

Isolation and Characterization of Microalgae Strains from Freshwater in Paraná State, South of Brazil

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Abstract:

Microalgae studies have gained considerable importance due to their potential utilizations as human and animal food, renewable biofuels, high-value bioactives, bioremediation applications, and as nitrogen fixing biofertilizers. Although there are several microalgae collections over the world the isolation of new species is essential for the phycology and also as a source of genetic material for biotechnologists. Thus, the aims in this work were to isolate and to characterize microalgae from several freshwater ecosystems in Paraná State, South of Brazil. As the emphasis in this study is on a culture collection formation, freshwater materials were collected from several environmental samples, including waste stabilization ponds, aquaculture ponds and others. Three standard isolation methods were utilized: filtration; enrichment culture; and streaking cells across agar plates. Microalgae isolates were characterized by using phenotypic characteristics (cultural traits on basal minimal solid medium and cellular characterization) and genotypic characteristics. The basal defined culture medium for autotrophic microorganisms was used to characterize the microalgae isolates obtained based on morphological, physiological and biochemical traits. The presence of chlorophyll a and b (determined from “in vivo” spectra at 435 nm to 645 nm) were tested using acetone or methanol method. The majority of strains obtained are green algae. The majority of strains presented chlorophyll a and b. Two structure of thallus were observed: unicellular and motile and filamentous cells. Several groups with different cultural characteristics were observed. The cell morphology also presented a high diversity. The cell shapes found were spherical, ellipsoid, oval and filamentous. The phenotypic and genotypic characterization of microalgae strains isolated from freshwater revealed high diversity. These strains were deposited at the Culture Collection of Living Microalgae facility of the Laboratory of Soil Microbiology of the Institute Agronomic of Parana State (IAPAR), Brazil and are being maintained in semi-solid mineral medium in thick-walled glass tubes with screw caps and also cryopreserved with methanol at -80oC.

Key words: Green algae, Genotypic characterization, Chlorophyll, Phenotypic characterization, 18S-RFLP