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Review

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# Improving the lipid recovery from wet oleaginous microorganisms using different pretreatment techniques

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**Abstract**

Lipid extraction directly from the wet oleaginous microorganisms for biodiesel production is preferred as it reduces the energy input for traditional processes which require extensive drying of the biomass prior to the extraction. The high water content (≥80% on cell dry weight) in the wet biomass hinders the extraction efficiency due to the mass transfer limitation. This limitation can be overcome by pretreating wet biomass prior to the lipid extraction using pressurized gas that can be used alone or combined with other pretreatments to disrupt the cell wall. In this review, an extensive discussion on different pretreatments and the subsequent lipid extraction using these pretreatments is presented. Furthermore, a detailed account of the cell disruption using pressurized gas (e.g., $CO_2$) treatment for microbial cell lysing is also presented. Finally, a new technique on lipid extraction directly from wet biomass using the combination of pressurized $CO_2$ and microwave pretreatment is proposed.

***Keywords:*** Biofuels, oleaginous microbes, biomass, cell disruption, lipid extraction