

Response of fertilizers and organic manure on growth, yield and quality of sweet sorghum

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ABSTRACT

Field experiment was conducted to study the response of fertilizers and organic manure on Growth, Yield and quality of sweet sorghum with four levels of fertilizers (Control, 40:20:20, 80:40:40 and 120:60:60 NPK kg ha⁻¹) and five levels of organic manures (No manure, VC 2.5t ha⁻¹, VC+ *Azospirillum*, VC + PSB, VC+ *Azospirillum*+ PSB). Results indicated that application of 120:60:60 NPK kg ha⁻¹ recorded the highest plant height, dry matter accumulation, leaf area, grain yield, green cane yield and juice yield, and application of 80:40:40 NPK kg ha⁻¹ recorded the highest values of TSS, pH, reducing sugar, non-reducing sugar and total sugar percentage of sweet sorghum juice. Application of vermicompost @ 2.5 t ha⁻¹ along with seed treatment of *Azospirillum* and PSB enhanced the growth characters and produced highest yield and enhanced the quality.

Key words : Sweet Sorghum, Fertilizer, Organic manure, Quality.

Sweet sorghum is presently getting its momentum as it has a number of alternative uses in the field of agriculture, industry and national economy in the sense of great source of alcohol production other than grain yield. With the introduction of sweet sorghum varieties new areas have opened for its commercial exploitation. The juice of green stalk of sweet sorghum can be used for ethanol production after removing earheads at physiological maturity. Ethanol is a renewable source of energy; it is used for blending purposes and is widely practiced around the world known as 'Biofuel' which is ecofriendly. To began with policy of blending of ethanol with petrol was initially upto 5 % and further increase upto 10 %, which is being sold in nine states. The study was undertaken to know the effect of fertilizer and organic manure levels on growth, yield and quality of sweet sorghum.

MATERIALS AND METHODS

The field experiment was conducted during *kharif* 2005 at Sorghum Research Unit, Dr. PDKV, Akola. The experiment was laid out in split plot design with 3 replications and 20 treatment combinations. Main plot consisted of 4 treatments (0, 40:20:20, 80:40:40, 120:60:60 NPK NPK kg ha⁻¹) and sub plot consisted 5 treatments (No manure, VC 2.5 t/ha, VC 2.5 t ha⁻¹ + *Azospirillum*, VC 2.5 t ha⁻¹+ PSB, VC 2.5 t ha⁻¹+ *Azospirillum* + PSB). pH was recorded by pH meter, TSS by hand refractometer, and reducing sugar and total sugar were analysed by Somagy and Dubois methods, respectively (Sadasivan and Manickam, 1996). Non-reducing sugar was estimated by subtracting reducing sugar from total sugar.

RESULTS AND DISCUSSION

The data (Table 1) dipicte that fertilizer application of 120:60:60 NPK kg ha⁻¹ recorded the significantly highest plant height (284.2 cm), dry matter accumulation (256 g), leaf area (337.3 dm²), grain yield (30.95 q ha⁻¹), green cane yield (67.77 t ha⁻¹) and juice yield (16962 L/ha). Higher dose of fertilizers increased the availability and nutrient uptake by the plants. Ultimately there was a good growth of the plant which resulted in highest yield. The results are comparable with those of Wanjari *et al.* (1996).

As regards organic manure application of vermicompost @ 2.5 t ha⁻¹+ *Azospirillum* + PSB seed treatment recorded the significantly highest values of dry matter accumulation/plant (206.3 g), grain yield (21.71 q ha⁻¹), green cane yield (53.53 t ha⁻¹) and juice yield (11089 l ha⁻¹). Plant height and leaf area were found to be non-significant but recorded the highest values. This might be due to availability of nutrients from vermicompost and fixation of N by *Azospirillum* and solubilization of P by PSB. This lead to more accumulation of amino acids and amide substances and their translocation to reproductive organs. Similar results were obtained by Savalgi and Savalgi (1991).

The interaction effect between fertilizer levels and organic manure was found to be non significant in case of growth and yield of sweet sorghum.

The data (Table 2) show that the application of 80:40:40 NPK kg ha⁻¹ recorded, in general, better response to comparison to 120 : 60 : 60 level on the characteristics recorded and 72%.

It indicates that increase in fertilizer levels increased