



# Vulnerability of Soil Microbiome to Monocropping of Medicinal and Aromatic Plants and Its Restoration Through Intercropping and Organic Amendments

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Cultivation of medicinal and aromatic plants (MAPs) is persistently increasing due to excessive demands of naturals. Agricultural land and its microbial diversity are primarily adapted to conventional crops, and introduction of MAP and their continuous monocropping may disturb the ecological stability of soil microbiome. Here, the effect of cultivation of MAPs on soil microbial diversity was studied. The aim of the study is to examine the effects of cultivation of MAPs on the possible shift in soil microbial diversity and to restore such impacts by using organic amendments or intercropping. Terminal restriction fragments polymorphism (TRFLP) and next-generation sequencing (NGS) studies showed that of the various selected MAPs, maximal modulation in the soil microbial diversity patterns was noticed in fields of *Mentha arvensis* and *Artemisia annua*, and the traces of essential oil/phytochemicals were detected in bulk and rhizospheric soil. In both *Artemisia*- and *Mentha*-cultivated soil, the total operating taxonomic unit (OTU) declined in both bulk and rhizospheric soil in comparison to control (*Zea mays*), but the bacterial richness of *Mentha* soil was slightly higher than that of control. However, cultivation of *Mentha* improved the evenness of the microbial community. The inclusion of crops like *Sesbania* and *Chlorophytum* and the application of vermicompost (VC) enhanced the microbial richness and evenness, thereby restoring the soil microbial state shift and resulting in higher productivity in the continuously *Mentha* cropped field. Our study concludes that long-term cultivation of some MAPs may affect the richness but promote the evenness of microbial diversity. The state shift could be restored to some extent, and crop productivity could be enhanced by the inclusion of selected crops and organic manures in cropping systems.

**Keywords:** medicinal and aromatic plants, rhizosphere, microbial richness, microbial diversity, evenness, state shift