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Life Sciences und
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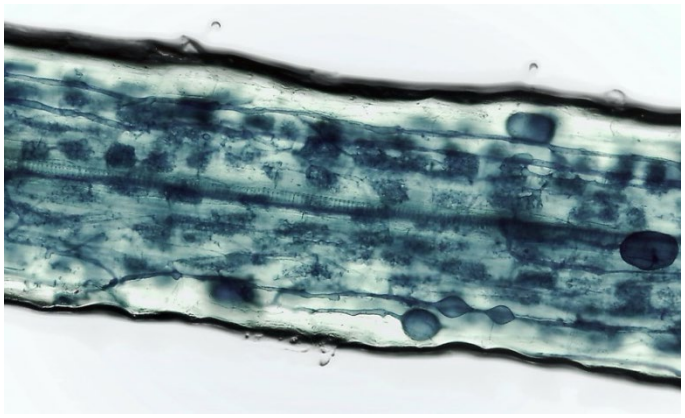
Sustainable food production with biostimulants

Testing the effects of arbuscular mycorrhizal fungus *R. irregulare* and the bacteria *B. amyloliquefaciens* on plant growth and disease resistance



The soil beneath our feet holds a complex network of microorganisms that influence each other as well as the plants that grow in the soil. Promoting these soil communities offers new opportunities to create sustainable agricultural systems. Through their fungal network arbuscular mycorrhizal fungi (AMF) provide additional nutrients from the soil to plants. Hence, they represent a natural soil nutrient resource with the potential to reduce external fertilizer inputs in the future. The AMF *Rhizoglomus irregulare* and the bacterium *Bacillus amyloliquefaciens* are two biostimulants that associate with roots of many important agricultural crops.

In this study three field trials were carried out with the crops celery, celery root and root parsley, on three vegetable farms with organic and demeter management. The effect of the two biostimulants *R. irregulare* and *B. amyloliquefaciens* inoculated alone or in combination, on yield performance and disease suppression was evaluated by measuring the plant weight, colonization rate by the inoculated fungus in plant roots, plant nutrient concentrations and disease infection rates.

A positive effect of the inoculation with *R. irregulare* on plant growth was found in root parsley with a significant yield increase of 31 %. In celery and root parsley both inoculated and control plants showed high colonization levels, indicating that in these soils the occurrence of native AMF was already high. The crop celery root showed a significant increase in arbuscular root colonization. No significant positive effects of *B. amyloliquefaciens* on plant growth, as well as of both biostimulants on disease suppression were found.

The yield increase by *R. irregulare* inoculation in root parsley was not reflected in a higher colonization rate by AMF in the roots. However, analysis of the nutrient concentrations of the experimental plants shows, that inoculated plants presented significantly higher uptakes of N, P, C, Mg and Ca. It is assumed that the inoculated AM-fungus has replaced the native AM-fungi in

the root. In the future, molecular methods present promising tools to investigate the arbuscular mycorrhizal root colonization at species level and therefore, to better understand the influence of inoculated AM- fungi.

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