Effect of different organic liquid formulations ~~on~~on the growth and yield of Soybean: A Cease Study

Abstract:
This case study investigates the influence of the six different organic formulationson the growth and yield parameters of soybean (Glycine max L.). These ~~sixtreatments includewell formulated organic liquids, namely Jeevamrut, Panchgavya, Vermiwash, Cowdung wash, Cow Urine, and a Control~~.A Randomized Block Design (RBD) with four replications was considered to carry out thefield experiment during rabi seasons of year 2022. Key observations were recordedforvarious parameters such as plant height, number of branches per plant, number of pods per plant, length of pod, number of seeds per pod, test weight, pod yield, seed yield, and straw yield. The analytical study indicated that Panchgavya is more effective among the treatments. The outcomes

Keywords: Soybean, Organic formulations, Crop protection equipment, Vegetable Oil seed, Randomized Block Design~~,~~,

INTRODUCTION

The consistently rising demand of vegetable oil has encouraged farmers to grow oil seeds crops. Soil health condition and climates of the topography of the farming land is one of the important deciding factors of opting oilseed crops. India has great growth potential of vegetable oil seeds and highly preferred to cultivate oil seeds crop is Soy~~a~~bean(*Glycine max* L. Merrill). Soybean oilseed, soybean oil as well as soybean meal have all attained significant importance in for the Indian economy in the past two decades. Soybean cultivation has risen in the central Indian states where the weather is suitable. It has become the crop of choice for the farmers during the kharif season.The soybean productivity in India has fluctuated significantly and has not reached anywhere near 3400 kg/ha achieved by the top producers USA and Brazil.The world edible oil production over last 4 years from 2017-18 to 2020-21 has increased by 4.87% to 199.33 MMT, soybean oil which accounts for 30.32% (60.44 MMT) of the world edible oil production in 2020-21. The consumption of edible oil in India is at 23.46 MMT with a per capita consumption of 16 kg/ person, India's edible oil production stands at 8.97 MMT in 2020-21 and it is assumed that the consumption may touch 30 million ton by 2025. India is dominated by Mustard oil production (2.85 MMT) followed by Soybean Oil (1.69 MMT)**[govt of Telangana].**

- **Please write on the role of organic formulations in improving soybean yield.**
- **Please add references to the introduction part**

MATERIALS AND ~~METHODOLOGY~~Methods

The field trials were Carried out during the R~~r~~abi season on the farming land at ASPEE agricultural research and development foundation (ARDF), located in the north Konkan region of Maharashtra, India. In this agricultural experiment, soybean~~s~~ are the chosen crop. This comprises of following experiment configuration details:

Comment [MM1]: The abstract provides a good overview of the case study, but there are some areas where it can be improved to enhance clarity and comprehensiveness.
1-→ In the first sentences, give an overview of soybeans. The abstract should briefly mention why the study is important (e.g., addressing challenges in organic farming or enhancing sustainable yield).
2-→It would be better to include a more detailed summary of the findings, such as (The analytical results indicated that Panchgavya was the most effective treatment, significantly increasing plant height and seed yield compared to other treatments).
3-→The abstract ends mid-sentence ("The outcomes"). Where is the conclusion of your study??

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The treatments include Jeevamrut, Panchgavya, Vermiwash, Cowdung wash, Cow Urine, and a Control

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They were sown on January 3, 2023. The planting configuration involves a spacing of 30 cm X 15 cm between individual soybean plants. The experiment follows a Randomized Block Design (RBD), and each plot has dimensions of 6.0 m X 4.2 m. With careful replication, the experiment includes four repetitions, ensuring a robust and statistically sound evaluation of the soybean cultivation under these specified conditions.

To investigate the effect of organic matters on growth of plants and overall yields,well scheduled treatments with six different kinds of organic formulations was applied during the course of experiment. The treatment formulations are presented in Table 1.

