



MICROBIAL COMMUNITY COMPOSITION OF HOT SPRINGS IN SRI LANKA

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Abstract

Natural flora and fauna are drastically affected by the chemical waste released by the industrial settings. Production of chemical waste can be considerably minimized using microbes. Thermophilic microbes and microbial products can be used as biocatalysts in industrial process, to reduce the usage of chemical catalysts. Hot springs are a vital habitat for thermophilic microbes which can tolerate extreme temperatures. Characterization and identification of microbial community in hot springs provide an initial platform for identification of thermophilic microorganisms useful in biotechnological prospects. In this study, microbial community composition of four hot springs (Madunagala, Mahaoya, Wahava, Kivlegama) was studied through 16s rDNA amplicon sequencing on Illumina MiSeq platform. Samples were collected from hot springs in Southern and Eastern province in Sri Lankaduring May 2018. Resulted sequencing data was analyzed using Mother V. 1.42 software. Temperature, conductivity, pH, and Dissolved Oxygen (DO) levels were measured at the site itself using portable standard meters. The microbial community of the hot springs were mostly comprised with Bacteria and Achaea while Bacteria (99%) were the major component. *Proteobacteria*, *Chloroflexia*, *Firmicutes*, *Actinobacteria*, *Deinococcus-thermus*, and *bacteroidetes* were the major bacterium phyla presence in the hot springs. Unclassified bacteria (3%) were found in all hot springs suggesting that there are some unidentified and novel bacterial species are present in the springs. As expected 7% of the hot spring microbial community was *Deinococcus-thermus* which have ability to produce extremozymes while surviving in extreme environmental conditions. According to the water quality analysis the temperature of the springs were ranged from 33.7°C to 55.4°C where conductivity, pH and DO levels were recorded from 801 to 1507 µS/cm, 7.20 to 8.27 and 1.05 – 3.5 mg/L respectively. The results revealed that hot springs are rich source of thermophilic bacteria which can be used for industrial prospects and further studies are in progress.

Keywords: Hot spring, Microbial Community, Extremophiles, Thermophilic bacteria