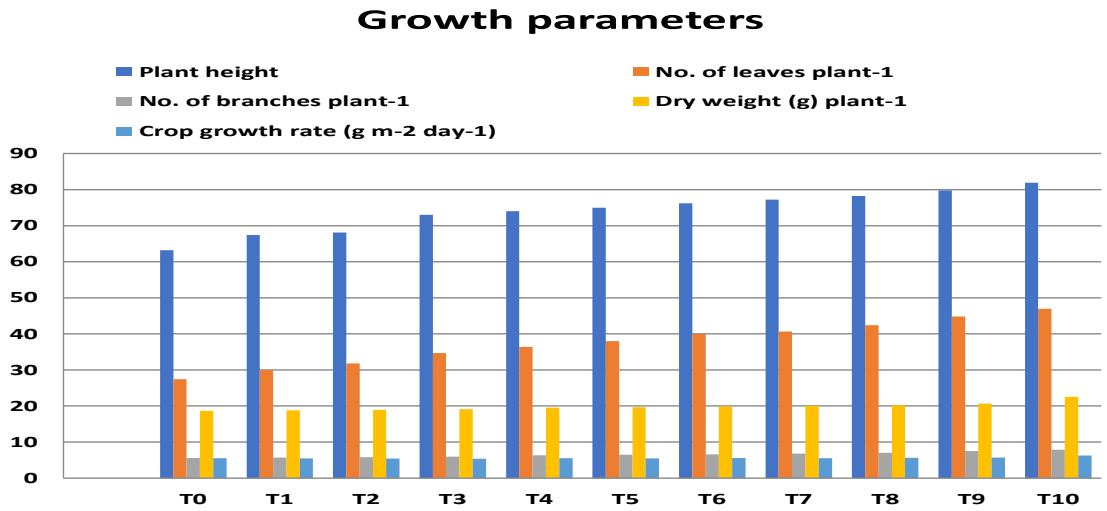
Growth parameters

At harvest stage significantly maximum plant height (81.93 cm) and no. of branches $plant^{-1}$ (7.88) were obtained due to application ofT_{10} (15t FYM ha^{-1}*fb* 5% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut) which were closely followed by the treatment of T_9(10t FYM ha^{-1}*fb* 3% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut) (Table 1). Organic manure and organic liquids fertilizers increase the availability of nitrogen to produce larger cells with thinner cell walls and its contribution in cell division and cell elongation, which promoted vegetative growth and ultimately increased plant height and no. of branches $plant^{-1}$. These results similar with the findings of Patel *et al*. (2021) and Brajendra et al. (2025).

Application of 15t FYM ha^{-1}*fb* 5% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut produced highest no. leaves $plant^{-1}$ (46.93), dry weight (g) $plant^{-1}$ (22.55 g), crop growth rate (6.27g m^{-2} day^{-1}) (Table 1). This might be more due to application of organic manure and organic liquids fertilizer because they provide nutrient to the plant in available form and easily absorbed by leaves through foliar application because rapid cell division and cell elongation occurs which

Table 1: Effect of organic manure cum organic liquids fertilization on growth parameters of sesamum crop

Treatments	Plant height (cm)	No. of leaves plant^{-1}	No. of branches plant^{-1}	Dry weight (g) plant^{-1}	Crop growth rate (g m^{-2} day^{-1})
T_0	63.19	27.46	5.58	18.63	5.51
T_1	67.44	29.96	5.67	18.80	5.49
T_2	68.09	31.82	5.79	18.93	5.43
T_3	72.99	34.67	5.98	19.12	5.35
T_4	74.00	36.41	6.33	19.55	5.53
T_5	75.01	37.97	6.46	19.64	5.50
T_6	76.19	39.97	6.60	19.87	5.57
T_7	77.22	40.67	6.81	20.05	5.54
T_8	78.26	42.41	7.00	20.17	5.63
T_9	79.79	44.82	7.50	20.64	5.71
T_{10}	81.93	46.93	7.88	22.55	6.27
SEm±	1.52	0.73	0.20	0.53	0.18
CD at 5%	3.17	1.53	0.42	1.1	0.39



