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# Modification of lipid profiles in wet biomass of *Chlamydomonas reinhardtii* CC1690 during concentration and storage

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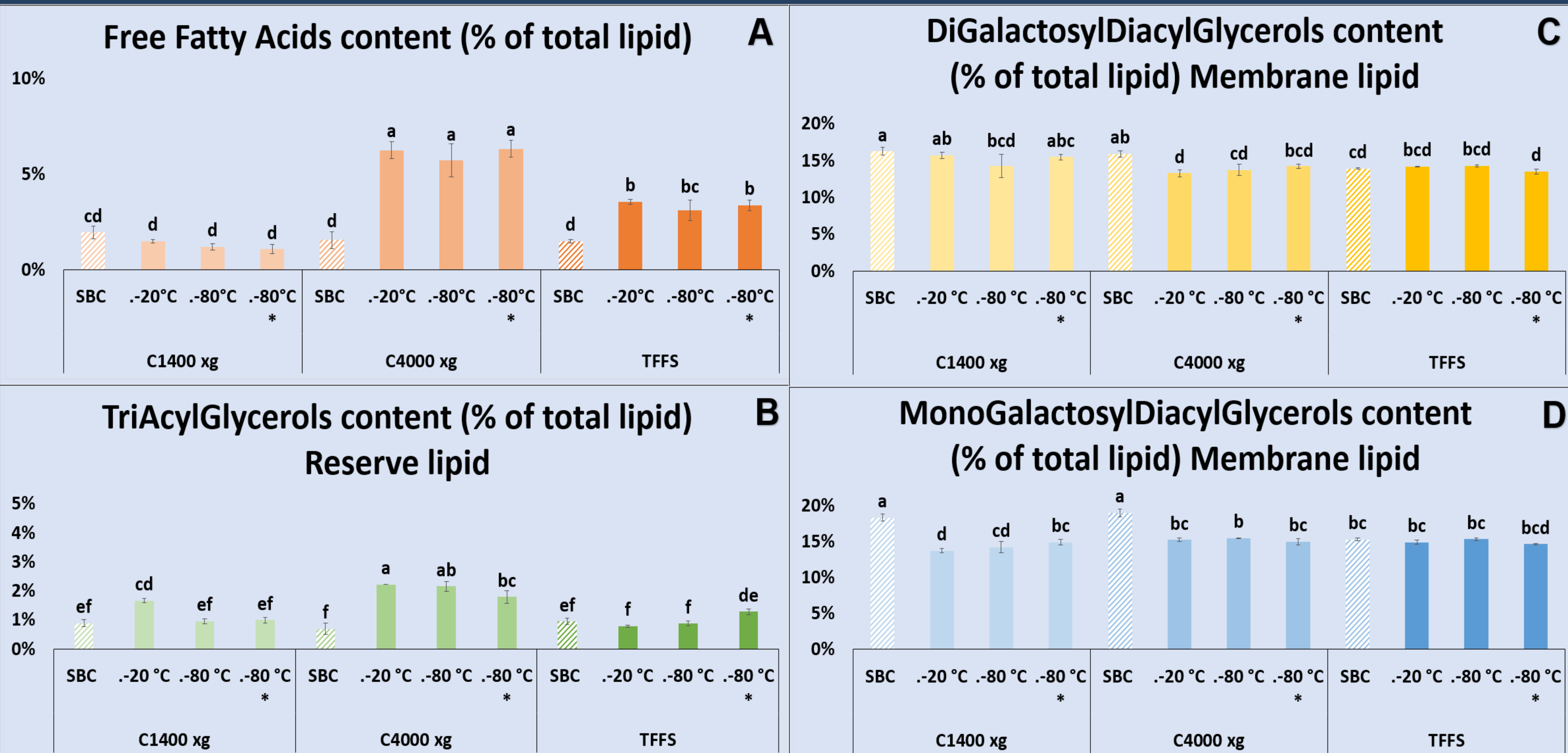
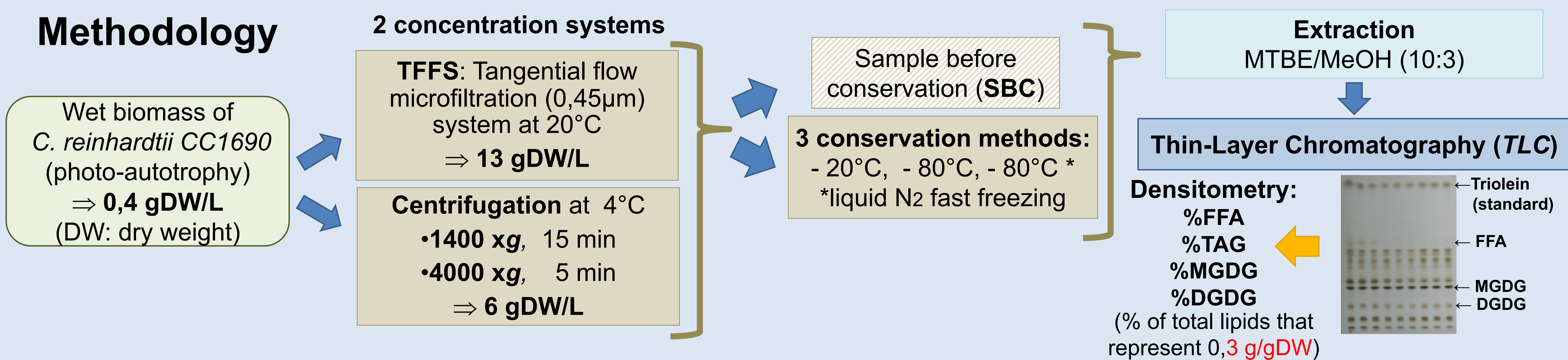
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Microalgae are a promising source of lipids, with applications extending from cosmeceutical and food industry to raw materials for oleochemistry (e.g. for biofuels production). Elimination of initial high water content of the microalgae biomass culture, through concentration and drying, represent the major part of the processing cost. Therefore, nowadays, studies focus on direct extraction and/or transesterification procedures on wet cells. However, during storage of wet biomass, it is known that uncontrolled release of significant amounts of Free Fatty Acid (FFA) can occur.



