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# Contribution of *Pseudomonas proradix*® and *Bacillus amilolyquefaciens* FZB42 on Healthy Plant Growth of Tomato Affected by Soil Sickness

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**Abstract**

The use of antagonistic microorganism in biological control of root disease is becoming an important alternative or supplement to chemical pesticides. At present, an increasing number of commercial products based on plant growth promoting rhizobacteria (PGPR) is becoming available world wide. Many of them contain strains of *Pseudomonas* spp., *Bacillus* spp., etc. Some biocontrol strategies have been proposed for controlling root pathogens, but practical applications are still limited. This is largely due to the lack of unequivocal answers to key questions concerning the relationship which the biocontrol agent may establish with the plant, and the mechanisms by which it may directly influence the pathogen or indirectly influence the plant's own resistance. Further, single studies have shown the potential of beneficial rhizobacteria to interact synergistically with indigenous, site specific and adapted arbuscular mycorrhiza fungi (AMF).

Single tomato seeds of two varieties (Money maker and Hellffrucht hillmar) were cultivated in pots containing 50 g substrate (Einheitserde Type P). Then, the two weeks-old seedlings were transplanted to bigger pots containing 1 kg replant disease soils/sand mixture (3:1). Fertilised with 100 N, 50 P, 150 K, 50 Mg, 0,06 Fe mg $kg^{-1}$. *Pseudomonas proradix*® (Sourcon Padena) ($1{,}5 \times 1010$ cfu $l^{-1}$) and *Bacillus amilolyquefaciens* FZB42 (Rhizovital ABiTEP®) ($100\,g\,l^{-1}$) or none of both were applied by root dipping.

Soil inoculation with Proradix® and FZB42 significantly improved the root and shoot biomass production of the two tomato varieties growing on pathogen-infected soil. Roots of both tomato varieties were not only healthier but also showed a significantly higher colonisation by arbuscular mychorriza fungi (AMF), indicating that the AMF infection potential in the soils was not generally low but rather suppressed directly by pathogens or indirectly as consequence of poor root development. The concentration of macro and micronutrients in tomato shoots was higher in the Proradix® and FZB42 treated plants when compared to the untreated control. The result obtained suggest an important role of rhizosphere interactions for the expression of bio-control mechanisms by inoculation with effective Pseudomonas and Bacillus strains independent of simple antagonistic effects.

**Keywords:** *Bacillus*, indigenous AMF, *Pseudomonas*, soil-sickness, tomato

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