Table 1: Treatment Details

Treatment (T)	~~Actions~~
T1	Jeevamrut
T2	Panchgavya
T3	Vermiwash
T4	Cowdung wash
T5	Cow Urine
T6	Control

Table 2: Observations of Growth and Yield Parameters

Treatment	Plant height (cm)	No. of branches per plant	No. of pods per plant	No. of seeds per pod	Test weight (g)	Seed Yield (kg/ha)	Straw Yield (kg/ha)
T 1	36.31	9	24.6	4.95	13.57	1101	1924.6
T 2	38.34	9.6	29	5.35	14.07	1223	2144.5
T 3	35.22	8.85	19	4.7	12.93	1029	1805.3
T 4	33.82	8.4	18	4.45	12.36	962	1684.9
T 5	30.84	7.6	17.2	4.2	11.84	923	1615.4
T 6	27.58	6.6	13.6	3.9	9.4	804	1406.3
S.Em.±	1.01	0.42	1.58	0.07	0.12	20.91	41.23
CD	3.04	1.27	4.76	0.2	0.36	63.02	124.27

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Treatments details
Six treatments were formulated to evaluate the effect of organic formulations on growth and yield of soybean. The details of treatment are as follows ...

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Treatments detail

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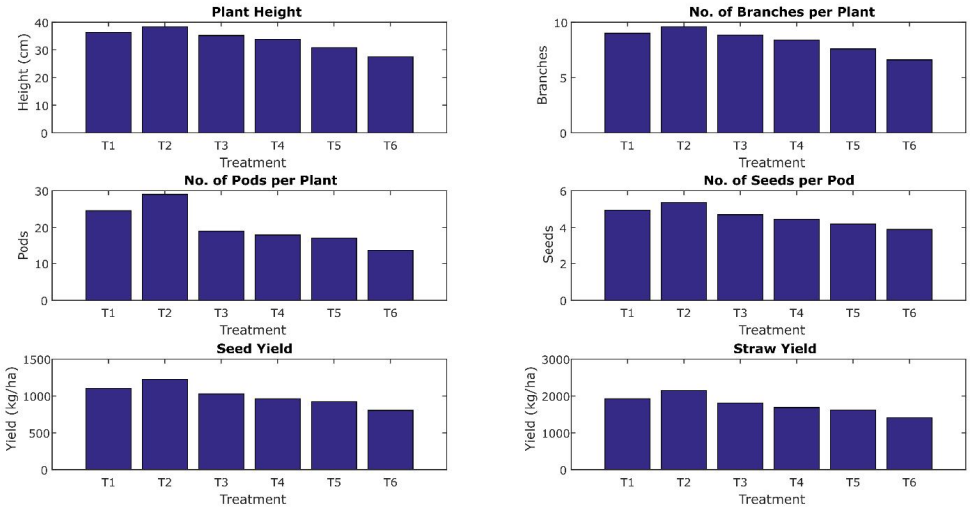

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Figure 1: Effect of treatments on various parameters

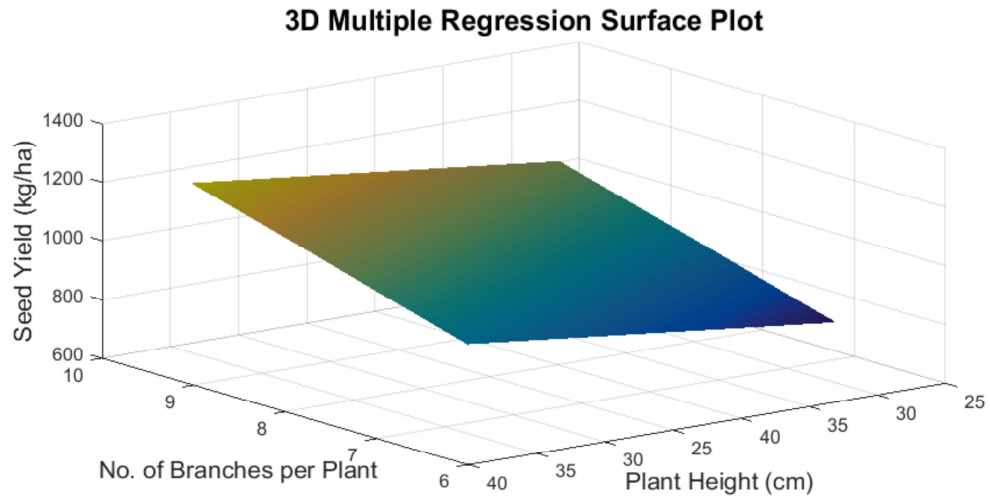

Figure 2: Response of influencing variables onseed yield

RESULTS:

