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AN *IN VITRO* STUDY OF TOTAL CARBOHYDRATES, TOTAL PROTEINS, AND MINERAL CONTENTS OF SOME CYANOBACTERIA ISOLATED FROM SELECTED SALT MARSH AND MANGROVE ENVIRONMENTS OF SRI LANKA FOR NUTRIENT-BASED APPLICATIONS

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Cyanobacteria are photosynthetic prokaryotes with a ubiquitous distribution. They have the ability to produce a broad spectrum of nutritionally important primary and secondary metabolites. Therefore, many nutrient-associated issues like food scarcity and nutrient deficiencies could be successfully addressed with potential cyanobacteria. A few local studies have focused on the cyanobacterial nutrients however, cyanobacteria from saline environments of Sri Lanka are underexplored for their nutrient potential. Thus, this study aimed to investigate the nutrient potential of some cyanobacteria isolated from selected saline environments of Sri Lanka in terms of their total carbohydrates, total proteins, and mineral contents. Fourteen cyanobacterial strains already isolated from selected salt marsh and mangrove environments in Mannar, Sri Lanka, by the Microbiology and Soil Ecosystems Research Project, National Institute of Fundamental Studies (NIFS), were used for the study. The strains were semi-mass cultured in 1/5th strength of BG-11 and GO mineral media providing necessary growth conditions such as pH of 7.5, 2000 lux of light intensity with constant illumination, and 200 rpm shaking conditions. At optimal growth, cyanobacteria biomass was harvested, oven-dried, and grounded into a fine powder. Total carbohydrate and total protein contents of dry biomass were analyzed using Dubois' and Lowry method, respectively. Macro and micronutrients were analyzed using Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). The highest total carbohydrate content of 59.86% was recorded in CYN-1 along with considerably high concentrations of Na (211.88 ppm) and Ca (174.95 ppm). The highest total protein content of 42.77% was recorded from CYN-13. CYN-10-G in the GO medium showed significantly high contents of Ca (228.64 ppm), Mg (65.44 ppm), Fe (33.25 ppm), Zn (3.46 ppm), and Cu (0.997 ppm). The cyanobacteria strains grown in GO and BG-11 showed differences in the carbohydrate and protein profiles showing relatively a high carbohydrate percentage in GO medium along with a high protein percentage in BG-11 medium. Accordingly, strains; CYN-1, CYN-10-G, and CYN-13, were noteworthy compared to previous records of several cyanobacterial nutrient profiles, showing the suitability of the reported cyanobacteria for nutrient-based applications. Moreover, studying such cyanobacteria with a significant nutrient content could also reveal their potential to be applied as biofertilizers to improve soil quality and crop yield.

Keywords: *Cyanobacteria, Nutrients, Saline environments, Mangrove, Saltmarsh*