

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

B. S. Ghods-Alavi^{1*}, M. Soleymani², M. Ahmadzadeh¹ and S. Soleymani³

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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.

1. Dept. of Plant Protec., College of Agric. and Nat. Resour., Univ. of Tehran, Karaj, Iran.

2. Dept. of Environ., Faculty of Nat. Resour., Isf. Univ. Technol., Isfahan, Iran.

3. Dept. of Soil Sci., College of Agric. and Natur. Resour., Univ. of Tehran, Karaj, Iran.

*: Corresponding Author, Email: beh_ghodsalavi@yahoo.com