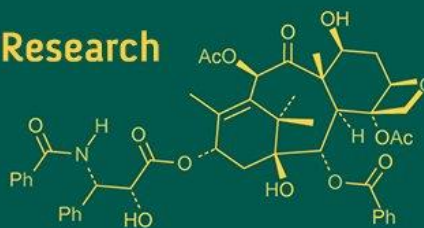


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Effect of natural and organic farming components on physico-chemical properties of soil

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Abstract

The present investigation entitled “Comparative performance of natural and organic farming modules in mango cv. Kesar” was conducted at the Regional Rice Research Station, *Musa Farm*, Navsari Agricultural University, Vyara, during the years 2023-24 and 2024-25. The experiment was laid out in Large Plot Technique with three replications. The results on soil properties indicated that significantly maximum available nitrogen, available potassium (K_2O) and soil organic carbon content were found in the modules M-1: Ghan Jeevamrut-5.0 kg + Jeevamrut-10 l (Soil application) + Jeevamrut 10% (Foliar spray) during both the years as well as in pooled analysis. While, the effect of models on available phosphorus (P_2O_5), soil pH and electrical conductivity was found to be non-significant. The maximum total soil microbial count (10^6 CFU/g) was also recorded in the same module.

Keywords: Mango, Ghan Jeevamrut, Jeevamrut, *Gliricidia* leaf extract, FYM

Introduction

Mango (*Mangifera indica* L.) is the most popular and celebrated tropical fruit which belongs to the family Anacardiaceae order Sapindales and originated from the Indo-burma region. Due to its high palatability, excellent taste, flavour and exemplary medicinal and nutritional values it is said to be the “King of Tropical Fruits”. Mango has been cultivated for thousands of years in India and its cultivation is as old as Indian civilization.

Indiscriminate use of chemical fertilizers and pesticides has led to a rapid deterioration in the nutritional and biological status of mango orchards; ultimately resulting in reduced tree vigour and lower fruit yields. Moreover, there is a strong link between soil quality and soil organic carbon (SOC) content. The SOC content of Indian soils has been severely depleted over recent years due to intensive cropping, and is often below the critical limit for soil and ecosystem functions. Increasing concerns for environmental and human health have stimulated interest in organic as well as natural mango production. Organic manures may be a viable alternative, or a partial substitute, for inorganic chemical fertilizers.

Natural farming is one solution towards reduction the hazards arrived due to farming using only chemical fertilizers and pesticides. Plenty of organic resources are present in the farm, these resources can be utilized to improve the soil health in respect of physical, chemical and biological properties of soil which helps in obtaining good yield. The efficiency and efficacy of some cowpathy like *Ghan Jeevamrut*, *Jeevamrut* and *Gliricidia* leaf extract are known to enhance the biological efficiency of plants and improve soil health. These natural products seem to enhance the productivity of different crops by suppressing the growth of various plant pathogens by producing antibacterial and antifungal compounds (Palekar, 2006) [6]. Incorporation of nutrient rich tree leaves, especially leaves of leguminous plants like *Gliricidia* has come into limelight as a solution towards improving soil fertility due to its profuse growth, deciduous nature, rapid decomposition rate and higher nutrient content. Mulching is an agricultural and horticultural technique which helps in increasing crop yield by reducing the cost of production, lowering weed growth and by conserving soil moisture. It improves the physical and chemical qualities of the soil and availability of nutrient pool and biological qualities by increasing beneficial soil microbes. (Kaur and Kaundal, 2009) [5]. On the other hand, the cost of inorganic fertilizers is increasing enormously and are now out of reach of small and marginal farmers.

Due to continuous use of inorganic fertilizers and insecticides, the population of beneficial organisms decreases and natural regeneration of nutrition in the soil is also ceases. The use of fermented liquid manures in such situation is, therefore practically a paying proposal. In these liquid manures, beneficial organisms survive and are helpful in phosphate solubilization, nitrogen fixation etc. Application of these organic liquid formulations will enhance the soil microbial activity and population to a larger extent, has a positive effect on growth and yield of crops.

