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## Characteristics of different organic manures

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**Abstract**

The experiment was undertaken to study the characteristics of different organic manures viz, farm yard manur (FYM), vermicompost (VC), poultry manure (PM) and sheep manure (SM). The analytical results revealed that both poultry manure and vermicompost contained same amount of total organic carbon (22%) but however, C:N ratio of poultry manure was narrow (10) compared to vermicompost (20.54). Maximum water holding capacity was highest in poultry manure (100.52 %) followed sheep manure (99.95 %). The loss on ignition was highest in FYM followed by sheep manure. The poultry manure contained highest concentration of both macro and micronutrients followed by sheep manure, vermicompost and farm yard manure.

**Keywords:** Poultry manure, vermicompost, sheep manure, FYM, C: N ratio and nutrients

**Introduction**

Organic agriculture is gaining much importance and popularity in recent days with increasing health concern among the farmers and consumers. It helps to enhance and maintain soil organic carbon status for sustained crop yield.

Organic manures such as farmyard manure (FYM), vermicompost (VC) poultry Manure (PM) and sheep manure (SM) are few commonly used in crop production either alone or as components of Integrated Nutrient Management. In India, FYM is the most popular organic manure applied to the fields and it can potentially supply about 6.8 million tonnes of N, P and K per year (Sarkar and Rattan, 1995). However, decline in availability of FYM due to mechanized agriculture and reduction in livestock population necessitates the search for alternate manures apart from recycling of crop residue. Vermicompost is an enriched organic manure carrying all the essential nutrients and growth hormones required by the crops and is receiving greater attention in recent years and has been advocated as a good source of nutrients in integrated nutrient management (INM).

In the last few decades poultry production and sheep rearing are the fastest growing subsidiary farm activities in our country. Although the manure obtained from these farms is richer in nutrients than FYM and VC, they are not fully utilized in crop production.

Organic manures are primarily used as a soil conditioners and not as fertilizer source because they contain a high organic carbon content (90-95%) but generally low concentrations of nitrogen, phosphorus, potassium as well as micro nutrients compared to commercial fertilizers. In order to know important physical properties and nutrients concentration in organic manures, a study was conducted to characterize the commonly used organic manures.

**Materials and Methods**

Four commonly used organic manures viz., farm yard manure (FYM), vermicompost (VC), poultry manure (PM) and sheep manure (SM) were selected for the study. The physical and chemical properties of manures were analysed on dry weight basis by using standard procedures as detailed below.

**Results and Discussion**

The data on the physico-chemical properties of different organic manures are presented in Table 2.

**Characteristics of organic manures**

The moisture content in the organic manures varied from 50.00 (FYM) to 65.01(PM) per cent. The highest maximum water holding capacity was recorded in poultry manure (100.52 %) followed by sheep manure (99.95%), vermicompost (99.12%) and FYM (98.10%). Among the four organic manures the lowest loss on ignition was recorded in poultry manure (62.07 %) and the highest was recorded in FYM (78.50%). Total organic carbon was highest in vermicompost (22.60 %) followed by poultry manure (PM) (22.00 %), sheep manure (SM)

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(17.08 %) and farm yard manure (12.47 %), while the C:N ratio followed the order PM<SM<VC<FYM. Although poultry manure and vermicompost contained almost same amount of total organic carbon (22 %) the C:N ratio of poultry manure was narrow (10) compared to vermicompost (20.54) due to its high nitrogen content (2.2 %). Poultry manure contained highest amount of the three major nutrients viz., N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and S (2.20, 1.60, 2.30 and 0.46 %, respectively) followed by sheep manure (1.21, 0.86, 1.10 and 0.40 %), Vermicompost (1.10, 0.80, 1.01 and 0.36 %) and

farm yard manure (0.50, 0.20, 0.53 and 0.25 %). The concentration of micro nutrients viz., iron, manganese, zinc and copper also followed the order PM>SM>VC>FYM. The poultry manure contained highest concentration of both macro and micronutrients. These findings are in conformity with Channal (2012), Vaisaki (2012) and Choudhary and Kumar (2013) who also reported highest concentration of nutrients in poultry manure. Sheep manure and vermicompost contained almost same amount of macronutrients.

Table 1

Particulars	Method
Moisture	Gravimetric method (Lindsay and Norvell, 1978).
Maximum water holding capacity	Keen's cup method (Piper, 2002).
Loss on ignition	Ashing technique (Lindsay and Norvell, 1978)
Total organic carbon	Wet oxidation (Lindsay and Norvell, 1978)
Nitrogen (N)	Kjeldhal digestion and distillation method as outlined by Lindsay and Norvell (1978).
Phosphorus (P <sub>2</sub> O <sub>5</sub> )	Spectrophotometer method (Lindsay and Norvell, 1978).
Patash (K <sub>2</sub> O)	Flame photometer method (Lindsay and Norvell, 1978).
Sulphur (S)	Turbidimetric method (Lindsay and Norvell, 1978).
Iron (Fe)	Atomic absorption spectrophotometer method (Lindsay and Norvell, 1978).
Manganese (Mn)	
Zinc (Zn)	
Copper (Cu)	

Table 2: Characteristics of different organic manures

Parameters	FYM	Vermicompost	Poultry manure	Sheep manure
Moisture (%)	50.00	50.01	65.01	60.02
Maximum water holding capacity	98.10	99.12	100.52	99.95
Loss on ignition (%)	78.50	61.05	62.07	70.55
Total organic carbon (%)	12.47	22.60	22.00	17.08
C: N ratio	24.94	20.54	10.00	14.11
Nutrients (%)				
N	0.50	1.10	2.20	1.21
P <sub>2</sub> O <sub>5</sub>	0.20	0.80	1.60	0.86
K <sub>2</sub> O	0.53	1.00	2.30	1.10
S	0.25	0.36	0.46	0.40
Micronutrients(ppm)				
Fe	900.04	1090.01	1400.04	1094.02
Mn	170.15	250.10	251.27	250.25
Zn	128.52	130.25	260.19	225.31
Cu	31.03	46.10	60.08	48.25

## Conclusions

Among the organic manures used, poultry manure contained highest amount of both macro and micronutrients followed by sheep manure, vermicompost and farm yard manure. As both poultry manure and sheep manure have higher concentration of nutrients and less bulky compared to FYM use these manures in integrated nutrient management could be more beneficial.

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