Effects of Soil Resetting® on plant available nutrients and suppression to various soil-borne pathogens

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Abstract

Soil Resetting® is a biological soil disinfection (BSD) technology based on the anaerobic digestion of organic, protein-rich soil amendments. The objectives of this research were two-fold: first, the effects on the control effect on the plant pathogenic nematode *Meloidogyne incognita* and on the disease suppressive effect on the plant pathogenic fungus *Pythium aphanidermatum* were investigated. Second, the impact of Soil Resetting® on plant available minerals was evaluated. Three types of commercial amendments were considered: Herbie®20, Herbie®22 and Herbie®25.

Results showed that when using the commercial Herbie® dose (*M. incognita* was reduced to levels below the economic threshold. Subsequently, treated and untreated soil was infested with *P. aphanidermatum* and planted with cucumber seedlings. Results showed a significant decrease in cucumber mortality for the treated soil.

Induction of anaerobic conditions depend on the type of Herbie® applied. While Herbie®20 and Herbie®22 showed high ammonium (NH_4^+) concentrations during anaerobic conditions, levels were quite lower for Herbie®25. After concluding the treatment, ammonium produced by Herbie®20 and Herbie®22 quickly disappeared after the soil became aerobic again, while in the Herbie®25 treatment ammonium production continued. This may suggest a higher decomposition of Herbie®20 and Herbie®22 compared with Herbie®25. Once aerobic conditions returned in soil, N became readily available for plant uptake in the form of nitrate in all three Herbie® products. Plant-available K improved as well, particularly when applying Herbie® 20 and 22 and also microelements appeared to become more available.

We conclude that the different amendments used in Soil Resetting® controls *M. incognita* and increases suppression of *P. aphanidermatum*. Furthermore, Soil Resetting® can promote plant nutrition with respect to N and K. Potential negative side-effects of high ammonium levels on plant development need to be evaluated.