II5. Bioprocess Integration and Intensification

P202. Biocompounds recovery from Spirulina by conventional and ohmic heating methodologies: chemical and biological properties

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Extracting the totality of bio-compounds with industrial interest from Cyanobacterium is often prevented by the intrinsic rigidity of its cell wall. In this sense, the present study focuses on evaluating the influence thermal batch extraction (conventional extraction technologies) and ohmic heating (OH) assisted extraction (considered a greener alternative technology) in blue green microalgae *Arthrospira platensis* (Spirulina) cell disruption for bioactive fractions recovery.

The proximal composition of Spirulina was initially determined. The maximum protein content (i.e., C-Phycocyanin), total carbohydrates (TC) and total phenolic compounds (TPC) extracted in water at different times (30-120 min) and temperatures (30-51 ºC) was quantified after the conventional and OH- assisted extraction. The freeze-thawing process was used as control. The antioxidant activity (i.e., FRAP and DPPH assays) of the obtained extracts was assessed.

Results showed that with the freeze-thawing process, traditionally used for the recovery of bio- compounds from Spirulina, the concentration of C-phycocyanin was approx. 42 mg/g of Spirulina, 26 mgGlcE/g Spirulina of TC and 9 mgGAE/g Spirulina of TPC. Using OH-assisted extraction, the maximum of C-Phycocyanin content obtained was 45 mg/g of Spirulina (obtained at 37 ºC, 30 min), the maximum carbohydrates' content was 40 mgGlcE/g Spirulina and the maximum TPC was 10 mgGAE/g Spirulina. On the other hand, using conventional thermal treatment it can be observed that, under the same conditions, the bioactive compounds recovery decreased to 35 mg/g, 20 mgGlcE/g Spirulina for C-phycocyanin concentration and TC ($p<0.05$), respectively. The concentration in phenolic compounds is not so affected, but even so the ohmic heating potentiates the extraction of these secondary metabolites.

The antioxidant activity of the extracts there was not different between conventional treatments andOH.

Thus, the results indicated that OH is a good alternative to conventional methods aiming at the extraction of intracellular components with a decrease in processing time and energy costs associated with the extraction process, which together with an easy upscale make OH an interesting methodology for use in the industrial production of microalgae colorants and bioactive supplements.