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Influence of Bio-spent mushroom compost tea and potassium humate as a sustainable partial alternate source to mineral-N fertigation on tomato

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SUMMARY

To examine if the use of PGPR-bacteria as biofertilizers (*Azotobacter chroococcum*, *Azospirillium brasilense, Pseudomonas putida* and *Pseudomonas fluorescens*), spent mushroom compost tea (SMC tea) and potassium humate (KH) can partially substitute the need of N fertilizers in tomato plant (El-Basha 1077 hybrid).Two field trials were conducted in sandy soil at the private farm in Beni Suef Governorate, during summer season of 2015 and 2016. The study comprised of four treatments: control (100% recommended doses of N); 75% N mineral +Bio-SMC tea; 75%N mineral+ KH and 75% N mineral+ Bio-SMC tea +KH. It was found that the triple application, Bio-SMC tea and potassium humate with75% N stimulated growth characteristics (plant length, number of leaves, leaf area, stem thickens, number of branches and dry weights) of tomato plant compared to all other treatments in both seasons. Mineral contents (N, P, K), citric acid and chlorophyll compounds were increased in plants fertilized with the above mentioned treatment. Under the triple application of 75% N mineral+ Bio-SMC tea + KH, the fruit yield plant^{-1}was increased significantly by 8% compared to control treatment, 5.9% compared to Bio-SMC tea along with 75% N mineral, 17.6% compared to KH coupled with 75% N recommended dose. The high efficiency of Bio-SMC tea and KH might be the result of its potential of nitrogen fixation, microbial metabolic activities and enhancing soil microorganisms, increased soil fertility and growth of microbes in the rhizosphere which ultimately contributed to higher yield, citric acid, and mineral concentrations in tomatoes. Thus, the integrative treatment Bio-SMC tea +KH may reduce application of chemical fertilizers and therefore, can be considered as a useful practice in sustainable agriculture.