

## The effect of integrated use of vermicompost, biofertilizer (*Azotobacter chroococcum*) and inorganic fertilizers (N, P, K and Zn) on yield and nutrient content and their uptake by wheat

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### ABSTRACT

A pot culture experiment was conducted in the pot house of the department of Agricultural Chemistry and Soil Science A.S. (P. G) college, Lakhaoti, Bulandshahr, U.P. to study the effect of integrated use of Vermicompost, *Azotobacter* and inorganic fertilizers on yield and nutrient content and their uptake by wheat. Conjunctive use of Vermicompost, *Azotobacter* and Zinc in collaboration with 100% recommended fertilizer dose produced significantly higher grain and straw yield of wheat. However, these results remained at par with those recorded with 75% recommended fertilizer dose plus Zn, Vermicompost (Vc) and *Azotobacter*. 100% NPK + VC + Zn + *Azotobacter* treatment appeared to be best. Significant improvement owing to appropriate combination of NPK, VC, Zn and *Azotobacter* was observed for the nutrient content and their uptake by the crop and the maximum nutrient content and their uptake was noticed due to 100% RFD of NPK + VC + Zn and *Azotobacter* and minimum with control.

**Key words :** Wheat, Vermicompost, *Azotobacter chroococcum*, Yield, Nutrient content and uptake

### INTRODUCTION

Fertilizer use especially (NPK) is considered as a corner stone in any drive for increasing the wheat yield. But the continuous use of micronutrient free high analysis NPK fertilizer in the intensive cropping system with diminishing use of organic manures has resulted in the depleting use of micronutrients from the soil reserves. Integration of organics with inorganics has been found to be quite promising not only in maintaining higher productivity but also in providing greater stability in crop production (Nambiar and Abrel, 1992)

Application of organic manures may also help to check the emerging deficiency of nutrients other than the N, P and K. Further it brings economy and efficiency in fertilizers. The INM affects the physical, chemical and biological environment of the soil and thus preserves the soil health. As such the goal of sustainable production could be achieved without any disastrous effects on soil and environment. Considering the above facts, present investigation was carried out to find out the effect of integrated use of Vermicompost, *Azotobacter* and inorganic fertilizers (N, P, K and Zn) on yield and nutrient content and their uptake by wheat.

### MATERIALS AND METHODS

A pot culture experiment was carried out in the pot house of department of Agricultural Chemistry and Soil Science, A.S. (P.G.) College, Lakhaoti, Bulandshahr (U.P) during the *rabi* season of 2006 – 07. The soil was well drained sandy loam, slightly alkaline in reaction (pH 8.0),

having E<sub>ce</sub> – 1.2 dSm<sup>-1</sup>, organic carbon – 2.80 g/kg soil, available K – 285.0 kg ha<sup>-1</sup> and DTPA – Zn 1.4 mg kg<sup>-1</sup>. Seventeen treatments consisted of 4 levels of NPK (50%, 75%, 100% alone and in combination with Vermicompost, Zn and *Azotobacter* and 150% alone) along with one absolute control were laid out in factorial randomized block design (RBD) with three replications. Nitrogen, phosphorus, potassium and zinc were applied in the form of urea, single super phosphate, muriate of potash and zinc sulphate @ 120, 60, 40 and 25 kg ha<sup>-1</sup>, respectively. The whole amount of potassium and phosphorous and half quantity of nitrogen was applied at the time of sowing as basal dressing and rest half of nitrogen was applied in two splits, as top dressing at the CRI and tillering stages. Vermicompost (5t/ha) as per treatment was also applied as basal dressing. Biofertilizer (*Azotobacter chroococcum*) was applied through seed treatment. The wheat variety H.D 2329 was used as test crop.

### RESULTS AND DISCUSSION

Increasing the levels of NPK caused increment in the grain and straw yield of wheat. The application of Zn along with 100% RFD of NPK or 75% RFD of NPK or with 50% RFD of NPK produced higher grain yield per hectare as compared to application of Vermicompost and *Azotobacter* (Table 1). The treatment comprising of 100% RFD of NPK + Zn + Vermicompost + *Azotobacter* produced significantly higher grain yield (57.28 q/ha) over all other treatments except T<sub>11</sub> (75% RFD of NPK + VC + Zn + *Azotobacter*) and T<sub>6</sub> (50% RFD of NPK + VC +