PhD. Thesis Title

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Abstract

The plant growth promoting (PGP) bacteria are able to fix atmospheric nitrogen, to transform the phosphorus into plant available form, capable to produce different plant hormones and exopolysaccharides, and also have the ability to inhibate the growth of plant patogens. The PGP rhizobacteria, beside plant growth promoting potential, activate the plant induced systemic resistance. Bacterial strains capable of maintaining their PGP properties in different conditions are important for sustainable crop production, as they contribute to increasing productivity even in case of environmental stress.

The aim of the present research was to isolate bacterial strains from different types of silage (grass, alfalfa, maize) with structural carbohydrate degrading capacity, which was the first selection phase. The selected isolates were identified with sequencing, then the bacterial strains were examined for different PGP properties: structural carbohydrate capacity, organic and inorganic phosporus mobilization, indole-3-acetic acid production and antagonistic capacity.

These bacterial strains were isolated on selective agar medium that contained only one structural carbohydrate (cellulose, xylan, carboxymethyl cellulose) as carbon source. Among the analyzed bacterial isolates (190 bacterial isolates) 55 strains were identified using 16S rDNA sequence analysis. The identified bacterial strains selected as having structural polysaccharide degrading potential from different types of fermented feed belong to the genera: *Arthrobacter* sp., *Micrococcus* sp., *Paenibacillus* sp., *Strenotrophomonas* sp., *Bacillus* sp. and *Weissella* sp. They were also tested for several plant growth promoting traits.

Following the PGP traits and antagonism tests the bacterial strains were selected for second time, with the goal to use the most prominent bacterial strains in plant experiments. The aim of plant experiments was to determine the effect of these selected strains on plant growth, physiology, as well as on the antioxidative response of plants.