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PII: S0960-8524(18)30170-6
DOI: https://doi.org/10.1016/j.biortech.2018.01.148
Reference: BITE 19505

To appear in: *Bioresource Technology*

Received Date: 13 December 2017
Revised Date: 30 January 2018
Accepted Date: 31 January 2018

Please cite this article as: Rivera, E.C., Montalescot, V., Viau, M., Drouin, D., Bourseau, P., Frappart, M., Monteux, C., Couallier, E., Mechanical Cell Disruption of *Parachlorella kessleri* microalgae: impact on lipid fraction composition, *Bioresource Technology* (2018), doi: https://doi.org/10.1016/j.biortech.2018.01.148

MECHANICAL CELL DISRUPTION OF *PARACHLORELLA KESSLERI* MICROALGAE: IMPACT ON LIPID FRACTION COMPOSITION

E. Clavijo Rivera[a], V. Montalescot[a], M. Viau[b], D. Drouin[a], P. Bourseau[a], M. Frappart[a], C. Monteux[c], E. Couallier[a, *]

[a] CNRS, GEPEA, UMR 6144, Université Bretagne Loire, CRTT - 37 boulevard de l'Université - BP 406 - 44602 SAINT NAZAIRE Cedex, France

[b] INRA, BIA, UR 1268, rue de la Géraudière - BP 71627 - 44 316 Nantes Cedex 3, France

[c] CNRS, PPMD – SIMM, UMR 7615, 10 rue Vauquelin - 75231 PARIS Cedex 05, France

* estelle.couallier@univ-nantes.fr

Abstract

Samples of nitrogen-starved *Parachlorella kessleri* containing intact cells (IC), cells ground by bead milling (BM), and cells subjected to high-pressure cell disruption (HPD), together with their supernatants after centrifugation, were compared for granulometry and lipid profiles. The effects of disruption on the lipid profile and organisation were evaluated. The quantity of lipids available for extraction increased with disruption, and up to 81% could be recovered in supernatants after centrifugation, but a marked reorganization occurred. The proportion of amphiphilic free fatty acids and lysophosphatidylcholine increased during disruption due to their release or owing to lipid degradation by enzymes or physical conditions. This effect was more marked in HPD than in BM. Lipids contained in the aqueous phase, after disruption and centrifugation, were enriched in unsaturated fatty acids, BM leading to larger droplets than HPD. The larger liquid lipid droplet would be easier to recover in the following downstream processing.

Key words

Microalgae, bead milling, high-pressure cell disruption, lipids

Highlights

Disruption increases the quantity of extractable lipids.

A large proportion of lipids is recovered in supernatants.

Bead milling yields larger droplets, easier to recover.