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Phylogeny of order Oscillatoriales (cyanobacteria) isolated from Sri Lanka based on 16S rDNA sequence analyses

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Order Oscillatoriales cyanobacteria have gained considerable attention in recent years because of their potential applications in biotechnology. Currently, there are no detailed records concerning the phylogenetic position of the order Oscillatoriales cyanobacteria in Sri Lanka. The objective of the present study was to investigate the phylogenetic affiliation of order Oscillatoriales cyanobacterial species isolated from Sri Lanka, based on their partial 16S rDNA gene sequences. Cyanobacterial cultures were grown in BG11 medium at 28 °C with 16:8-h light dark cycling. Microscopic observations were used to determine the morphological diversity of cyanobacteria isolated from different habitats. Genomic DNA was isolated and purified from 32 cyanobacterial strains using Boom's method and was subjected to DNA amplification with cyanobacterial specific primers. After sequencing, the data obtained in this study were deposited in the National Center for Biotechnology Information (NCBI) database. A neighbour joining (NJ) analysis using MEGA 4.0 was used to illustrate the relationship of partial 16S rDNA gene sequences of isolated cyanobacteria and other cyanobacteria available in the NCBI database.

Microscopic analysis revealed the presence of cyanobacterial genera, *Limnothrix*, *Leptolyngbya* and *Plectonema*. All DNA samples submitted to PCR reactions for the 16S rDNA gene yielded the unique fragment of about 450bp revealing the presence of cyanobacteria in cultures. The phylogenetic tree showed nine distinct clusters and two separate branches of *Limnothrix* DPW8 and *Leptolyngbya* sp. DPFW1. Members of *Leptolyngbya*, *Plectonema* and *Limnothrix* were indistinguishable using morphological analysis alone and each of these groups separated into distinct clusters during phylogenetic analysis. The overall phylogenetic tree generated from order Oscillatoriales sequences, suggested that several very similar morphotypes may be in distinct genera. The differences between morphotypes and genotypes may result from the variation induced during culturing or differential selection may favor the maintenance of different genotypes in the population. Thus, all the morphological characteristics at the genus level were not always significant. The classification of morphologically indistinguishable groups clearly must be done using molecular methods.