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Effect of Nitrogen Stabilizing and Potassium and Phosphorus Solubilising Bacteria on Mungbean (*Vigna radiata*) Yield

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Abstract

Biological fertilisers as an alternative to chemical fertilisers in sustainable agriculture can improve the quantitative and qualitative yield of crops. In order to investigate the effect of nitrogen stabilising bacteria, solubilising bacteria of potassium and phosphorus on mung bean yield, a field experiment was carried out using a randomised complete block with factorial treatment structure. Two mungbean (*Vigna radiata*) cultivars (Dezfouli & hendi) were cultivated in six treatments and three replications at the Agricultural Research Station, Ferdowsi University of Mashhad, Iran in 2017. The biofertiliser treatments used in this study included: 1) nitro power bacter (NPB) 2) phosphate power bacter (PhPB) 3) potassium power bacter (PPB) 4) nitro power bacter+ phosphate power bacter + potassium power 5) nitrogen fertiliser (N) 6) control (C) without any fertiliser. The results indicated that application of investigated bacteria had significant effect on mungbean yield ($p < 0.05$). The highest biomass and grain yield was obtained for Dezfouli cultivar in NPB + PhPB + PPB bacteria-integrated treatment with an average of 6555 and 1558 kg ha^{-1}. The lowest amount was observed for Hendi cultivar in control treatment with an average of 3518 and 1393 kg ha^{-1}. The effect of treatments on yield components also was significant ($p < 0.05$). As a result, the highest number of pods per plant and number of seeds per pod were obtained in the NPB+PhPB+PPB treatment as well. These two parameters had the largest role in yield improvement especially in bacterial-induced treatments. The superior treatment in this experiment was attributed to the interaction of biofertiliser nitrogen, phosphorus and potassium, which caused the highest yield and yield components in mungbean plants. Results of the present study revealed that the mixed application of nitrogen stabilising bacteria, solubilising bacteria of potassium and phosphorus as biological can not only improve yield of mungbean but also can reduce chemical inputs in crop production sestems.

Keywords: Biofertiliser, mung bean, sustainable agriculture, yield components

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