Biofuel, sugar content, grain yields and qualities of two sorghum bicolor in responses to levels and timing of nitrogen applications

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Abstract

Tow filed experiments were conducted during the 2017 and 2018, the objective of this work was to evaluate two sweet sorghum varieties under the effect of three nitrogen levels and two different timing of nitrogen application on plant characteristics, quality and yield traits of sweet sorghum. The experimental design was a split-split plot in RCBD with three replications. The main plots were assigned to sweet sorghum varieties *viz.*, Brandes (V_1) and Honey (V_2). The subplots were occupied with three levels of nitrogen 80 (N_1), 100 (N_2) and 120 (N_3). Two nitrogen applications times *viz.*, at two equal doses (T_1) and at three equal doses (T_2) were arranged in the sub-subplots treatments.

Recapitulating our results indicated that nitrogen fertilizer levels and timing of nitrogen application had a highly significant ($P\leq 0.01$). Moreover, varieties differed significantly ($P\leq 0.05$) positive effect on yield and yield components traits in both seasons. The grain yield (1.12 and 1.28ton/fed, fed= 4200 m^2= 0.405 hectare) in each seasons, were obtained by Brandes variety (V1) with 120 N kg fed^{-1} (N_3) and *T*2 (third equal doses of nitrogen application).

The obtained results of regression analysis of theoretical ethanol yield clarified that, there were three traits, i.e. the sucrose %, the stalk yield and the juice weight in the first year, while in the second year, six traits, i.e. the sugar yield, the sucrose%, the stalk yield, the brix %, the juice extraction% and juice weight were significantly ($P\leq 0.001$) contributed to variation in the theoretical ethanol yield per feddan.