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73. Metabolites of Pseudomonas aureofaciens H16 and Bacillus megaterium PC2 increase draught resistance of spring wheat

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Cell-free lyzates of rhizosphere bacteria Pseudomonas aureofaciens H16 and Bacillus megaterium PC2 are major components of Albit product developed for use in agricultural practice for plant growth promotion and induction of immunity. In this work, we studied the influence of these bacteria upon an practically important feature of agricultural plants, their draught resistance.

Lyzates of bacterial biomass were prepared from $10^{10}$ cells/ml stationary phase cultures of P. aureofaciens and B. megaterium (ratio of strains 1:3). Spring wheat was treated with the product (diluted 1:2000) by pre-sowing soaking and foliar spray in the stage of tillering. Wheat was grown in greenhouse pots. 10 days after the foliar treatment, one half of the plants were subjected to week-long draught, following which the draught resistance was determined.

Treatment with bacterial lyzates increased water content in plant leaves (average by 4.3 absolute % of humidity). Heat resistance was also increased by 34 % against untreated plants. The rate of transpiration was decreased by 31-55 % depending on the day of measurement which enabled the plants to spend less water. Water retention ability was promoted by the lyzate both under draught (by 28 %) and watering conditions (by 4 %). Hence, draught resistance was promoted in treated variants according to all resistance parameters studied.

The mechanisms of draught resistance stimulation by metabolites of P. aureofaciens and B. megaterium are subject of further study. Salicylate, which is a key regulatory compound of plant immunity, as well as other phenolcarbon acids such as mandelic and gallic were found in high concentrations in the lyzates tested and are supposed to contribute to the induction of draught resistance.