Materials and Methods

The experiment was conducted at the Regional Rice Research Station, Musa Farm, Navsari Agricultural University, Vyara, during the years 2023-24 and 2024-25. The experiment was laid out in Large Plot Technique. Six farming modules viz., M-1: *Ghan Jeevamrut*-5.0 kg + *Jeevamrut*-10 l (soil application) + *Jeevamrut* 10% (Foliar spray), M-2: FYM-100 kg + *Gliricidia* leaf extract 10 l (Soil application) + *Gliricidia* leaf extract 10% (Foliar spray), M-3: FYM-75 kg + *Gliricidia* leaf extract 7.5 l (soil application) + *Gliricidia* leaf extract 5% (Foliar spray), M-4: *Ghan Jeevamrut*-5.0 kg + *Jeevamrut*-10 l (soil application) + *Gliricidia* leaf extract 5% (Foliar spray), M-5: FYM-50 kg + *Gliricidia* leaf extract 10 l (soil application) + *Jeevamrut* 5% (Foliar spray) and M-6: *Ghan Jeevamrut*-5 kg + *Gliricidia* leaf extract 10 l (soil application) + *Jeevamrut* 5% (Foliar spray) were applied with three replications. Foliar sprays of *Jeevamrut* and *Gliricidia* leaf extract were given from end of September up to initiation of flowering at monthly interval. Soil application of *Ghan Jeevamrut*, *Jeevamrut* and *Gliricidia* leaf extract were given from July up to 8 months (at monthly interval). FYM were applied as soil application in July. Mulching was common with paddy straw.

Results and Discussion

Available N (kg/ha)

The data pertaining to available nitrogen in soil as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and *Gliricidia* leaf extract are presented in Table 1. The results revealed that the different modules showed significant effect on available nitrogen in soil.

Among the different modules, significantly higher available nitrogen in soil (329.08 kg/ha) was recorded under module M-1: [*Ghan Jeevamrut* @ 5.0 kg + *Jeevamrut* @ 10 l (soil application) along with *Jeevamrut* 10% as foliar spray]. Module M-1 was found to be at par with M-4. Application of *Jeevamrut* and *Ghan Jeevamrut* increased the availability of nutrients due to enhanced population of soil micro flora resulting in increased bacteria, fungi and actinomycetes population and higher enzyme activity in the soil and also due to increasing earthworm activity in soil which helps in faster decomposition of organic matter that ultimately add the nutrient to the soil (Ravi *et al.*, 2022) ^[7]. Similar results were reported by Chaithra (2018) as they observed significantly higher nitrogen content in soil due to application of *Jeevamrut* as compared to without *Jeevamrut* application. Findings of Gohil (2023) ^[3] in pomegranate, Gore and Srinivas (2011) ^[9] in tomato.

Available P₂O₅ (kg/ha)

The data pertaining to available phosphorus (P₂O₅) in soil as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and *Gliricidia* leaf extract are presented in Table 1. The results revealed that the effect of different modules on available P₂O₅ in soil was found to be non-significant.

Available K₂O (kg/ha)

The data pertaining to available potassium (K₂O) in soil as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and *Gliricidia* leaf extract are presented in Table 1. The results revealed that the different modules showed significant effect on available K₂O in soil. Among the different modules, significantly higher available K₂O in soil (346.50 kg/ha) was recorded under module M-1: [*Ghan Jeevamrut* @ 5.0 kg + *Jeevamrut* @ 10 l (soil application) along with *Jeevamrut* 10% as foliar spray]. Module M-1 was found to be at par M-4. The increase in available potassium in soil is due to the decomposition products of organic matter which contain various organic acids, might have aided in the release of non-exchangeable K to the water-soluble forms (Ravi *et al.* 2022) ^[7]. These findings are in close accordance with the result of Gore and Srinivas (2011) ^[9] in tomato.

