

## **Lipidomic Profiling of *Chlorella* sp. and *Scenedesmus abundans* towards Deciphering Phospholipids and Glycolipids under Nitrogen Limited Condition**

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**Abstract :** 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 analysing 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.

**Keywords :** biofuel, GC-MS, LC-MS, lipid, microalgae

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