Nutrient Risk Management using Organic Manures in Radish Production in Chitwan, Nepal

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INTRODUCTION

- Soils of Chitwan, are dominated by Inceptisols, and of sandy loam type, accompanied by less water retention capacity, less nutrient adsorption capacity, high infiltrability and high hydraulic conductivity.
- Furthermore, most of the rainfall occurs in rainy season (>80% in June –August) which leads to a great risk of nutrient leaching.
- Organic manures can help to retain water and nutrient in soil and thus become a potential source of minimizing nutrient leaching and subsequent risk.

OBJECTIVES

To make safe soil environment via viable nutrient risk management option by determining the effect of different sources of organic manure on soil properties, nitrate retention capacity in correlation with radish yield.

METHODOLOGY

Design: Randomized Complete Block Design (RCBD).
Plot Size: 8 m² (4 m×2 m).
Test Crop: Radish (Pyuthane Red).
Treatments: 6 (in Table 1).
Dose of each organic manure was calculated on the basis of nitrogen content of each sources keeping N value constant (100 kg N per ha).
Soil Sampling: 0-30 cm and 0-60 cm depth after the harvest of the crop.
Other nutrient application: P and K was applied as basal dose at 60 and 40 kg/ha respectively.

MAIN RESULTS

Discussion. Due to its rapid mineralization, poultry manure was recognized as a valuable source of the plant nutrients for crops. Espitiru *et al.* (1995) reported that the crop yield improvement due to addition of poultry manure was attributed to the presence of both readily available and slow release nitrogen The increase in water holding capacity, bulk density and porosity of soil from the application of poultry manure might be due to an increase in C content of the soil increases aggregation, decreases bulk density, increases water holding capacity, and hydraulic conductivity (Biswas and Khosla, 1971; Gupta et al., 1977; Weil and Kroontje, 1979). The increase in soil pH from poultry manure application might be due to higher calcium content which decreased the activity of Almunium (Materechera and Mkhabela, 2002). Decrease in nitrate leaching in lower soil depth from FYM and poultry manure application agreed with that of Yanwang et al. (2002).

Treatments	Yield (Mg/ha)	
	Biomass	Root
Poultry manure	75.16[a]	49.41[a]
Goat manure	63.20[bc]	39.82[ab]
Farm Yard Manure (FYM)	60.98[bc]	40.64[ab]
Biogas by product	55.97[c]	34.75[b]
Recommended doses of fertilizers (RDF)	70.88[ab]	46.78[a]
Control	26.91[d]	15.28[c]
Grand Mean	58.9	37.8
Sem±	3.86	3.15
LSD (0.05)	11.63	9.49
C.V %	13.1	16.7

Table 1: Effects of organic manure in yield of Radish.

Treatments	Gravimetric moisture (%)	soil pH	Bulk density (g/cc)	CEC (meq/100g)	OM (%)	NO_3-N (0-30cm)	NO_3-N (30-60 cm)
Poultry manure	15.82[a]	4.7[a]	1.2[a]	10.4[a]	0.93[ab]	0.061[ab]	0.06[bc]
Goat manure	15.08[bc]	4.5[ab]	1.3[b]	9.6[ab]	0.89[b]	0.075[a]	0.073[ab]
FYM	15.60[ab]	4.5[b]	1.3[ab]	9.2[ab]	0.97[ab]	0.045[bc]	0.048[c]
Biogas	15.60[ab]	4.5[ab]	1.3[b]	8.97[bc]	1.01[a]	0.045[bc]	0.07[ab]
RDF	14.96[c]	4.4[b]	1.3[c]	8.6[bc]	0.776[c]	0.065[ab]	0.087[a]
Control	14.19[d]	4.6[b]	1.4[c]	7.95[c]	0.781[c]	0.0348[c]	0.046[c]
Grand Mean	15.21	4.52	1.283	9.11	0.891	0.0542	0.0651
Sem±	0.2	0.07	0.021	0.39	0.034	0.0069	0.0072
LSD (0.05)	0.602	0.22	0.064	1.16	0.103	0.021	0.0219
C.V %	2.6	3.2	3.3	8.5	7.7	25.6	22.4

Table 2: Effects of organic manure in physiochemical properties of soil.

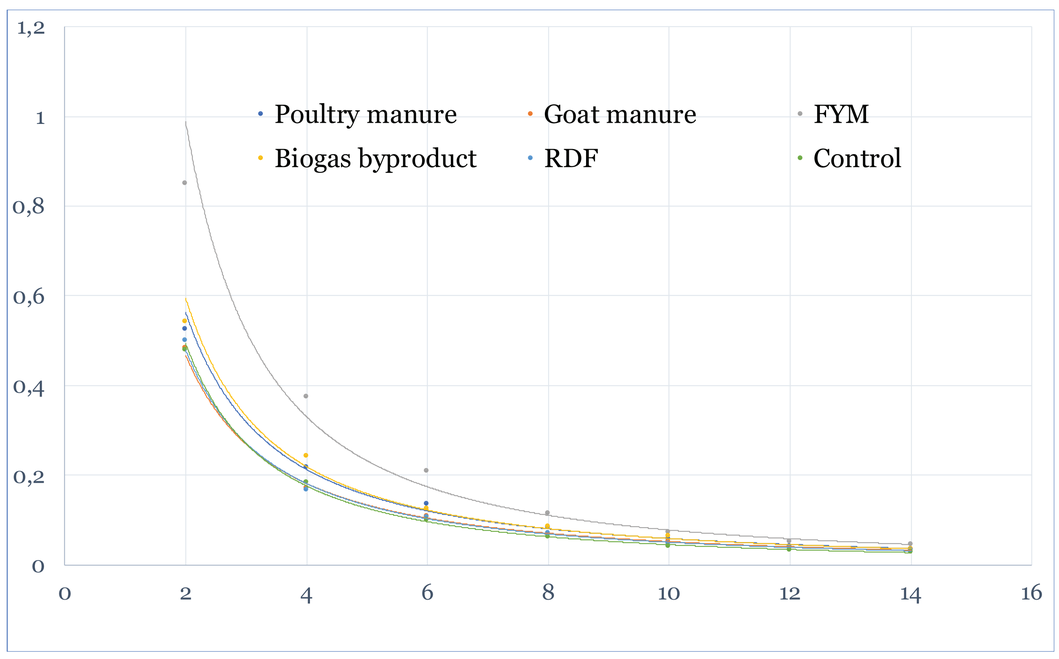

Fig. 1: Soil infiltrability as influenced by different sources of organic manures.

CONCLUSION

Among the various treatments poultry manure was the best source of organic manure resulting higher root yield of radish by improving soil moisture content, soil pH, bulk density, soil porosity, CEC, nitrate nitrogen availability and reducing the leaching of nitrate nitrogen to lower depths. Hence, poultry application was recommended in sandy loam soil to lower risks along with the improvement in the soil properties.

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