



IN VITRO AND IN VIVO EVALUATION OF PGPR-ACTIVITIES OF NEWLY ISOLATED RHIZOSPHERE STRAINS

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Introduction

In the last two decades various plant-growth promoting rhizobacteria (PGPR) strains have been known to play an essential role improving crop production. There is growing interest in the use of root-colonizing, plant growth-promoting rhizobacteria (PGPR) as supplements or alternatives to the use of chemicals to increase crop productivity in agriculture. Strains of genus *Bacillus* have the potential to increase growth and/or yields of different crops. Crop yield increases because PGPR can be as high as 57%, depending on the crop.

Material and Methods

A germination test was performed to establish the biological effect of four newly isolated rhizosphere strains *Bacillus subtilis* (M1, SZ1, SZ2 and AZ5) in different concentrations on the growth and development of seeds of *Lactuca sativa* (lettuce) and *Lycopersicon lycopersicum* (tomato). The effect of cell-free supernatants (CFS) from newly isolated strains of the genus *Bacillus* has been studied.

Results

Morphology of single colonies of isolated strains

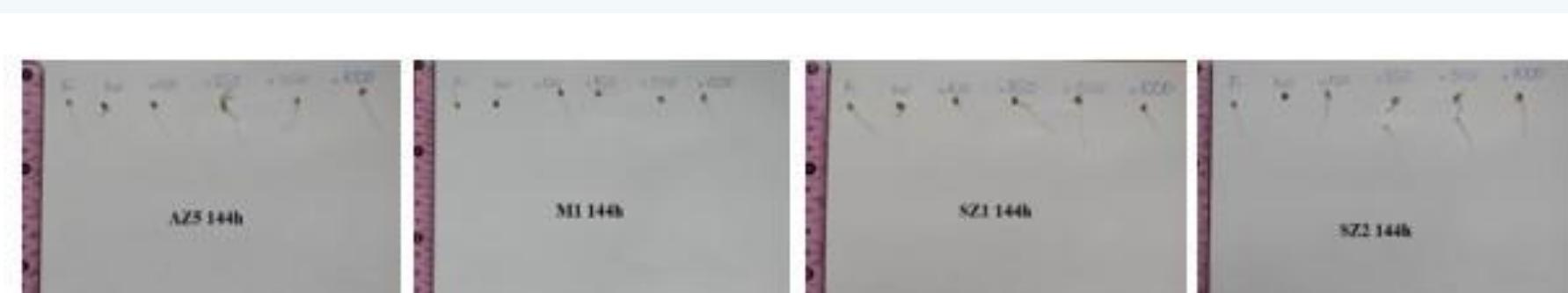


The strains isolated from different regions in Bulgaria were identified from genus *Bacillus* by classical phenotypic techniques and 16S rDNA sequence analysis.

Test results of 144-hour cell-free supernatant on *Lactuca sativa* seeds

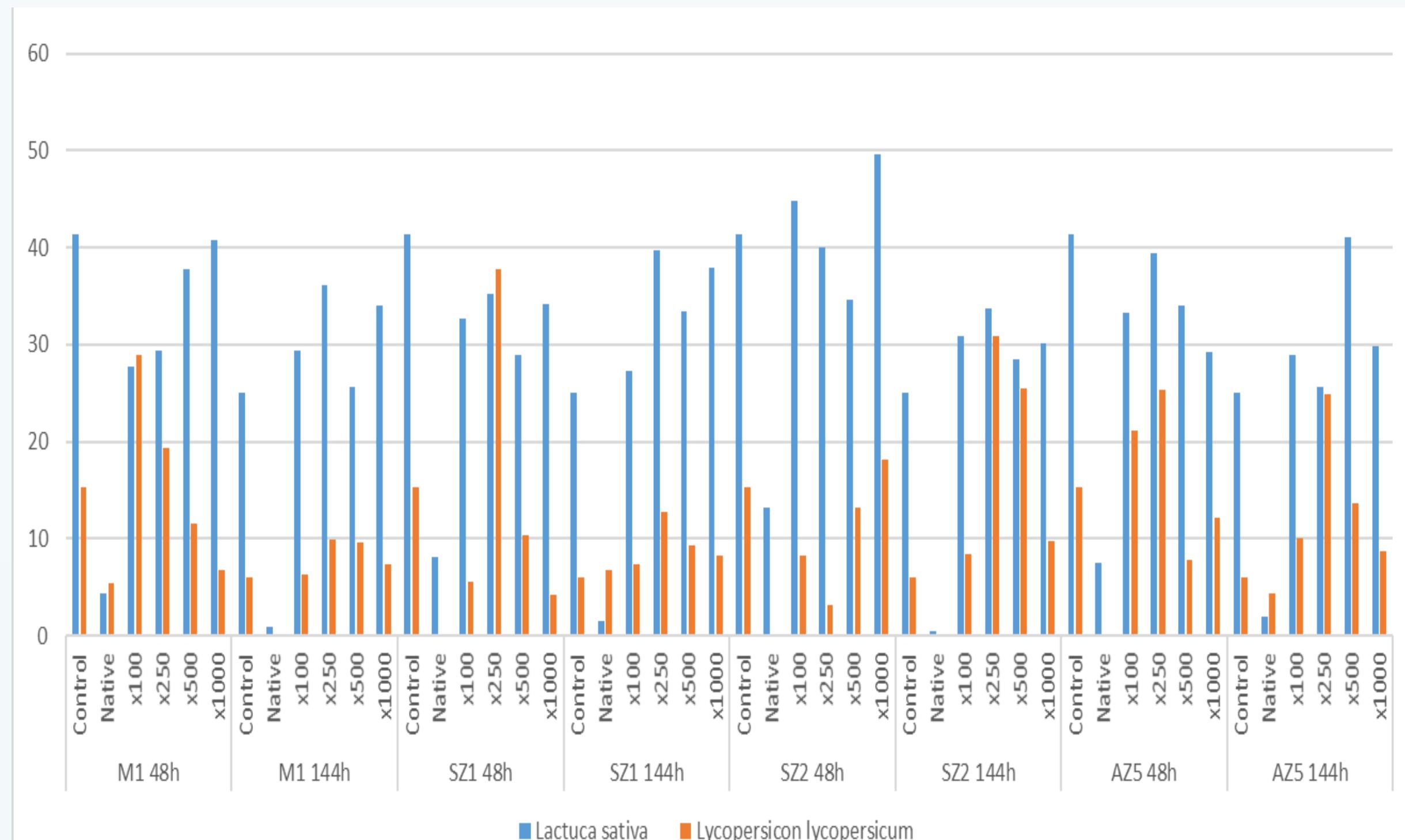


Test results of 144-hour cell-free supernatant on *Lycopersicon lycopersicum* seeds



The cell-free supernatants of strains *B. subtilis* AZ5, *B. subtilis* SZ1, *B. subtilis* SZ2 and *B. subtilis* M1 have a clear effect on the treated tomato and lettuce seeds, which clearly follows the "dose-effect" pattern.

Germination test of lettuce and tomato seeds



A 144-hour cell-free supernatant of *Bacillus subtilis* (M1, SZ1, SZ2 and AZ5) strains was found to show a positive effect with about a 30% increase the length of the root in lettuce seed germination test compared to control variants. In all four used CFS of the bacterial strains, more than 35% positive effect was observed on the length of the root in germination seeds test of tomato compared to the control variant treated with water.

Conclusion

From the data obtained it can be concluded that the tested strains from genus *Bacillus* have the potential to be applied as components of biological fertilizers aiming to increase the bioproduction.

Acknowledgements