Enrichment of IncP-1 plasmid carrying bacteria in the rhizosphere of lettuce and tomato – is there a fitness advantage?

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Plasmids can offer bacteria a wealth of accessory functions enabling the survival and adaptation of a population in heterogeneous conditions or under environmental stresses. IncP-1 plasmids belong to the group of broad host range plasmids which are of great interest due to their ability to shuttle between different members of bacterial communities under various conditions. Furthermore, the plasmids can replicate in a wide range of hosts. This plasmid group was detected in different environments such as sewage, soils and river sediments and its abundance seemed to be correlated with pollutants. They have a conserved plasmid backbone containing e.g. the *korB* gene which is specific for this plasmid group and is used for the detection of IncP-1 plasmids. The backbone contains also hot spots of insertion where accessory elements can be inserted. IncP-1 plasmids can carry multiple antibiotic resistances and could easily enter the food chain via plant-associated bacteria.

An enrichment of IncP-1 plasmids in soil is often found in response to pollution, like the application of manure containing antibiotics. Recently, an enrichment of IncP-1 plasmids could also be shown in the rhizosphere of lettuce plants grown in untreated soil. The result based on the quantification of *korB* in total community DNA and was compared to bulk soil. The enrichment of IncP-1 plasmids in the rhizosphere compared to bulk soil is plant species dependent which could be shown in another study investigating the rhizosphere of tomato and potato. The abundance of IncP-1 plasmids was higher in the rhizosphere of tomato compared to bulk soil, but not in potato rhizosphere.

To further investigate the unexpected high abundance in the lettuce rhizosphere, IncP-1 plasmids were captured from rhizosphere bacteria in a triparental mating using their ability to mobilize an IncQ plasmid. The majority of the transconjugants obtained belonged to the IncP-1β subgroup.

In current experiments, competition experiments are performed to analyze the potential fitness advantage of *Pseudomonas putida* in the rhizosphere given by the plasmids. Therefore, different *P. putida* transconjugants are inoculated together with a non-plasmid bearing strain in a 50/50 ratio into DS soil with lettuce and tomato plants. Rhizosphere samples are taken using the Stomacher method by which the soil directly attaching the root can be washed off. The samples are used for CFU counts and total community DNA extraction. Quantification of *korB* is done by taqman qPCR to analyze a potential enrichment in non-inoculated plants. First results will be presented at the conference.