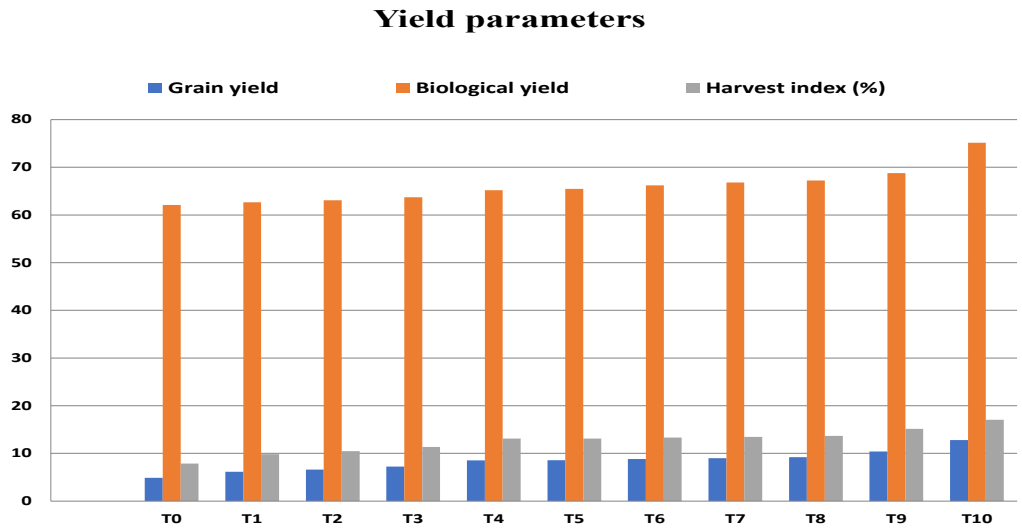
ultimately increase the value of dry weight plant^{-1} and crop growth rate. Similar results were recorded by Haruna and Abimiku (2012), Sutar *et al*. (2019) and Somoasundaram *et al.* (2003).

Yield parameters

Yield parameters are directly responsible for the final production of sesamum. Statistically maximum no. of capsules plant^{-1} (30.02), no. of seed capsule^{-1} (47.81), grain yield (12.78 q ha^{1}), biological yield (75.15 q ha^{1})and harvest index (17.04%) were obtained with the application of treatment T_{10} (15t FYM ha^{-1}*fb* 5% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut) (Table 2). This might be due to the reason that with application of organic manure improves soil health and with foliar application of organic liquids nutrients rapidly available to the plant that increases nutrient uptake capacity of plant. With the foliar application of higher nutrient quantity which helps to uptake more nutrition and reduces the losses by the leaching which means that whole nutrient is supplied to only plant that ultimately increases yield of sesamum. Similar results

Table 2: Effect of organic manure cum organic liquids fertilization on growth parameters of sesamum crop

Treatments	No. of capsules plant^{-1}	No. of seeds ^{1} capsule^{-}	Test weight (g)	Grain yield (q ha^{-1})	Biological yield (q ha^{-1})	Harvest index (%)
T_0	19.62	40.93	2.18	4.89	62.11	7.87
T_1	21.63	43.63	2.36	6.15	62.66	9.83
T_2	23.25	43.95	2.43	6.59	63.09	10.46
T_3	25.64	44.26	2.49	7.23	63.73	11.36
T_4	26.90	44.63	2.58	8.54	65.18	13.11
T_5	26.26	45.00	2.66	8.57	65.47	13.09
T_6	26.56	45.25	2.75	8.80	66.23	13.30
T_7	27.15	45.44	2.82	8.99	66.82	13.46
T_8	27.37	45.85	2.98	9.19	67.24	13.67
T_9	28.12	46.24	3.07	10.41	68.79	15.16
T_{10}	30.02	47.81	3.22	12.78	75.15	17.04
SEm±	0.61	0.26	0.11	0.24	1.75	0.54
CD at 5%	1.27	0.54	0.23	0.51	3.65	1.13



were recorded by Somoasundaram *et al.* (2003), Mokariya *et al*. (2021), Ghabane *et al*. (2019), Brajendra et al. (2025) and Patel et al. (2025).

Statistically highest test weight (3.22 g) was reported with the application treatment T_{10} (15 t FYM ha^{-1}*fb* 5% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut) which was at par with treatment T_9 (10 t FYM ha^{-1}*fb* 3% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut) was (3.07 g) (Table 2). Foliar application of essential nutrients through organic liquid fertilizers make easily absorption by plant that effectively translocated to capsules and helps to nourish the seed and induce test weight of plant. Similar results were reported by Mokariya *et al*. (2021) and Patel et al. (2025).

