



PhD project title: Use of microorganisms in peat-free and peat-reduced substrates.

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Abstract: The PhD project explores intricate interactions among microorganisms, addressing key challenges associated with nitrogen immobilization, and endeavors to optimize plant growth in cultivation systems that use minimal or no peat. The project aims to promote a comprehensive understanding of microbial dynamics, their implications for substrate quality, and their additive and synergistic effects on plant performances. The project involves the thorough characterization of single microorganisms. This encompasses an in-depth analysis of their properties, behaviors, and potential benefits for horticultural applications. The choice of different substrates is also a crucial component, with researchers seeking to uncover the implications of various growing media on the performance of microorganisms and the overall health of cultivated plants. Furthermore, the research extends to the assessment of the effects of single and combinations of microorganisms on the plant microbiome. This should increase our understanding of how the introduction of beneficial microorganisms influences the community of plant-associated microbiota. The ultimate objective is to develop sustainable cultivation systems that not only reduce or eliminate the use of peat but also enhance overall plant health and productivity.

Beyond its immediate practical applications, the project will significantly contribute to our knowledge of microbial communication in the realm of sustainable horticulture. By delving into the intricate web of interactions between microorganisms, plants, and growing media, the research deepens our theoretical understanding of processes in the rhizosphere. This, in turn, facilitates the development of practical solutions for more environmentally responsible horticultural practices, thereby paving the way for sustainable plant production systems.

The PhD project is embedded in a collaborative initiative, spearheaded by the ToPGa* project consortium and is therefore not only supervised by Prof. Dr. Philipp Franken, an expert in root-colonizing fungi, but also by Dr. Adam Schikora, head of the research group Plant-Bacterial Interactions at the Julius Kühn Institute in Braunschweig. This combined expertise will help to develop strategies and approaches to formulate and analyze microbial consortia for application in peat-free substrates.

*TopGa: Entwicklung und Bewertung von torf reduzierten Produktionssystemen im Gartenbau