Table 1: Effect of natural and organic farming modules on soil available N in mango cv. Kesar after harvest (Mean of two years)

Modules	Available N in soil (kg/ha)	Available P ₂ O ₅ in soil (kg/ha)	Available K ₂ O in soil (kg/ha)
M-1	329.08 ^a	39.81	346.50 ^a
M-2	303.67 ^c	38.48	324.70 ^{bc}
M-3	300.97 ^c	37.78	321.87 ^{bc}
M-4	321.85 ^{ab}	39.55	335.17 ^{ab}
M-5	299.04 ^c	37.12	311.42 ^c
M-6	308.63 ^{bc}	39.28	325.63 ^{bc}
S.Em. ± (T)	4.90	0.90	4.81
CD at 5% (T)	14.31	NS	14.04
S.Em. ± (Y)	2.83	0.52	2.78
CD at 5% (Y)	NS	NS	NS
S.Em. ± (Y × T)	6.93	1.28	6.80
CD at 5% (Y × T)	NS	NS	NS
CV%	3.87	5.71	3.60

Soil pH

The data pertaining to soil pH as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and

Gliricidia leaf extract are presented in Table 2. The results revealed that the effect of different modules on soil pH was found to be non-significant.

Electrical conductivity (ds/m)

The data with respect to soil electrical conductivity as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and *Gliricidia* leaf extract their pooled analysis are presented in Table 2. The results revealed that the effect of different modules on soil electrical conductivity was found to be non-significant.

Soil organic carbon content (%)

The data pertaining to soil organic carbon content as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and *Gliricidia* leaf extract are presented in Table 2. The results revealed that the effect of different modules on soil organic carbon content was found to be significant. Among the different modules, significantly higher soil organic carbon content (0.797%) was recorded under module M-1: [*Ghan Jeevamrut* @ 5.0 kg + *Jeevamrut* @ 10 l (soil application) along with *Jeevamrut* 10% as foliar spray]. Module M-1 was found to be at par with M-4. The significant increase in soil organic carbon content might be due to the rapid decomposition of organic matter applied through mulching and *Ghan Jeevamrut*. The application of *Jeevamrut* at frequent intervals help to increase the soil biological activity in the soil ultimately changed the

physico-chemical properties of soil. These findings are supported by Ravi *et al.* (2022) [7]. Similar results have also been reported by Upperi *et al.* (2008) [10] and Saharan *et al.* (2023) [8].

Soil microbial count (10⁶ CFU/g)

The data pertaining to soil microbial count as influenced by different applications of *Ghan Jeevamrut*, *Jeevamrut*, FYM and *Gliricidia* leaf extract are presented in Table 2. The results revealed that the effect of different modules on soil microbial count was found to be significant. Among the different modules, significantly higher soil microbial count (6.73 × 10⁶ CFU/g) was recorded under module M-1: [*Ghan Jeevamrut* @ 5.0 kg + *Jeevamrut* @ 10 l (soil application) along with *Jeevamrut* 10% as foliar spray]. Palekar (2006) [6] reported that *Jeevamrut* contains enormous amount of microbial load which multiplies in the soil and acts as a tonic to enhance microbial activity in soil. Vasanthkumar (2006) [11] reported that *Jeevamrut* is a fermented liquid product which contains higher microbial load when applied to soil enhance the soil biomass and improves the soil health. Similar result also reported by Devakumar *et al.* (2008) [2].

