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"TOWARDS SUSTAINABLE AGRICULTURE: AN INTERDISCIPLINARY APPROACH"

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SINGLE AND MIXED INOCULATION OF SOYBEAN WITH PLANT GROWTH PROMOTING BACTERIA AND *BRADYRHIZOBIUM JAPONICUM*

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Plant growth-promoting rhizobacteria (PGPR) play an important role in increasing the plant mass and yield, as well as controlling diverse plant diseases. Growth promotion by *Bacillus* is a complex process that includes synthesis of some metabolites, production of siderophore, hydrogen cyanide, volatile compounds, providing mineral solubilization, advantage in competition and induced systemic resistance. In our previous investigation, indigenous *Bacillus* spp. strains were isolated and tested for PGP ability. The present study was undertaken to assess the effect of inoculation with *Bradyrhizobium japonicum* and two selected *Bacillus* spp. on plant growth and yield of soybean. The field trail was conducted on Lozovik locality, Serbia, on 0.5 ha plots using soybean cv. Galeb. The effects of PGP bacteria were tested using three treatments: (A) *B. japonicum* 526; *B. japonicum* 526 and (B) *Bacillus* sp. Q10 or (C) *Bacillus* sp. Q14. *Bacillus* strains were cultivated on Tryptic Soy broth at 28°C for 24h, while *B. japonicum* was cultivated on Yeast Manitol broth at the same temperature for 72h. All strains were optimized to 10^9 $CFUmL^{-1}$ and mixed with peat as carrier until planting. Results showed that individual inoculation with *B. japonicum* 526 was less effective than combined inoculation of this strain with *Bacillus* spp. For treatment B, the highest values of plant height and pod number, grain number and grain mass per plant were observed at the early maturity stage. Treatment C increased trifoliate leaf number and branch number per plant more than other two treatments. All treatment showed no statistically significant difference in nitrogen, carbon and sulphur content in grain. Soybean yield was the significantly higher in treatment B, suggesting the combination of *Bacillus* sp. Q10 and *B. japonicum* 526 could increase the productivity of soybean cv. Galeb.