

## Effect of Plant Growth Promoting Rhizobacteria on the Germination and Early Growth of Onion (*Allium cepa*)

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**Abstract :** Plant growth promoting rhizobacteria (PGPR) are a heterogeneous group of bacteria that can be found in the rhizosphere, at root surfaces and in association with roots, enhancing the growth of the plant either directly and/or indirectly. Increased crop productivity associated with the presence of PGPR has been observed in a broad range of plant species, such as raspberry, chickpeas, legumes, cucumber, eggplant, pea, pepper, radish, tobacco, tomato, lettuce, carrot, corn, cotton, millet, bean, cocoa, etc. However, until now there has not been much research about influences of the PGPR on the growth and yield of onion. Onion (*Allium cepa* L.), of the Liliaceae family, is a species of great economic importance, widely cultivated all over the world. The aim of this research was to examine the influence of plant growth promoting bacteria *Pseudomonas* sp. Dragana, *Pseudomonas* sp. Kiš, *Bacillus subtilis* and *Azotobacter* sp. on the seed germination and early growth of onion (*Allium cepa*). PGPR *Azotobacter* sp., *Bacillus subtilis*, *Pseudomonas* sp. Dragana, *Pseudomonas* sp. Kiš, from the collection of the Faculty of Agriculture, Novi Sad, Serbia, were used as inoculants. The number of cells in 1 ml of the inoculum was  $10^8$  CFU/ml. The control variant was not inoculated. The effect of PGPR on seed germination and hypocotyls length of *Allium cepa* was evaluated in controlled conditions, on filter paper in the dark at 22°C, while effect on the plant length and mass in semicontrol conditions, in 10 l volume vegetative pots. Seed treated with fungicide and untreated seed were used. After seven days the percentage of germination was determined. After seven and fourteen days hypocotil length was measured. Fourteen days after germination, length and mass of plants were measured. Application of *Pseudomonas* sp. Dragana and Kiš and *Bacillus subtilis* had a negative effect on onion seed germination, while the use of *Azotobacter* sp. gave positive results. On average, application of all investigated inoculants had a positive effect on the measured parameters of plant growth. *Azotobacter* sp. had the greatest effect on the hypocotyls length, length and mass of the plant. In average, better results were achieved with untreated seeds in compare with treated. Results of this study have shown that PGPR can be used in the production of onion.

**Keywords :** germination, length, mass, microorganisms, onion

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