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### البحث الثالث

#### الملخص باللغة الإنجليزية:

Two field experiments conducted during 2013 and 2014 seasons at the farm of the Faculty of Agriculture, Demo, Fayoum University, Egypt, to evaluate two sweet sorghum varieties under the effect of three nitrogen levels and three potassium levels on yield and its attributes. The experiment was set up according to three factorial (Split-split plot) block design in three replications, the main plots were assigned to sweet sorghum varieties viz., Honey ( $V_1$ ) and Brandes ( $V_2$ ). The sub plots were occupied with three levels of nitrogen at the level of 80 ( $N_1$ ), 100 ( $N_2$ ) and 120 ( $N_3$ ) Kg N/fed (fed = 4200 m<sup>2</sup> = 0.405 hectare) in three equal doses. Potassium sulphate (48% K<sub>2</sub>O) applied to the soil at the level of 25 ( $K_1$ ), 50 ( $K_2$ ) and 75 ( $K_3$ ) kg K<sub>2</sub>SO<sub>4</sub>/fed were arranged in the sub-sub plots treatments and applied in three equal doses. Results indicated that the effect of nitrogen levels as well as, potassium levels had a highly significant positive effect on yield, yield components and quality traits, varieties differed significantly in stem diameter, seed index and theoretical ethanol yield in both seasons, the highest former traits produced by Brandes variety ( $V_2$ ). The highest values of seed index in both seasons, as well as brix, juice extraction, juice yield and sugar yield in the first season, while stem length, leaf weight and leaves yield in the second season were obtained by Brandes ( $V_2$ ) variety with 120 kg N/fed ( $N_3$ ) with 75 ( $K_3$ ) kg K/fed. The highest yields of sugar and juice were 1.83 and 10.68 t/fed were obtained from the trilateral interaction among Brandes ( $V_2$ ) variety with 120 kg N/fed ( $N_3$ ) with 75 ( $K_3$ ) kg K/fed in the first season, respectively. According to, best-subsets regression the best model for the stem height, stem diameter, stem weight, stem yield, brix%, sucrose % , purity % and juice extraction% showed that high adjusted R<sup>2</sup> = 99.80 and 99.90%, in the 1<sup>st</sup> and 2<sup>nd</sup> seasons, respectively.