The interaction effect of biofertilizers and mineral fertilizers on growth, yield and biocontents of some economic crops

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Two field experiments were conducted through 1991/1992 and1992/1993 years at Sids Agricultural Research Station to study theinteraction between mineral and biofertilizers on growth, yield andbiocontents.Therefore, sets of field experiments were carried out using cereal crop(wheat) and legumes crop (soybean) as indicator plants.Wheat plants were individually inoculated with either A;otobacter apor A;oapirillUun sp, while legumes (soybean) were individually inoculatedwith either phosphorine or V.A. Myco”hi;al.The obtained results and conclusions can be summarized as follows:A. Cereal crops (wheat):1. The application of the mineral fertilizer at 7S% of the recommended ratewith SO g1Fed A;otobacter ap or SO glFed A;oapirillum ap yielded,similar or even higher in plant hight, number oftillers, dry weight, spikelength, number of spikelets, number of grains per spike, weight of grainper spike, weight of 1000 grains, grain yield and straw yield than thatyielded upon fertilization with the mineral fertilizer.2. The inoculation of the rhizosphere with either A%OtObtJCU16”p orAzoapirillum ap at rate of SO glFed accompanied with fertilization withinorganic nitrogen at 7S% of its recommended field rate led to thehighest concentrations ofN, P and K in wheat plants.3. The obtained results of plant uptake ofN, P and K at both stages of growth(4S and 100 days of planting) indicated that the a significant incrementhad been occurred by fertilizing the plant with inoculation of therhizosphere with either ~ 6p or~ ’P at rate of SOg/Fed accompanied with fertilization with inorganic nitrogen at 75% ofits recommended field rate.4. The obtained data of wheat grain and straw uptake of N,P and Killustrated that a significant of N, P and K uptake with 75% of therecommended rate of the inorganic nitrogen combined with inoculationwith 50 g/Fed of either Azotobacter sp or AZospirillum sp.5. The obtained data indicated that the treatments of(56.25 kg N/Fed + 50g/Fed Azotobacter) and (56.25 kg N/Fed + 50 glFedAzospirillum)caused the highest protein value while this treatment caused the lowestvalue of total carbohydrates and starch content.6. Results of the follow-up of the soil contents of total nitrogen, available Pand K may be due to the different fertilization treatments. Data revealedthat in both seasons of cultivation soil contents of the three fertilizerelements were highest upon fertilizing the soil with urea at 75% of itsfield recommended level) combined with 50 g/Fed of Azotobacter sp orAzospiriJuum sp inoculated at the plant rhizosphere.B. LegQJDinasease (Soybean):1. The application of the mineral fertilizer at 16.5 kg Pz0s/Fed superphosphate with 50 g/Fed phosphorine or 50 g/Fed VA-Mycorrhizalyielded plant height, number of tillers, dry weight, number of bods perplant, number of seed per plant, weight of seed per plants, weight of1000 seeds, soybean yield and straw yield, almost similar or even higherthan that yield upon fertilization with the mineral fertilizer.2. The inoculation •of the rhizosphere with either phosphorine or VA.Myco”hir,al at rate of 50 g/Fed accompanied with fertilization withsuper phosphate at 75% of its recommended field rate caused the highestconcentrations ofN, P and K.3. The obtained results of plant uptake of N, P and K at both stage of growth(45 and 75 days of planting) indicated that a significant increment hadbeen occurred by fertilizing the plant with inoculation ofte rhizospherewith either phosphorine or VA. Mycorrhizal at rate of 50/Fedaccompanied with fertilization with super phosphate at 75% of itsrecommended field rate.4. The obtained data of soybean grain and straw uptake of N, P and

Kindicated that the a significant increase ofN, P and K uptake with 75%of the recommended rate of the super phosphate combined withinoculation with 50 g1Fedof either phosphorine or VA-Myco”hir,al.5. The obtained data indicated that the treatments of (16.5 kg PzOs/Fed + 50g1Fed phosphorine) and (kg PzOslFed + 50 g1Fed VA-Myco”hiza)caused the highest protein and oil value while this treatment caused thelowest value of total carbohydrates.6. The interaction effect ofbiofertilizers and mineral fertilizers on the fattyacid composition on soybean crude fat has been studied. The obtainedresults indicated that all analyzed fat samples had a low content ofsaturated fatty acids (12.6-18.54%) while the unsaturated fatty acidscomprised 84.41-8736%.7. The interaction comprised effect ofbiofertilizers and mineral fertilizers onSDS-PAGE patterns of soybean proteins has been investigated. Theobtained results revealed that no differences for each protein in soybeantreatment.8. Results of the follow up of the soil contents of total nitrogen, available Pand K is due to the different fertilization treatments. Sata revealed that inboth seasons of cultivation soil contents of the three fertilizer elementswere highest upon fertilizing the soil wih super phosphate (at 75% of itsfield recommended level) combined with 50 g/Fed ofphosphorine or VAMyco”hizal inoculated at the plant rhizosphere.