

# The Effect of Soil Physico – Chemical and Chemical Properties Using Farm Yard Manure

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**Abstract--** The field experiment was conducted at Karisalpatti in Cheranmahadevi block, Tirunelveli district of Tamil Nadu, South India in 2018 to evaluate the effect of Farm yard manure(F), Goat manure(GM) and Vermicompost(VC) at different concentrations and combinations such as 7.5 t ha<sup>-1</sup>, 12.5 t ha<sup>-1</sup>, 17.5 t ha<sup>-1</sup>. The treatments of this study were applied and after 30 days, the soil was collected in each sample area and analysed in soil testing laboratory. The pH, electrical conductivity(EC), and available Nitrogen(N), Phosphorus(P), Potassium(K) values were found out. The pH, electrical conductivity values decreased than control plot and available Nitrogen, Phosphorus and Potassium values increases. The result shows that amending the soil by Farm yard manure is one of the way to obtain a healthy soil.

**Keywords--** Farm yard manure, Amendment, Physico-chemical and Chemical Properties.

## I. INTRODUCTION

Organic farming have been important sources of nutrient inputs especially of Nitrogen and organic matter, besides being source of Phosphorus (P), Potassium(K) and micronutrients in crop production. Organic farming leads to food security at the family level and national level. Organic farming aims at reducing the cost of production and helps the farmers to get reasonable returns. Use of harmful chemicals and artificial treatments in crop production has changed the soil physical properties. Soil structure is improved by the incorporation of organic matter. Higher level of fertilization results in higher residual nutrient status in soil.

Soils having high organic matter content and significant water holding capacity with neutral pH balance are considered as proficient for high productivity of crop. (Inderpal Singh Brar et.al., 2017). Organic farming produces 100% nutritional values of organic food elements. Farm Yard Manure compost is the most important and widely used bulky organic manures. They improve soil physical properties like structure, water holding capacity and saturated moisture. They increase the availability of nutrients and organic matter. Carbon dioxide released during decomposition act as a CO<sub>2</sub> fertilizer (Jeyamangalam et.al., - 2011).

The pH of soil tells us how basic or acidic it is, which can influence the electrical conductivity results. pH is the

measurement of ions as well, but specific ions positively charged hydrogen ions cause a substance to be more acidic, while negatively charged hydroxyl ions cause a substance to be more basic. As these ions carry charges, they can also carry electricity. The more ions, the higher the electrical conductivity is. Therefore, the more acidic or basic soil is, the higher the EC will be. The closer pH is to being neutral, the less it will affect the electrical conductivity of soil. In the proposed system average percentage of basic soil nutrients are determined. Nitrogen, Phosphorus, Potassium determine the suitable crops for the particular soil type.

## II. RESEARCH METHODOLOGY

A field experiment was conducted at Karisalpatti in Cheranmahadevi block, Tirunelveli district of Tamilnadu. It is located at 8.60° latitude and 77.58° longitude. The ground was prepared by proper ploughing three or four times into a fine tilth and manured before 30 days of cultivation. Thirteen plots each of 5 x 8 mts where chosen. A control plot without applying organic manure was taken. In the next three plots F was applied @ 7.5, 12.5, 17.5 t ha<sup>-1</sup> respectively. Similarly for the other combination like F+GM(3), GM+VC(3) and F+GM +VC(3) in equal combination with above 3 concentration were added. Therefore total treatments were 1+3+3+3+3= 13 plots. The manures were completely mixed by manvatti and drip irrigated. The experiment was laid out in Randomized block design.

This study aims at the effect of farm yard manure(F) with goat manure(GM), and Vermicompost(VC) in different ratios in soil physical properties. The EC and pH were measured with (1:2.5 – soil water ) potentiometry method given by Jackson, (1970). Nitrogen content was measured using the method given by Subbiah et. al.,(1956), phosphorus by Olsen et. al.,(1954), potassium by Hanway et .al.,(1952). The experimental site consists of sandy loam soil texture which were clay type minerals consist of microscopic layers. Sandy loam soils are have high concentration of sand that require more frequent irrigation and fertilization.

## III. RESEARCH FINDING AND ANALYSIS

Soil Analysis Results for F along with GM & VC (Before harvest) F+(GM+VC)

Table 1:

S.No	Manure	Plots	EC (ds m <sup>-1</sup> )	pH	N Kg ha <sup>-1</sup>	P Kg ha <sup>-1</sup>	K Kg ha <sup>-1</sup>
1	F	T1-A	0.20	6.2	192.5	15.0	277.5
2	F	T1-B	0.16	6.5	182.5	15.0	255.0
3	F	T1-C	0.19	6.4	200.0	32.5	297.5

