

Process Intensification and Integration for Efficient Downstream Processing of Bioactives from Micro and Macroalgae

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Production aspects (fermentation and cultivation) were well studied and reported in the international literature. However, Downstream Processing (DSP) received scant attention with an assumption that whatever is produced can be isolated and purified. In fact, many of the lab scale processes do not see the light of the day due to high cost of DSP. Algae (micro and macroalgae) are rich natural sources of many important bioactive compounds (proteins, pigments, lipids, carbohydrates, and polyphenols). They are becoming popular post-pandemic owing to their numerous applications in diagnostics, therapeutics, nutraceuticals, and functional foods. Our group has been active in the research area of DSP. Process intensification and integration enable increased productivity and in turn, increase economic viability. The efforts in this direction are presented in the current study. Most of the work is reported on wet algal biomass which is highly perishable, and very few reports are available on dry microalgal biomass. While, practically none found on dry macroalgae. Biomass cultivation requires a lot of space which is a major obstacle for industries especially those located in urban and metropolitan places. On the other hand macroalgae is cultivated in sea water along the coastline making it imperative to have the processing units in its vicinity. Drying of micro and macroalgae alleviates these constraints. In this context, biomass drying increases the shelf life and it also helps in eliminating the significant space requirement for cultivation, benefiting small-scale industries. Therefore, our study focuses on the process intensification and integration for efficient downstream processing of biomolecules from dry micro and macroalgae. All these aspects are discussed in this presentation.