

Proceeding Paper

Assessment of the Effect of Outer Membrane Vesicles of Endophytic Bacteria on the Growth and Physiological Response of *Arabidopsis thaliana* [†]

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The world faces a challenge to produce a sufficient amount of food for the constantly growing human population in a sustainable manner. It means the usage of pesticides and fertilizers with minimized adverse effects on the environment and wide application of the beneficial microorganisms. Bacteria produce outer membrane vesicles (OMVs) that might affect plant development.

The aim of the study was to evaluate the impact of OMVs on the *Arabidopsis thaliana* condition. The experiments were conducted with endophytic bacteria. To obtain OMVs the specific protocols for their isolation have been developed. OMVs morphology, size and surface charge were performed with the use of SEM, TEM. OMVs were added on the surface of sterilized seeds of *A. thaliana* that were grown on Murashige and Skoog agar medium for 14–21 days. To assess the impact of OMVs on plants the rate of seeds germination, the biomass and length of shoots and roots were measured. Moreover, the level of oxidative stress and activity of antioxidant enzymes in plants were evaluated.

Experiments conducted so far have shown that OMVs produced by tested strains had great ability to induce the germination and growth of seedlings. The OMVs originated from the tested bacteria differently influenced the length of plant roots. *Serratia* sp. OMVs inhibited the growth of *A. thaliana* seedlings whereas OMVs released by *Pseudomonas* sp. stimulated it. Furthermore, OMVs produced by both bacterial strains had a great effect on the activity of plant oxidative enzymes.

The knowledge on plant response to OMVs is limited. Therefore, the preliminary studies seem to be important to obtain knowledge that may be applicable in the development of the new natural compounds used as plant growth stimulators.

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