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## SYNERGISTIC EFFECT OF *Pseudomonas lini* AND *Bacillus pumilus* ON RUNNER BEAN GROWTH ENHANCEMENT

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### Abstract

In order to improve the soil fertility, several eco-friendly alternatives to traditional cultivation practices have been proposed. The use of biofertilizers, such as rhizobacteria with different plant growth promoting properties is an environmentally-friendly option to achieve sustainability in agriculture. In this context, two bacterial strains (*Bacillus pumilus* R3 and *Pseudomonas lini* R7) isolated from the rhizosphere of runner bean plants were assessed for their plant growth promoting abilities. R3 was found positive for phosphate solubilization and R7 for indol-acetic acid production (IAA). In a greenhouse experiment, runner bean seeds were inoculated with a single strain (R3/R7) or with a combination of strains (R3+R7) in order to confirm their potential as biofertilizers. Thus, growth parameters (length of the aerial parts, number of flowers), physiological indicators (photosynthesis rate, stomatal conductance, transpiration, water use efficiency – WUE, chlorophyll content) and yield characteristic were observed during vegetative, flowering and fruiting stages. The results showed that all the parameters were influenced by the presence of the bacterial strains. In particular, the plants inoculated with R3+R7 generally outperformed those with the other treatments or the non-inoculated plants. They significantly increased the length of the aerial parts, the number of flowers, the photosynthetic activity and WUE during late vegetative and flowering stages, the chlorophyll content at 34 and 83 days after inoculation and the grain yield. These could indicate the synergistic effect of the tested strains. The results suggest that our rhizobacterial strains may be used as biofertilizer for vegetable production in organic agricultural systems.

*Key words:* biofertilizer, rhizobacteria, seed inoculation, synergism, yield increase

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