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# Effect of integrated nutrient management practices on soil properties and yield in sweet sorghum [*Sorghum biocolor* (L.) Moench] in vertisol

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## ABSTRACT

A Field experiments was conducted on sweet sorghum to evaluate the influence of inorganic (chemical ) fertilizer, organics(Vermicompost), Biofertilizers (Azotobactor and phosphate solublising organisms(PSB) and micronutrient (Zn and Fe) on soil properties,green stalk yield, grain yield and various quality parameters of sweet sorghum (Var.HES-04) on Vertisol (Typic Haplustert) at Sorghum Research Station, Marathwada Agricultural university, Parbhani during *kharif* season of 2005-06. The seven treatment comparised of inorganic fertilizer,vermicompost, biofertilizer (*Azotobacter* + PSB) and micronutrient (Zn and Fe). The treatment used were $T_1$ - 100% RDF, $T_2$ - 50% RDF+ vermicompost @ 2.5 Mg ha-1, $T_3$- 50% RDF + micronutrients $ZnSO_4$20 kg $ha^{-1}$ and FeSO4 25 kg $ha^{-}$ $T_4$-50%RDF + biofertilizer (*Azotobacter* + PSB), $T_5$- $T_2$+ micronutrient (Zn+Fe),$T_6$-$T_2$+biofertilizer,$T_7$-$T_2$ +biofertilizer (Zn+Fe).The result indicated that the grain yield, green stalk yield and application of vermicompost, biofertilizers alone with 50% recommended dose of fertilizers and micronutrients were found desirable to improve soil health and sustained the productivity in sweet sorghum growth on Vertisol.

**Key words :** Physico-chemical properties, Soil properties microbial count, INM, Sorghum, Vertisol.

Sweet sorghum is a special type of sorghum that accumulates sugars (sucrose, glucose and fructose) in stalk. Green juicy cane contributes 70-80 per cent of total biomass. Green revolution with its higher production capabilities has gradually depleted the major, secondary and micronutrients in early eighties. These deficiencies are to be met with proper amelioration techniques.

Due to high prices of fertilizers there is need to substitute the part of it through organic manure like vermicompost, FYM and biofertilizers. The importance and usefulness of organic manures in soil sustainability has been emphasised by Katyal (2000) and judicious use of inorganic fertilizer along with organic sources have been suggested. The continuous use of chemical fertilizers over a long period may cause imbalance of microflora and thereby directly affect the biological properties (Manickam and Venkataraman, 1992). To sustain the crop yield and increase land productivity, combination of organic manures and fertilizers not only increase the crop yield of sorghum but also improves physical and biological properties of soil (Bagade *et al*., 2003). Yield and soil properties were significantly improved by combined application of organic, inorganics and biofertilizers than the inorganics alone (Gawai and Pawar, 2005).

Therefore, an attempt has been made to study the impact of inorganic fertilizer, vermicompost, biofertilizer and soil test based micronutrients (Fe and Zn) on yield in Sweet Sorghum, soil properties, nutrient availability and soil microbial count.

## MATERIALS AND METHODS

A field experiment was conducted on Vertisol (Typic-Haplustert) at Sorghum Research Station, Marathwada Agricultural University, Parbhani (M.S.) India in rainy season of 2005-06. The soil was slightly alkaline (pH 8.2) and low in available N (231 kg $ha^{-1}$) and moderate in availability of $P_2O_5$ (15 kg $ha^{-1}$) and high in $K_2O$ (472 kg $ha^{-1}$) having DTPA extractable Zn and Fe 0.79 and 4.29 mg $kg^{-1}$, respectively. The experiment was laid out in randomized block design with seven treatments replicated thrice. Sweet sorghum variety HES-04 was sown on 7th July, 2005. Inorganic fertilizers were applied as per recommended dose of fertilizer and micronutrients as per treatment through chemical fertilizers. However, Azotobacter and phosphorus solubilizing bacteria (PSB) were used for seed treatment before sowing. Vermicompost was applied @ 2.5 Mg $ha^{-1}$ as per treatment at the time of sowing. Other cultural operations and plant protection measures were followed as per recommendations. The soil samples were analyzed as per standard procedure and Soil microbial counts (bacteria, fungi and actinomycetes) were estimated using serial dilution method.

## RESULTS AND DISCUSSION

***Effect of integrated nutrient management practices on grain yield, green stalk yield, total biomass and dry matter of sweet sorghum:***

The grain and green stalk yield of sorghum significantly improved with the application of inorganic