CHLOROPICRIN SOIL FUMIGATION TO RESOLVE SARD IN APPLE TREE MONOCULTURE IN EU

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SUMMARY:
SARD - Specific Apple Replant Disease is a complex of soil pathogenic micro flora and abiotic factors, causing severe damage to root and vascular system of apple trees, effecting tree rooting, growth, vigor and yield.

During 2010/2011, chloropicrin soil fumigation was conducted in order to evaluate its efficiency against a group of pathogens causing SARD. Trials were set up with a commercial formulation of Tripicrin (chloropicrin 94%) at intensive apple tree monoculture areas in Germany, Rheinland-Pfalz and Austria, Steiermark. Soil microflora dynamics were investigated 0, 14, 40 and 180 days after treatment, using a semi selective media, in order to determine the effect of chloropicrin soil fumigation on dynamics of pathogenic populations of fungi and bacteria, as well as their natural antagonistic fungi (*Trichoderma*) and bacteria (*Pseudomonas* and *Bacillus*). Tree growth indicators (stem diameter and crown volume) as well as yield were observed for a 3 year period after treatment.

The data demonstrated that professional targeted fumigation with chloropicrin of soils devoted to intensive apple replant do not induce biological vacuum effects and suppresses the negative effects of replant disease. The most important detrimental effects were observed on *Fusarium* populations, while *Trichoderma*, fluorescent aerobic bacteria and *Bacillus*, enhanced their population density after the fumigation treatment. The data also confirms previous efficacy findings and might explain the increase in aerial and root vigor and plant yield in trees transplanted on fumigated soil.

To conclude, chloropicrin soil fumigation affects both target and non-targeted soil microflora and can be used to create an agronomically beneficial conditions in the rhizosphere for intensive apple tree monoculture.

Keywords: chloropicrin soil fumigation, apple tree monoculture, SARD, biological soil vacuum