

## Ability of rhizobacteria of valerian in phosphate solubilization and their symbiotic efficiency

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### Abstract

Phosphorus (P) and nitrogen (N) are the most essential nutrients for plant growth. Deficiency of these elements causes a considerable loss of crop yield. Nowadays, using of biofertilizers in cultivation of strategic crops, such as greenhouse crops, is very important because of resolving the P and N deficiency. This research was carried out to evaluate the potential of rhizobacteria of valerian (as a medicinal plant) in phosphate solubilization, N fixation, as well as salinity tolerance in the root zone, in laboratory conditions. To do so, 40 bacteria were isolated from the rhizosphere of valerian, and their mineral-phosphate solubilizing activities were measured on solid and liquid Sperber media. Besides, N-fixation ability of the isolates in symbiosis with wheat was evaluated under greenhouse conditions. Results showed that 77.5% of the isolates had the ability to solubilize mineral phosphate. Two isolates belonging to *Pseudomonas* and *Xanthomonas* genera and two isolates belonging to *Pseudomonas* genus had the maximum ability for phosphate solubilization in solid and liquid media, respectively. Among the isolated bacteria, one isolate belonging to *Pseudomonas* genus, showed the highest symbiosis efficiency (132%). Furthermore, results of the salinity-tolerance test of the bacteria revealed that all of the isolated bacteria could tolerate 500 mM NaCl concentration and two isolates (belonging to *Pseudomonas* genus) were able to tolerate salinity of 1000 mM NaCl. Overall, it can be concluded that rhizobacteria of valerian have high potential to be used as biofertilizer.

**Keywords:** Phosphate solubility, Rhizobacteria, Biofertilizer, Salinity.

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