Table 2: Effect of natural and organic farming modules on soil pH, Electrical conductivity, Soil organic carbon content (%), Soil microbial count in mango cv. Kesar after harvest (Mean of two years)

Modules	Soil pH	Electrical conductivity (ds/m)	Soil organic carbon content (%)	Soil microbial count (10 ⁶ CFU/g)
M-1	7.22	0.256	0.797 ^a	6.73 ^a
M-2	7.34	0.276	0.778 ^{ab}	6.22 ^{bc}
M-3	7.44	0.285	0.771 ^{bc}	6.08 ^c
M-4	7.23	0.265	0.784 ^{ab}	6.41 ^b
M-5	7.47	0.293	0.764 ^c	6.01 ^c
M-6	7.29	0.274	0.778 ^{ab}	6.29 ^{bc}
S.Em. ± (T)	0.10	0.006	0.003	0.10
CD at 5% (T)	NS	NS	0.013	0.29
S.Em. ± (Y)	0.06	0.003	0.003	0.06
CD at 5% (Y)	NS	NS	NS	NS
S.Em. ± (Y × T)	0.14	0.008	0.006	0.14
CD at 5% (Y × T)	NS	NS	NS	NS
CV%	3.22	5.00	1.38	3.87

Conclusion

The results of the present investigation indicated that application of *Ghan Jeevamrut* @ 5.0 kg + *Jeevamrut* @ 10 l (Soil application up to 8 month) along with *Jeevamrut* 10% as foliar spray (end of September to initiation of flowering at monthly interval) followed by *Ghan Jeevamrut* @ 5.0 kg + *Jeevamrut* @ 10 l (Soil application up to 8 month) along with *Gliricidia* leaf extract 5% (end of September to initiation of flowering at monthly interval) as foliar spray improve soil properties.

References

1. Chaithra M. Effect of farm yard manure and jeevamrutha on growth and yield of sunflower (*Helianthus annuus* L.) [M.Sc. (Agriculture) thesis]. Bengaluru, India: University of Agricultural Sciences; 2018.
2. Devakumar N, Rao GGE, Shubha S, Imran Khan N, Gowda SB. A Book on Activities of Organic Farming Research Centre, Navile, Shimoga. Bengaluru, Karnataka, India: University of Agricultural Sciences; 2008.
3. Gohil VM. Effect of biofertilizer and Jeevamrut on flowering, fruiting and yield of pomegranate (*Punica granatum* L.) [M.Sc. (Horticulture) thesis]. Jagudan, Gujarat, India: Sardarkrushinagar Dantiwada Agricultural University; 2023.
4. Gore NS, Sreenivasa MN. Influence of liquid organic manures on growth, nutrient content and yield of tomato (*Lycopersicon esculentum* Mill.) in the sterilized soil. Karnataka Journal of Agricultural Sciences. 2011;24(2):153-157.
5. Kaur K, Kaundal GS. Efficacy of herbicides, mulching and sod cover on control of weeds in plum orchards. Indian Journal of Weed Science. 2009;41(1-2):110-112.
6. Palekar S. *Shoonya Bandovalada Naisargika Krushi*. Bangalore: Swamy Anand Agri Prakashana; 2006.
7. Ravi GK, Kulapati H, Masthiholi A, Prasanna SM, Rudresh DL. Effect of jeevamrutha on soil physicochemical parameter of mango var. Alphonso. The Pharma Innovation Journal. 2022;11(4):246-252.
8. Saharan BS, Tyagi S, Kumar R, Vijay, Hari Om, Mandal BS, *et al.* Application of jeevamrit improves

- soil properties in zero budget natural farming fields. Agriculture. 2023;13:196:1-20.
9. Srinivasa Rao Ch, Venkateswarlu B, Dinesh Babu M, Wani SP, Dixit S, Sahrawat KL, *et al.* Soil health improvement with *Gliricidia* green leaf manuring in rainfed agriculture: On-farm experiences. Technical Bulletin No. 2/2011. Hyderabad, India: Central Research Institute for Dryland Agriculture (CRIDA); 2011.
 10. Upperi SN, Lokesh BK, Maraddi GN, Agnal MB. Jeevamrutha: A new organic approach for disease management and crop production in pomegranate and groundnut. Journal of Environmental Ecology. 2008;27(1):202-204.
 11. Vasanthkumar HHA. Jeevamrutha slurry preparation. Siri Sammrudhi. 2006;4-5.