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Biodiesel productivity of *Scenedesmus obliquus* under nitrogen starvation in mixotrophic cultivation exceeds the combination of autotrophic and heterotrophic cultivations

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Microalgae oil is a promising feedstock for renewable fuel. In this study, the biodiesel production of *Scenedesmus obliquus* under nitrogen starvation in autotrophic, heterotrophic and mixotrophic cultures was investigated. It was found that both the biomass and biodiesel productivities of mixotrophic algae cells exceed the combination of autotrophic and heterotrophic cells when acetate is adopted as the organic carbon source, and fatty acid methyl ester productivity from mixotrophic culture was 1.64 times greater than from the combination of autotrophic and heterotrophic cultures. Moreover, the fatty acid yield from mixotrophic culture (0.45) was almost two times greater than from heterotrophic culture (0.23). This indicated that *S. obliquus* cells under mixotrophic cultivation convert the assimilated carbon to lipid more effectively than heterotrophic cells. Proteomics analysis revealed that the activity of the TCA cycle was improved in mixotrophic culture when compared with heterotrophic culture, leading to more fatty acid synthesis in *S. obliquus* cells. This study indicates a great potential to recover COD as fatty acids via *S. obliquus*, in which lipid productivity and COD recovery can be significantly improved by combining nitrogen starvation with mixotrophic cultivation.

Biography

Xiao-Fei SHEN is a PhD student at the University of Science and Technology of China. Her group discovered the role of phosphorus on biodiesel production from microalgae under nitrogen starvation conditions. She has pulished three papers in SCI journals.

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