

A study on nutrient uptake by paddy in integrated use of fertilizers and vermicompost

M. KUMAR AND A.K. SINGH

See end of the article for
authors' affiliations
.....

Correspondence to :

M. KUMAR

Department of Soil Science
Regional Horticultural
Research Station,
Bhaderwah, DODA (J&K)
INDIA

Accepted : March, 2008
.....

ABSTRACT

A green house experiment was conducted in earthen pots filled with 10 kg soil having pH 7.8, organic carbon 0.56%, available nitrogen 312.5 kg/ha, available phosphorus 21.0 kg/ha and available potassium 380 kg/ha. Eleven treatments comprising of three replications were carried out in complete randomized design. Two-third fertilizer dose + 1/3 VC recorded maximum uptake of nitrogen and 3/4 fertilizer + 1/3 vermicompost recorded maximum uptake of phosphorous and potassium

Key words : Nitrogen, Phosphorous, Potassium, Fertilizer and Organic Carbon.

For sustainable agriculture, it is imperative to utilize renewable inputs, which can maximize the ecological benefits and minimize the environment hazards. Application of organic-inorganic combination is very effective in realization of high yield and high responses to added nutrients (Sarkar *et al.*, 1997). An integrated approach is considered as the need of hour. Hence, present study was conducted to know the effect of different combinations of vermicompost and fertilizer on nutrient uptake in paddy crop.

MATERIALS AND METHODS

A green house experiment was conducted in earthen pots filled with 10kg soil at the Agriculture College of Jaunpur, U.P in completely randomized design. The soil was sandy loam with pH 7.8, organic carbon 0.56%, available nitrogen 312.5 kg/ha, available phosphorus 21.0 kg/ha. and available potassium 380 kg/ha. Eleven treatments comprised of T₀ (control), T₁ = full dose of fertilizer (N,P,K), T₂ = 2/3 fertilizer dose + 1/3 VC, T₃ = 3/4 fertilizer + 1/3 VC, T₄ = 1/2 VC, T₅ = 1/4 VC, T₆ = 2/3 VC, T₇ = 1/2 VC, T₈ = 2/3 fertilizer dose, T₉ = 3/4 fertilizer dose, T₁₀ = 1/2 fertilizer dose. These treatments A basal application of 1/3 of nitrogen (N) dose, phosphorus (P₂O₅) full dose and potassium (K₂O) full dose was made through ammonium chloride (NH₄Cl), Potassium phosphate (KH₂PO₄) and potassium chloride (KCl), respectively Rest of 2/3 N was applied in two-split dose after 20 days

and 40 days of transplanting of rice seedling. Dose of nitrogen through organic matter was made as basal. Ten seedlings of rice were transplanted in each pot at five hills and watered to maintain at least 5 cm water for maintaining water-logged condition. Weeding was done as and when required. Plant and soil analysis were carried out as per standard procedures (Jackson, 1973).

RESULTS AND DISCUSSION

Nutrient composition:

Nitrogen content (%) and its uptake:

Nitrogen content of rice (whole plant, straw and grain) increased significantly with increasing levels of nitrogen application (Table 1). The increased uptake of nitrogen may be due to integrated use of fertilizer and manure because manure is helpful in increasing availability of nutrients as also reported by Madhumita *et al.* (1991). The nitrogen content (%) was maximum with T₂ treatment as also reported (Shukla and Sharma, 1994). This may be due to fact that when manure was added to soil along with fertilizer, the fertilizer N got immobilized. This immobilized N got mineralized and become slowly available to plants, hence due to presence of manure, availability of nitrogen remains for a longer period and also reduced the nitrogen loss.

Phosphorus content (%) and its uptake:

Phosphorus content of rice (Whole plant, straw and grain) increase significantly with increased levels of nitrogen maximum being in T₂ treatment (Table 1). It was due to the fact that vermicompost enhances phosphorus