

Identification and Characterization of Culturable Nitrogen Fixing Cyanobacteria from Rice Fields in the Wet Zone of Sri Lanka

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Cyanobacteria represent a highly diverse group of prokaryotes that thrive in aquatic ecosystems. Due to their nitrogen-fixing capabilities, cyanobacteria are considered as potential biofertilizers for paddy cultivation. This study aimed to isolate and identify culturable nitrogen fixing cyanobacteria in selected rice fields in the Wet Zone in Sri Lanka. Soil samples (0-10 cm) were collected from 13 paddy fields distributed in Gampaha, Colombo, Kegalle, Kalutara, and Galle districts and seven cyanobacterial species were isolated and characterized using morphological traits. Molecular analysis further confirmed their identities as four unicellular species (*Chroococcus*, *Synechococcus*, *Aphanothece*, *Chroococcidiopsis*) and three filamentous species (*Leptolyngbya*, *Phormidium*, *Anabaena*). Among them, *Chroococcus* and *Phormidium* emerged as the most widespread unicellular and filamentous species in the studied paddy fields. All isolates were successfully cultured and maintained in BG11 medium under controlled conditions (28 ± 2 °C, 100 rpm, 2,000 lx light intensity, and a 16:8 light-dark cycle). Laboratory assays confirmed their nitrogen-fixing potential. In addition, pairwise cross-streak method showed that all seven strains were mutually compatible. The findings highlight the diversity and abundance of cyanobacteria in the Wet Zone paddy soils, and results underscore the potential of the isolates as candidates to develop into biofertilizers through further research.

Keywords: Cyanobacteria, Biofertilizer, Diazotrophs, Paddy soil, Wet zone

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