

Research paper

Enhancing Faba bean (*Vicia faba* L.) Productivity and Seed Quality Using Chemical Fertilizers in High Terrace Soil in the River Nile State, Sudan

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Abstract

Experiments were conducted at the Hudeiba Research Station Farm in the winter seasons of 2017/ 18 and 2018/ 19. The objectives were trying to improve faba bean production and seed quality using chemical fertilizers (nitrogen, phosphorus and potassium). The treatments consisted of eight fertilizers (nitrogen phosphorus, potassium, nitrogen + phosphorus, nitrogen+ potassium, potassium+ phosphorus and nitrogen+ phosphorus +potassium and control, 21kg N/ha,43kg P₂O₅/ha and 45.22kg K₂O/ha). The treatments were arranged in randomized complete block design (RCBD) with four replicates. Significant differences were found between the fertilizers as reflected on the number of pods per plant and total seed yield. Also, significant differences were observed in all other measured characters due to application of the nitrogen+ phosphorus +potassium fertilizers treatment in the two successive seasons. The nitrogen+ phosphorus potassium gave the best grain yield compared to all other fertilizer treatments. Nonetheless, carbohydrates%, starch%, protein% were increased when 21kg N/ha,43kg P₂O₅/ha and 45.22kg K₂O/ha dose, was applied. As well as the total flavonoids contents in faba bean (*Vicia faba* l.) was improved when 21kg N/ha ,43kg P₂O₅/ha and45.22kg K₂O dose was applied. Economic feasibility was tested using gross-rate (GR) analysis. The GR can be calculated by dividing gross profit by net sales. Economically, the results showed that the nitrogen+ phosphorus+ potassium dose gave the highest GR ratios (146%) compared to the other fertilizers, in the two successive seasons. Nitrogen+ phosphorus+ potassium is the best option for faba bean farmer in the River Nile State to be adopted for profitable yield.

Keywords: Chemical fertilizers, faba bean, gross rate of return, high Terrace