

## Applying Massively Parallel Sequencing to Forensic Soil Bacterial Profiling

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**Abstract :** Soil can often link a person or item to a crime scene, which makes it a valuable evidence in forensic casework. Several techniques have been utilized in forensic soil discrimination in previous studies. Because soil contains a vast number of microbiomes, the analyse of soil microbiomes is expected to be a potential way to characterise soil evidence. In this study, we applied massively parallel sequencing (MPS) to soil bacterial profiling on the Ion Torrent Personal Genome Machine (PGM). Soils from different regions were collected repeatedly. V-region 3 and 4 of Bacterial 16S rRNA gene were detected by MPS. Operational taxonomic units (OTU, 97%) were used to analyse soil bacteria. Several bioinformatics methods (PCoA, NMDS, Metastats, LEfse, and Heatmap) were applied in bacterial profiles. Our results demonstrate that MPS can provide a more detailed picture of the soil microbiomes and the composition of soil bacterial components from different region was individualistic. In conclusion, the utility of soil bacterial profiling via MPS of the 16S rRNA gene has potential value in characterising soil evidences and associating them with their place of origin, which can play an important role in forensic science in the future.

**Keywords :** bacterial profiling, forensic, massively parallel sequencing, soil evidence

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