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Lipidomic profiling: Unveiling a direct route for conversion of polar lipids to neutral lipids in microalgae *Chlorella species* and *Scenedesmus abundans* under nitrogen limited condition

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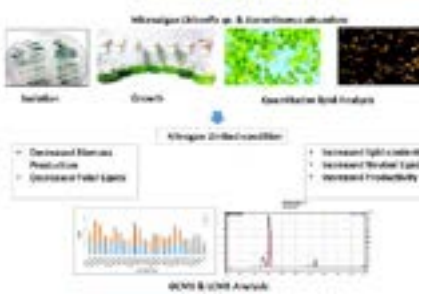
Microalgal strains can accumulate greatly enhanced levels of lipids under nitrogen-deficient condition, making these as one of the most promising sustainable sources for biofuel production. High-grade biofuel production from microalgal biomass could be facilitated by analyzing the lipid content of the microalgae and enumerating its dynamics under varying nutrient conditions. In the present study, a detailed investigation of changes in lipid composition in *Chlorella species* and *Scenedesmus abundans* in response to nitrogen limited condition was performed to provide novel mechanistic insights into the lipidome during stress conditions. The mass spectroscopic approaches mainly LC-MS and GC-MS were employed for lipidomic profiling in both the microalgal strains. The analyses of lipid profiling using LC-MS revealed distinct forms of lipids mainly phospho- and glycolipids, including betaine lipids, and various other forms of lipids in both the microalgal strains. As detected, an overall decrease in polar lipids was observed. However, GC-MS analyses had revealed that the synthesis of the storage lipid i.e. triacylglycerol (TAG) was substantially stimulated in both the strains under nitrogen limited conditions. The changes observed in the overall fatty acid profile were primarily due to the decrease in proportion of polar lipids to TAGs. This study had enabled in analysing a detailed and orchestrated form of lipidomes in two different microalgal strains having potential for biodiesel production.



Biography

Jyoti Singh has her expertise in biochemical and molecular aspects of algae to enhance the lipid production in algae that will further lead to increased biofuel production. She has been working in this area for more than 4 years. She has worked on 'omics' based approaches (transcriptomics and lipidomics) applied to defining whole cell metabolic and regulatory pathways in algae that will further help in increase of biofuel production from algae, moreover, optimize the productive capabilities of algae as a potential biofuels production host. Her demonstrated creativity, adaptability, and abundant enthusiasm explore new and potential molecular targets in algae, which are regulating the increased lipid production in algae to enhance the biofuel production. She has skilled in many biochemical and molecular techniques.

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