

ABSTRACT

Sweet sorghum (*Sorghum bicolor* L. Moench) contains fermentable sugars in the stem that can be converted to ethanol. The current study aimed at evaluating the performance of three sweet sorghum genotypes with five checks and contributes towards availing suitable sweet sorghum for industrial ethanol production. Field studies were carried out in Kenya at varied locations in a randomized complete block design with three replications. Sorghum was harvested at hard dough stage of grain development and evaluated for several stem juice production traits including plant height, cane yield, juice volume, degrees Brix, total, reducing, and non-reducing sugars, and ethanol yield via juice fermentation. Analyses of variance using SAS version 9.1 showed a significant effect of genotype for morphological characters and ethanol yield. Genotype EUSS10 produced the greatest cane (27.4 T/ha) and juice yield (7806.7 L/ha) whereas ACFC003/12 recorded the greatest ethanol yield (423.1 L/ha). At all sites, EUSS10 had the greatest plant height and days to 50% heading whereas SS04 had the greatest Brix and total sugar concentration. The greatest grain yield and non-reducing sugar concentration was produced by SS17 and SS21, respectively. Results of this study show that though Brix and total sugars are desirable for ethanol yield, cane yield, and juice volume of sweet sorghum determines the ultimate volume of ethanol produced.

Keywords: sweet sorghum, genotypes, stalk juice, ethanol