

BENEFICIAL BACTERIA COMMUNITIES FROM THE TOMATO SEED AND ROOT ENDOSPHERE

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Microbial inoculants have the potential to reduce the use chemicals such as pesticides and fertilizers which makes them important in developing sustainable agricultural practices. Among these micro-organisms associated to plants ‘endophytes’ reside inside the plants without obvious negative effects on the host, contributing to their growth and development and the ability to adapt to adverse conditions. There is a growing interest in endophytic bacteria due to their potential use as microbial inoculants. Bacterial endophytes may be horizontally acquired from the environment or could be vertically transmitted from seeds. In this study we analysed the bacterial communities of tomato endosphere with cultivable and non-cultivable methods. Proteobacteria was the most representative taxon in the endosphere of seeds (43%), roots of nursery plantlets (70%) and roots of plants at the flowering stage after transplanting in agricultural soil (50%) or in coconut fiber (50%). Other representative phyla were Actinobacteria (up to 20% in the seeds), Firmicutes, and Bacteroidetes. Verrucomicrobia, Chloroflexi, and Planctomycetes were mostly found in all samples at different concentrations. Amongst Proteobacteria Ochrobactrum was the most abundant taxon in seeds and Enterobacter in root-tomato plant growth in nursery. Bacillus was the most abundant genus of the Firmicutes. Rhodococcus were the most representative Actinobacteria in all samples except for the endosphere of plants grown soilless where Streptomyces was predominant. Pseudomonadaceae were found in all samples including several Pseudomonas OTUs. We characterised 82 endophytic isolates from the cultivable bacterial population. The isolates could show one more beneficial trait, namely siderophore production, phosphate solubilisation, aminocyclopropane-1-carboxylate (ACC) deaminase activity, HCN production, and salt tolerance. The 29% of the isolates showed antagonistic activity against all the tomato pathogens tested, *Clavibacter michiganensis* pv. *michiganensis*, *Pseudomonas syringae* pv. *tomato*, *P. corrugata* and *Xanthomonas euvesicatoria* pv. *perforans* and *Fusarium oxysporum* f. sp. *lycopersici*.