**Objective:** The main goal of this study was to characterize lipolysis during harvesting and storage of *Chlamydomonas reinhardtii* wet biomass.

## Methodology



**Figure 1:** Variation of Free Fatty Acids, (FFA), TriAcylGlycerols (TAG), DiGalactosylDiacylGlycerols (DGDG) and MonoGalactosylDiacylGlycerols (MGDG) content (expressed as % of the total lipid fraction) in wet *C. reinhardtii* biomass after different concentration methods (C1400 xg: Centrifugation 1400 xg at 4°C during 15 min; C4000 xg: Centrifugation 4000 xg at 4°C during 5 min; TFFS: Tangential flow microfiltration system at 20°C) and before conservation (SBC), and after different storage methods (-20°C; -80°C; -80°C\*: after liquid N2 fast freezing). All extractions were done in triplicate and supported by statistical analysis ( $p \leq 0.05$ , Tukey test). Bars that share letters do not display statistical significant diff

## Results

- ✓ Figure 1A. FFA percentage vary from 2% to 6% of total lipids. The C4000 xg samples show the highest FFA percentage. The C1400 xg method has the lowest FFA percentages, been this method the best option to obtain the minimum FFA. There is no significant difference between the three conservation temperatures in each method.
- ✓ Figure 1B. TAG percentage vary from 0.7% to 2% of total lipids. C4000 xg samples stored at -20°C show a slightly high TAG percentage, been this method the best option to obtain the better TAG yield.

- ✓ Figure 1C. DGDG percentage vary from 13% to 16% of total lipids. The DGDG percentage is slightly high in the samples SBC (C1400 xg and C4000 xg) compared to SBC (TFFS). However, DGDG show a tendency to decrease for all the conservation temperatures by C4000 xg method.
- ✓ Figure 1D. MGDG percentage vary from 14% to 19% of total lipids. The MGDG percentage is higher in the samples SBC (C1400 xg and C4000 xg) compared to SBC (TFFS). However, MGDG show a tendency to decrease for all the conservation temperatures by C1400 xg and C4000 xg methods.

## Conclusion

Concentration and storage methods can influence the lipid profiles of microalgae biomass. There are endogenous lipases activity that can modify this profile; it was observed that lipolysis started immediately after harvesting and continued during storage. Our results show that the