

## Extraction of Phycocyanin from *Spirulina platensis* by Isoelectric Point Precipitation and Salting Out for Scale Up Processes

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**Abstract :** Phycocyanin is a blue pigment protein with fluorescent activity produced by cyanobacteria. It has been recently studied to determine its anticancer, antioxidant and antiinflammatory potential. Since 2014 it was approved as a Generally Recognized As Safe (GRAS) proteic pigment for the food industry. Therefore, phycocyanin shows potential for the food, nutraceutical, pharmaceutical and diagnostics industry. Conventional phycocyanin extraction includes buffer solutions and ammonium sulphate followed by chromatography or ATPS for protein separation. Therefore, further purification steps are time-requiring, energy intensive and not suitable for scale-up processing. This work presents an alternative to conventional methods that also allows large scale application with commercially available equipment. The extraction was performed by exposing the dry biomass to mechanical cavitation and salting out with NaCl to use an edible reagent. Also, isoelectric point precipitation was used by addition of HCl and neutralization with NaOH. The results were measured and compared in phycocyanin concentration, purity and extraction yield. Results showed that the best extraction condition was the extraction by salting out with 0.20 M NaCl after 30 minutes cavitation, with a concentration in the supernatant of 2.22 mg/ml, a purity of 3.28 and recovery from crude extract of 81.27%. Mechanical cavitation presumably increased the solvent-biomass contact, making the crude extract visibly dark blue after centrifugation. Compared to other systems, our process has less purification steps, similar concentrations in the phycocyanin-rich fraction and higher purity. The contaminants present in our process edible NaCl or low pHs that can be neutralized. It also can be adapted to a semi-continuous process with commercially available equipment. This characteristics make this process an appealing alternative for phycocyanin extraction as a pigment for the food industry.

**Keywords :** extraction, phycocyanin, precipitation, scale-up

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