

ASSESSMENT OF SOIL BACTERIAL DIVERSITY IN ORGANIC AND CONVENTIONAL AGROECOSYSTEMS VIA HIGH THROUGHPUT SEQUENCING

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Soil bacterial diversity is a vital regulator of fundamental ecosystem processes. Using synthetic inputs in agriculture alters the microbial community structure and its functional capacity. The alpha diversity of soil measures the species diversity within an ecosystem or area. The Chao1 diversity index measures species richness, and the Shannon diversity index measures species richness and evenness. High throughput sequencing (HTS) is an ideal way to gain information on microbial communities in heterogeneous environments such as soil. This research is intended to compare soil bacterial diversity in organic and conventional farms in different agroecological zones of Sri Lanka by accessing soil metagenome. To this end, the metagenomic sequencing data of the V4 region of the bacterial 16S rDNA extracted from six organic and conventional agricultural lands located in Nuwara Eliya, Mawathagama, and Labuduwa (Wet zone), Makandura and Padiyathalawa (Intermediate zone) and Maha Illuppallama (Dry zone) of Sri Lanka were analysed using the QIIME2 2022.2 (Quantitative Insights into Microbial Ecology) pipeline. Samples were rarefied at a sequencing depth of 15,000, and the alpha diversities (Chao1 and Shannon) were calculated. The Chao1 diversity of the organic fields in Nuwara Eliya, Mawathagama, Labuduwa, Makandura, Padiyathalawa and Maha Illuppallama were 1397.17, 659.37, 594.67, 1025.50, 814.08 and 733.94 respectively and Chao1 diversity of the respective conventional fields were 592.47, 357.83, 1030.51, 762.02, 666.47 and 568.00. The Shannon diversity of the organic fields in Nuwara Eliya, Mawathagama, Labuduwa, Makandura, Padiyathalawa and Maha Illuppallama were 9.13, 8.57, 8.32, 9.20, 8.62 and 8.43 respectively and the Shannon diversity of respective conventional fields were 8.55, 7.72, 8.95, 8.51, 8.49 and 8.22. Except for the farm in Labuduwa, the results showed that organic farms had higher Chao1 and Shannon diversity. Thus, this study suggests that organically cultivated agricultural fields may have more alpha diversity than conventionally cultivated fields.

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