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The Influence of Liquid Organic Manures on Growth and Quality by Pea (*Pisum Sativum* L.)

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Introduction

Pea (*Pisum sativum* L.) is an important vegetable crop grown throughout the world. In India, it is grown as an herbaceous winter annual in the plains of North India and as summer vegetable in the hills. Peas are very common nutritious vegetable and pulse crop. Several kinds of vegetables are grown in India, out of them vegetable pea is one of the foremost versatile legume crops, having much more protein than other vegetables. Two types of peas are generally cultivated - field pea (*Pisum sativum* L. var. arvense) generally used for 'dal' making and garden pea (*Pisum sativum* L. var. hortense) is a green coloured, wrinkled seeded, sweet in taste used as green vegetable. (Joshi *et al.*, 2020). Vegetable pea is grown for their fresh green pods, for livestock forage and as soil enhancing green manure. Legumes, such as pea, are significant as it has the ability to fix atmospheric nitrogen through symbiotic nitrogen-fixing bacteria present in structures called root nodules. The nitrogen is one of the most important elements that cause intensive elongation growth of the main and lateral shoots (Tadeusz *et al.*, 2013).

Organic farming has gained popularity in recent years owing to the awareness of the inherent benefits it provides in terms of crop productivity as well as preserving dynamic soil nutrient status and a safe environment (Lokanath and Parameshwarappa, 2006). Organic farming has been proposed as a tool for a second green revolution. Organic farming is a system that avoids the use of synthetic chemical fertilizers, pesticides and growth regulating hormones and raises the crop with the use of organic manures, crop rotation, green manure and biological pest control. In modern farming liquid manure play a crucial role in significant yield increase as well as reduce the fertilizer dose. The Panchagavya, Jeevamrut, Sanjivak are ecofriendly liquid organic preparation made from cow products i.e., cow dung, urine, milk, curd, ghee, legume flour and jaggary etc. results in higher growth, yield & quality of crops.

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They contain macro nutrients, essential micro-nutrients, vitamins, essential amino acids, growth promoting factors like IAA, GA and beneficial microorganisms. In the existing technology of organic farming where FYM and compost are used as sources of nutrient supply, productivity of soil depletes during the transitory period (until fertility, structure and microbial activity of soil have been restored) leading to low yield levels in initial years of cultivation (Natarajan, 2002). The increasing concern for environmental safety and global demand for pesticide residue free food has evoked keen interest in crop production using eco-friendly products which are easily biodegradable and do not leave any harmful toxic residues besides conserving nature.

In Sanskrit, panchgavya means a mixture of five substances obtained from a desi cow. Each of these five products is known as a 'Gavya,' and together they are known as 'Panchagavya,' which is a mixture of five products of cow such as cow dung, cow urine, milk, ghee, and curd in a proper ratio (5:3:2:2:1) to this banana, jaggary, and coconut water is added It is a very effective organic substance that is suggested for crop enhancement in organic agriculture (Sangeetha and Thevanathan, 2010). Panchagavya has played an important role in providing pest and disease resistance, leading in higher overall yields (Tharmaraj *et al.*, 2011). Spraying panchgavya stimulates early blooming, a high proportion of seed setting, and enhances growth and yield components with growth stimulating action. It is a low-cost technique. It has the qualities of fertilisers as well as bio insecticides (Sireesha, 2013). It has had a favourable impact on crop growth and production (Somasundaram *et al.*, 2003).

Vermiwash is nutrient rich liquid manure, extracted from vermicomposts riches with a greater number of earthworms feeding on organic waste material and plant residues. It is non-toxic and eco-friendly, which arrests bacterial growth and forms as a protective layer for their survival and growth. Vermiwash contains N, P, K, Ca and hormones such as auxin, cytokinin, some other secretions and many useful microbes like heterotrophic bacteria, fungi etc. The soil state increased as a result of the use of vermicompost, which is rich in humus, various minerals, vitamins, and growth chemicals that encourage great plant growth and production.

Jeevamrut is a low-cost improvised preparation that enriches the soil with indigenous microorganisms needed for soil mineralization. Cow dung, urine, milk, curd, ghee, legume flour, and jaggery are used to make the liquid organic compounds. They contain

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macronutrients, essential micronutrients, many vitamins and necessary amino acids, as well as growth factors such as IAA, GA, and beneficial micro- organisms. (Sreenivasa *et al.*, 2010). Jeevamruth promotes immense biological activity in soil and provides the nutrients for the crop stand. Mixing cow urine, cow dung, pulse flour and jaggary (gur), it is prepared and allowed to ferment for a week. The filtered extract is used for soil application, and numerous beneficial microorganisms are believed to microbiologically enrich soil. Jeevamruth is reported to have a very large population of nitrogen fixers, phosphate solubilizers and siderophore producers (Pathak and Ram, 2013).

Heavy use of chemicals in agriculture has damaged the ecological foundation, resulting in soil deterioration, water resource depletion, and food quality degradation. At this stage, there is a growing awareness of the use of "organic farming" as a remedy. Organic farming is low-cost and uses chemical-free fertilizer. It is important to create a powerful, practical, and suitable nutritional management solution.

Vegetable cultivation with organic manures and biological components is the only method of preserving soil and soil resources while also ensuring environmental and human health security. Organic manures not only boost production but also enhance soil's physical, chemical, and biological qualities, which have a direct influence on moisture retention, nutrient conservation, and soil fertility, productivity, and water holding capacity.

Result and Analysis of parameters

Control

Best Treatment

Difference between these two pictures, clearly showing the difference. On the basis of morphological characters we can obtained from Influence of different liquid organic manures on growth, yield and quality of pea (*Pisum sativum* L.)", it is concluded that application of *(i.e.,* Jeevamruth @ 500 liters/ha at the time of sowing and 30 DAS + Panchagavya @ 4% sprays at 30 and 45 DAS + Vermiwash @ 10% sprays at 35 and 50 DAS) significantly improved the values of different important characteristics of pea such as highest pod length

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(8.85 cm), pod weight (10.24 g), number of pods per plant (4.82), total number of pickings (5.9), yield per plant (24.45 g), yield per plot (7.396 kg), yield per hectare (10.95 along with maximum improvement in soil properties (i.e., organic carbon, available soil NPK), soil microbial population (*i.e.*, bacteria, fungi and actinomycetes) and nutrient uptake (NPK) by pea.

Conclusion

From the investigation and findings therein, it may be concluded that Panchagavya, Jeevamruth and vermiwash with their combinations have significantly good effects over the yield and quality attributes of garden pea under Southern Rajasthan conditions. Inorganic fertilizers mainly urea, SSP, MOP and different types of bulky organic manures such as, farmyard manure, compost and green manures and biofertilizers are normally used to increase soil productivity. There is a need to replace the high use of synthetic fertilizers by organic sources of nutrients to sustain soil health. Organic matter is considered as life of the soil, and also favours sustainable productivity (Baswana *et al.*, 2007). So, incorporation of plant residues particularly N_2 - fixing legumes is a useful method to sustain organic matter content and thereby enhance the biological activity, improve soil fertility and increase nutrient availability to succeeding crop (Desuki *et al.*, 2010). In terms of protecting nature, the growing concern for environmental safety and global demand for pesticide residue-free food has sparked a great interest in crop production using eco-friendly products that are easily biodegradable and do not leave any detrimental toxic residues. As a result, natural products such as Panchagavya, Jeevamruth and Vermiwash etc. must be used to create chemical residue-free food crops. As a result, various liquid organic manures has the potential to play a significant role in organic farming.