

Effect of Chemical Mutagen on Seeds Germination of Lima Bean

Authors : G. Ultanbekova, Zh. Suleimenova, Zh. Rakhmetova, G. Mombekova, S. Mantieva

Abstract : Plant Growth Promoting Rhizobacteria (PGPR) are a group of free-living bacteria that colonize the rhizosphere, enhance plant growth of many cereals and other important agricultural crops and protect plants from disease and abiotic stresses through a wide variety of mechanisms. The use of PGPR has been proven to be an environmentally sound way of increasing crop yields by facilitating plant growth. In the present study, strain improvement of PGPR isolates were carried out by chemical mutagenesis for the improvement of growth and yield of lima bean. Induced mutagenesis is widely used for the selection of microorganisms producing biologically active substances and further improving their activities. Strain improvement is usually done by classical mutagenesis which involves exposing the microbes to chemical or physical mutagens. The strains of *Pseudomonas putida* 4/1, *Azotobacter chroococcum* P-29 and *Bacillus subtilis* were subjected to mutation process for strain improvement by treatment with a chemical agent (sodium nitrite) to cause mutation and were observed for its consequent action on the seeds germination and plant growth of lima bean (*Phaseolus lunatus*). Bacterial mutant strains of *Pseudomonas putida* M-1, *Azotobacter chroococcum* M-1 and *Bacillus subtilis* M-1, treated with sodium nitrite in the concentration of 5 mg/ml for 120 min, were found effective to enhance the germination of lima bean seeds compared to parent strains. Moreover, treatment of the lima bean seeds with a mutant strain of *Bacillus subtilis* M-1 had a significant stimulation effect on plant growth. The length of the stems and roots of lima bean treated with *Bacillus subtilis* M-1 increased significantly in comparison with parent strain in 1.6 and 1.3 times, respectively.

Keywords : chemical mutagenesis, germination, kidney bean, plant growth promoting rhizobacteria (PGPR)

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