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The correlation of polar lipids changes with TAG accumulation under nitrogen deprivation in *Nannochloropsis oceanica* based on lipidomics

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Nannochloropsis as one of the ocean microalgal species, has been considered as a promising resource of biodiesel feedstocks because of its capacity of TAG accumulation. TAG biosynthesis has been classified in different pathways. Polar lipids have big contribution for TAG accumulation by providing acyl group or DAG. The quantification and characterization of the contribution in microalgae are still veiled. In this study, there are total 117 polar lipid species covering eight classes (i.e. MGDG, DGDG, SQDG, DGTS, PC, PE, PG, PI) identified by UPLC/Orbitrap and quantified by UPLC/Q-TOF to study the correlation of polar lipids changes with TAG synthesis under nitrogen deprivation condition of *Nannochloropsis oceanica* IMET1. Through comparision of the lipids profiling of polar lipids, we proposed that C18 acyl groups are desaturated while attached to PC. PE and DGTS acts as the carrier of EPA synthesis and the donors of imported DAG to the chloroplast for major MGDG which is eukaryotic-like molecule species. Under nitrogen limitation, the 16:0 acyl chain-containing lipid species in PC and DGTS were increased while 16:1 acyl chain-containing lipid species decreased. Similarly, in PE and DGTS, 18:0, 18:1 acyl chain-containing lipid species in PC and DGTS increased while 18:2 acyl chain-containing lipid species decreased. The changes of lipid species in DGTS, PC and PE further affected photosynthetic membrane lipids profiling. Thus we suggest under nitrogen limitation, the changes in polar lipid are mainly caused by the reduction of palmitic Δ7 desaturase and oleic Δ12 desaturase activity.

Biography

Song Xue PhD, is Professor, Marine Bioengineering Group Leader, Dalian Institute of Chemical Physics, Chinese Academy of Sciences. She completed PhD in Biochemical Engineering in 2003 and was funded by "100 talents plan" of Chinese Academy of Sciences. From 2007 to 2009, she worked at Florida State University as research faculty. She has published papers in Science, *Nature Structural & Molecular Biology, Molecular Cell, Bioresource technology* and so on.

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