Conclusion

The results of this study indicate that treatment T_{10}, involving the application of 15 t FYM ha^{-1} *fb*5% Panchagavya solution + 3% Vermiwash + 5% Jeevamrut, resulted in a significant improvement in plant growth and yield of sesamum crop. Additionally, this treatment demonstrated a

positive impact on the physical, chemical and biological properties of the soil.

References

Brajendra, M. B. B.; Prasad Babu; Manasa V, K. V. Rao; Tejendra Kumar; Vinod Kumar; R. V. Singh and Amarendra Kumer (2025). Factor productivity, nutrient and harvest status of rice in farmers' fields of Ghagraghat. The Journal of Rural and Agricultural Research 25 (2): 57-60.

Brajendra; Pati Ram and L. Somendro Singh (2025). Soil test crop response-based fertilizer recommendations in Meghalaya. The Journal of Rural and Agricultural Research 25 (2): 89-95.

Devakumar, N.; Rao, G.G.E. and Shuba, S (2011). Evaluation of locally available media for the growth and development of nitrogen fixing micro-organisms. Proceedings of the 3rd scientific conference of ISOFAR Organic are life knowledge for tomorrow, held on 28th September-01 October 2011, Korea.PP 504-509**.**

Gabhane, A.R.; Gite, P.A.; Khadse, V.A.; Kadu, P.R. and Patle, P.N. (2019). Production potential of organic summer sesame as influenced by compost, foliar nutrients and biofertilizers. *Journal of Pharmacognosy and Phytochemistry*. 47-50.

Haruna, I.M. and Abimiku, M.S. (2012). Yield of Sesame (*Sesamum indicum* L.) as Influenced by Organic Fertilizers in the Southern Guinea Savanna of Nigeria. *Canadian Center of Science and Education, Sustainable Agriculture Research*.1 (1).

Mokariya, L.K.; Vaja, R.P.; Malam, K.V. and Jani, C.P. (2021). Effect of microbial consortia enrich vermicompost on growth, yield and quality of summer sesame (*Sesamum indicum* L.). *The Pharma Innovation Journal*. 10(12): 974-977.

Patel, S.P.; Malve, S.H.; Chaude, M.H. and Vala, Y.B. (2021). Effect of panchagavya on growth, yield attributes and yield of summer pearl millet. *The Pharma Innovation Journal*. 10(12): 105-109.

Singh, R.P.; Dhania, G.; Sharma, A. and Jaiswal, P.K. (2007). Biotechnological approaches to improve phytoremediation efficiency for environment contaminants. Environmental bioremediation technologies. 223-258.

Soasundaram, E.; Meena, S. and Sankaran, N. (2003). Efficiency of panchagavya (organic nutrition) spray on Greengram. Abstract of UGC sponsored state level seminar on Indigenization of Indian farming problems and prospectus held at Gandhigram Rural Institute, Deemed University, Gandhigram, Tamil nadu on 7th- 18th March. 41.

Patel Mukesh Kumar; Ramawatar Meena; Yad Vir Singh; Ramjeet Meena; Munna Lal and Brajendra (2025). Effect of Phosphorus and Bio-Organics on Yield and Nutrient Uptake by Mung bean [Vigna radiata (L.) Wilczek] in an Inceptisol of Varanasi. The Journal of Rural and Agricultural Research Volume 25, No. 2, 69-73.

Patel Mukesh Kumar; Ramawatar Meena; Yad Vir Singh; Ramjeet Meena; Munna Lal and Brajendra (2025). Enhancing Mung bean [Vigna radiata (L.) Wilczek] Growth with Phosphorus and Bio-Organics in an Inceptisol. The Journal of Rural and Agricultural Research Volume 25, No. 2, 74-77.

Pradeep Kumar; Sukhjinder Singh; Harmanpreet Kaur; Neeharika Parmar; Vipin Kumar and Devendra Pal (2019). "Effect of organic and inorganic fertilizers on plant uptake, protein synthesis and productivity of pearl millet-wheat sequence under semi-arid inceptisols" International Journal of Chemical Studies 7(6): 437-443 **E-ISSN: 2321-4902.**

Sutar, A.U.; Vaidya, P.H.; Deshmukh, A.V.; Lilhare, M.A. and Landge, R.B. (2019). Effect of foliar application of vermiwash, compost tea and panchagavya on yield and quality of soybean in inceptisol. *Journal of Pharmacognosy and Phytochemistry*. 8(5): 1228-1230.