4	F+GM	T2-A	0.19	6.7	200.0	30.0	415.0
5	F+GM	T2-B	0.18	6.5	190.0	32.5	317.5
6	F+GM	T2-C	0.12	6.3	182.5	22.5	307.5
7	F+VC	T3-A	0.14	6.6	237.5	17.5	225.0
8	F+VC	T3-B	0.13	6.4	192.5	32.5	235.0
9	F+VC	T3-C	0.15	6.4	220.0	22.5	265.0
10	F+GM+VC	T4-A	0.12	6.5	217.5	37.5	245.0
11	F+GM+VC	T4-B	0.15	6.2	190.0	30.0	255.0
12	F+GM+VC	T4-C	0.20	6.4	202.5	22.5	265.0
13	Control	T5	0.26	7.0	177.5	7.5	215.0

F – Farm Yard Manure GM – Goat Manure VC – Vermicompost A – 7.5 t ha<sup>-1</sup> B – 12.5 t ha<sup>-1</sup>  
C – 17.5 t ha<sup>-1</sup> EC-Electrical Conductivity N – Nitrogen P – Phosphorus K– Potassium

#### IV. PHYSICO-CHEMICAL PROPERTIES- F+(VC+GM)

EC : The EC of the soil amended with F results in decreased values compared to the control plot without applying the organic manure. In the present study for F+ GM @ 17.5 t ha<sup>-1</sup> and F+GM+VC amended plot @ 7.5 t ha<sup>-1</sup> the EC value was at its lowest 0.12 ds m<sup>-1</sup> which was 53.8% less than the control plot as shown in the table. As the dosage of concentration increases as 7.5, 12.5 & 17.5 t ha<sup>-1</sup>, the EC values decreases as 0.19, 0.18 & 0.12 ds m<sup>-1</sup> for the F+GM plots. EC value was maximum as 0.26 ds m<sup>-1</sup> in the control plot. This is similar to Ramesh (2001) who revealed that the practice of addition of silty loam tank sediment to clay soils resulted in increased sand and silt content. Chemical properties indicated a decrease in soil pH and EC with increase in soil total, available NPK and micro nutrients.

pH : The pH value was found to be minimum in F plot @ 7.5 t ha<sup>-1</sup>, with a value of 6.2 and (F+GM+VC) @ 12.5 t ha<sup>-1</sup> as 6.2 which was 11.4% less than the control plot. As the dosage of concentration increases as 7.5, 12.5, & 17.5 t ha<sup>-1</sup>, the pH values decreases as 6.7, 6.5, 6.3 respectively for the F+GM plot. The control plot had the maximum value of pH as 7.0. This is possible during microbial decomposition of organic manure. Organic acid may have been released, which neutralized the alkalinity of the organic manures thereby leaving the pH of the soil almost what it was initially which is favourable for a good crop production as revealed by Okwuagu et. al.,(2003).

#### V. CHEMICAL PROPERTIES

N : The N value was found to be maximum in F+VC plot at 7.5 t ha<sup>-1</sup> with a value of 237.5 Kg ha<sup>-1</sup>, which was 25.3% higher than the control plot. For the control plot the value of N content was minimum as 177.5 Kg ha<sup>-1</sup>. The higher nitrogen content contribute to greater height of the plant (Sharma and Dayal, 2005).

P : The value of phosphorus content was maximum at F+GM+VC combination @ 7.5 t ha<sup>-1</sup> as 37.5 Kg ha<sup>-1</sup> and minimum as 7.5 Kg ha<sup>-1</sup> which was 80% higher than the control plot. The next higher value of 32.5 Kg ha<sup>-1</sup> was noticed in F @ 17.5 t ha<sup>-1</sup>, F+GM @ 12.5 t ha<sup>-1</sup> and F+VC @ 12.5 t ha<sup>-1</sup>. Similar findings was given by Singh et. al.,(2002) that

application of P increased the uptake of P and N which shows synergistic relationship between the two nutrients.

K : The K content increased as concentration of the dosage increased. This was noticed in the combinations of amendments. In F+VC plot @ 7.5, 12.5, 17.5 t ha<sup>-1</sup> the value of K content was 225, 235, 265 Kg ha<sup>-1</sup> and similarly for F+GM+VC @ 7.5, 12.5, 17.5 t ha<sup>-1</sup> the value of K content was 245, 255, 265 Kg ha<sup>-1</sup> respectively. The level of potassium was high as 415 Kg ha<sup>-1</sup> in F+GM @ 7.5 t ha<sup>-1</sup> and low as 215 Kg ha<sup>-1</sup> which was 48.2% more than the control plot. The present results were in accordance with Mohankumar and Narase Gowda (2010).

#### CONCLUSION

Among the thirteen plots in F+GM+VC combination, the combined application of all the three combination of organic manure suits the soil for its physico - chemical and chemical properties. The pH, electrical conductivity values decreases than control plot and available Nitrogen, Phosphorus and Potassium increases. Thus the result shows that amending the soil by Farm yard manure is one of the way to obtain a healthy soil.

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