Impact of microbial inoculants on maize growth

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World population is estimated to reach 9.7 billion by 2050 which will greatly increase the demand for food. Agricultural sector is facing several challenges mostly related to the negative impact of non-sustainable farming practices and climate change on soil fertility and health which impairs crop growth and yield. To foster crop productivity, there is a need to invest in research and on the development of new biotechnological tools to increase plant growth and resilience. Among sustainable strategies is the use of microbial-based tools, such as biofertilizers.

The aim of this work was to characterize bacterial strains for their multiple plant growth promoting traits, including P-solubilization and N_2 fixation ability, as well as the production of ammonia and indole-3-acetic acid (IAA). The bacterial strains *Arthrobacter nicotinovorans* EAPAA, *Pseudomonas fluorescens* S3X*, Pseudomonas azotoformans* IR1-5 and *Bacillus aryabhattai* LS1-2 presented the best plant growth promoting traits. These strains were tested for their biocompatibility and different bacterial consortia were inoculated on maize in a short-term greenhouse pot.

The inoculation of maize plants with the different consortia fostered shoot biomass and elongation, suggesting their ability to be used as biofertilizers. However, more research should be carried out to evaluate their use in sustainable agriculture under reduced chemical fertilization conditions.

Keywords: Bioinoculants, Biofertilizers, N_2 fixation, P solubilization, Plant growth-promoting traits, phytohormones