The present field studyevaluated the influence of six different organic treatments on the certain plant parameters for growth and yield of soybean (Glycine max L.) during the rabi season of 2022. The well-formulated combination of organic treatments includesJeevamrut, Panchgavya, Vermiwash, Cowdung wash, Cow Urine, and a Control. The observations were recorded during course of time for various parameters. These are presented in Table 2. The obtained data were statistically analysisedusing variance (ANOVA) to get the stabilized results.The graphical representation of the effects of these treatments on various parameters areillustrated in Figures 1&2. They also show a general trend of increasing values for these parameters from T6 (Control) to T2 (Panchgavya), indicating the positive impact of the organic formulations on soybean growth and yield. Notably, the control group (T6) had the lowest values for all parameters, highlighting the potential benefits of using organic formulations in soybean cultivation.

DISCUSSION:

Plant height

The obtained results showed that the highest plant height 38.34 cm was recorded with treatmentPanchgavya(T2). It was noticed to varying significantly. The micro-organic matters in Panchgavyaprobably improves different soil characteristics helps in supplying required nutrients to growing plants. Navin et al.(1996); Ayoola and Maknide,(2009); Mahmoud and Ibrahim,(2012); Khaim et al. (2013). Similar observations have also been reported seen byGhaly et al.(2020).

Branches/plant

The maximum average number of branches per plant noticed 9.6 with treatment T2. The larger plant spacing, at 6 m x 4.2 m between plants, provides sufficient sunlight, soil moisture, and nutrients, leading to increased photosynthesis, metabolic activities, and overall growth and development, which results in a higher number of branches Gadade et al. (2018)[9].

Number of pods per plant

Different organic treatments showeds a significant effect on the number of pods per plant (Table 2). It was ranged from 13.6 to 29. The highest number of filled pod was recorded in with T2 where as lowestwith T6. Similar observations wasChaubey et al. (2000) and Khaim et al (2013).

Number of seeds per pod

Variation in number of seed per pod was marginally varying 3.9 to 5.35. The highest was seen with T2 and lowest with control (T6). It was supported by Sharma et al.(2002).

Seed Yield:

Treatment T2exhibiteds the significant variation inseed yield. The highest seed yield was 1223kg/hawith T2 whereas lowest yield was 804 kg/ha with Control (T6)
found similar outcomes was Mahesbabu et al. (2008).
The above discussion revealed that Panchgavya, on soybean growth and yield can be attributed to the rich nutrient content and beneficial microorganisms present in these formulations. Panchgavya, which is a

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combination of cow dung, urine, milk, curd, and ghee, is known to enhance soil fertility and provide essential nutrients to plants. The presence of beneficial microorganisms in organic formulations may have contributed to improved soil health, leading to better plant growth and productivity. Further research can explore additional factors and provide recommendations for promoting soyabean farming.

CONCLUSION:

The findings of this study indicate that the application of a well formulated organic treatments has a positive impact on the growth and yield of soybean. Among the tested formulations, Panchgavyaemerged ~~as~~ as the most effective treatment ~~influencer~~in enhancing various parameters, highlighting its potential as an organic input for soybean cultivation.

The results also support the adoption of appropriate organic farming practices, emphasizing the importance of these liquids in promoting sustainable and environmentally friendly agriculture. Further research and field trials can explore optimal application rates and combinations of organic formulations for maximizing other similar crops productivity under varying soil and climatic conditions.

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COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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