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PROSPECTS OF MICROALGAE BIOREFINERY START-UP IN NORTHEAST INDIA FOR GENERATION OF GREEN ENERGY AND OTHER NOVEL PRODUCTS

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Microalgae have been the immense source of global attraction as a highly potential and promising renewable biomass source of energy, biomitigation and sustainable valuable products. Biotechnological explorations of the underutilized bountiful indigenous algae diversity of NE India, have potentially opened a new avenue for sustainable product development including green energy production. Several microalgae species have been marked as potential source of naturally occurring high valued products such as lipids, vitamins, proteins, carbohydrates, antioxidants, colorants, food supplements and other bioactive molecules. The North East India, apart from being one of the mega biodiversity hotspots in the world, has bestowed upon with vivid freshwater microalgal resources. These diverse bio-resources of the region are yet to be explored to the extent for their potential biotechnological applications. Recent studies carried out are envisaged with the isolation and screening of freshwater biodiesel potential microalgae of the region yielding with the isolation of 24 indigenous freshwater microalgae species, which require further works for possible commercial utilizations and biotechnological applications. Among the isolated microalgae, *Chlorella* sp, *Botryococcus braunii, Ankistrodesmus* sp, *Scenedesmus* sp, *Euglena* sp, *Haematococcus* sp, *Navicula* sp, and *Nitzchia* sp are known to be a few oleaginous microalgae noteworthy for biofuel production. Oil (lipid) contents were quantitatively evaluated in laboratory cultures of isolated A*nkistrodesmus* sp, *B braunii, Scenedesmus* sp, *Chlorella* sp and *Chlorococcum* species. The lipid content of some of the isolated microalgae species grown in normal BG11 medium were found to be in the range between 11.3–42.0% of dry weight. Analysis of the carotenoid contents of the selected native microalgae species also revelled higher content of lutein, lycopene and astaxanthin, which can be produced as other high valued products for additional fund generation during liquid biofuel production. The liquid hydrocarbon producing green microalgae *B braunii* is found to be significant among the isolated microalgae, which exhibited hydrocarbon in the range between 21.9-60.7% of dry weight. Some of these isolated microalgae e.g. *Scenedesmus* sp (8-56% protein; 10-52% carbohydrate), *Chlorella* sp (51-58% protein; 12-26% carbohydrate), *Euglena* sp (39-61% protein; 14-18% carbohydrate and 14-20% lipid) are also reported to contain high percentage of carbohydrate and protein in addition to its moderate to high lipid content, which justify the enough scope for utilization of these species in developing a technology for potential biofuel production and other value added products of commercial potential based on biorefinery approaches.

BIOGRAPHY

Mohan Chandra Kalita has completed his MSc (GAU), PhD (GAU), Postdoc (IARI, New Delhi), FLS (London). He has served as Head (2007-2010), Department of Biotechnology, Gauhati University and Founder Head (i/c) (2009-2014), Department of Bioengineering and Technology, Gauhati University Institute of Science and Technology (GUIST), Gauhati University. Till now he has 49 PhD degrees; and five Post doctorate degrees has been supervised under his guidance. A total of 162 research papers has been published in reputed journals. He also has two granted patents and six filed patents. He has completed 23 research projects of different funding agencies including one international collaboration with University of Rio De Jenerio, Republic of Brazil. (International Collaboration). He has h-index 14 and 527 citations.

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