41-3 - Nachhaltiger Pflanzenschutz gegen parasitäre Nematoden durch Applikation von bakteriellen Biotensiden

Sustainable plant protection against parasitic nematodes via bacterial biosurfactants

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Plant protection against biotic stressors is an essential aspect to yield crops in the required amount and quality. However, more and more conventional plant protection agents are no longer registered due to negative side effects. Nematicides, synthetic pesticides to control plant-parasitic nematodes (PPNs), are almost banned from the German market due to their rather unspecific biocidal activity. Thus, new eco-friendly approaches and means for nematode control are in demand. Our preceding experiments with *Arabidopsis thaliana* and the beet cyst nematode *Heterodera schachtii* in an axenic model system indicated that rhamnolipids (RLs), bacterial secondary metabolites of amphiphilic nature, are very promising candidate compounds for the control of PPNs. These molecules are produced with structural diversity by various bacteria and fill different biological roles including antimicrobial features. The latter was proven for various agriculturally relevant pathogens while the effectivity against PPNs in a system with a crop plant is not yet described. Greenhouse trials with sugar beet confirmed protection against *H. schachtii* to be reproducible under non-sterile conditions with tolerant and suceptible cultivars. The respective efficiency differed among application strategies. A single RL application decreased plant infestation significantly at very low concentrations and this effect was stable for more than one nematode generation. In contrast to the observations made with numerous fungal pathogens, we did not observe a direct lethal impact on *H. schachtii* for the concentrations used in the greenhouse trials. Our results implied that RL-based plant protection against PPNs results from a stimulation of plant immunity further indicated by the pattern of reactive oxygen species of plant tissue in response to RLs. We show that RLs have great potential to contribute to plant protection in agriculture and that they serve as valuable example for a biopesticide with a sustainable mode of production and a safe mode of action.

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41-4 - Evaluate the effect of Paraffin oil as adjuvant on the efficacy of Pelargonic Acid on three perennial weeds

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Intensive inversion tillage and use of herbicides (especially glyphosate) are among the practices which are commonly used to control creeping perennial weeds. In the past few years, there has been a growing interest towards reducing tillage and herbicide usage because of their negative effects on environment. More environmentally friendly alternative methods in weed management including using bio-herbicides are currently investigated. Pelargonic acid occurs naturally in many plants and animals. As a bio-based active ingredient, Pelargonic acid is already used as a broad-spectrum contact herbicide for the control of annual and mossy weeds. In this particular study, we investigated if Paraffin oil as adjuvant can increase the efficacy of Pelargonic Acid on the three creeping perennial weed species creeping thistle (Cirsium arvense), perennial sowthistle (Sonchus arvensis) and quackgrass (Elymus repens).