Effect of Inoculated Azotobacter chroococcum and Soil Yeasts on Growth, N-uptake and Yield of Wheat (Triticum aestivum) under Different Levels of Nitrogen Fertilization

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Abstract:

Background: mixed inoculants are used for many crops grown under field condition, and many studies have shown that mixed inoculants containing mixture of bacterial species promote greater beneficial effects than single strain inocula. Materials and Methods: A pot experiment was conducted to study the effect of inoculation with A. chroococcum or plus yeast strains (Saccharomyces cervisiae, Candida sake, Saccharomyces exiguus, Pichia membranifaciens and Cryptococcus laurentii) on grain germination, growth of wheat (Triticum aestivum L.) cv., Giza-164, and to choose the best yeast strain for inoculation under field condition. Results: The results showed that the mixed inoculation of any of the yeast strains with A. chroococcum except yeast strain Cryptococcus laurentii resulted in significant (P≤0.05) increases in shoot fresh and dry weights, root fresh and dry weights. The most stimulative treatment on all plant growth parameters was that inoculated with A. chroococcum + Candida sake, scoring the following increases in ; germination, shoot fresh and dry weight and root fresh and dry weights making 134.09 %, 210.9% , 30.23 %, 20.71 % and 71.60 %, respectively, compared with the single inoculation treatment with A. chroococcum alone. The response of wheat to co-inoculation with A. chroococcum and the selected yeast strain (Candida sake) was tested in season 2015/2016 under field condition in presence of different N levels (40, 60 and 80 kg N/feddan). The dual inoculation treatments of A. chroococcum + yeast strain C. sake under any of the N levels produced significant (P≤0.05) increases in fresh and dry weights of shoots and roots, N-uptake and grain yield of wheat compared to the single inoculation treatment with A. chroococcum alone. Conclusions: Dual inoculation with A. chroococcum + yeast strain C. sake along with 60 kg/fed. is recommended for wheat fertilization in Egypt since it gave highest grain yield and was equal to that obtained with dual inoculation+80 kg/feddan, thus saving 20 kg N-fertilizer/feddan. Main conclusions : the magnified promotion induced by the mixture of the yeast strain C. sake and A. chroococcum may indicate a synergetic interaction between them.

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