

Microwave-Assisted Alginate Extraction from Portuguese *Saccorhiza polyschides* - Influence of Acid Pretreatment

Authors : Mário Silva, Filipa Gomes, Filipa Oliveira, Simone Morais, Cristina Delerue-Matos

Abstract : Brown seaweeds are abundant in Portuguese coastline and represent an almost unexploited marine economic resource. One of the most common species, easily available for harvesting in the northwest coast, is *Saccorhiza polyschides* grows in the lowest shore and costal rocky reefs. It is almost exclusively used by local farmers as natural fertilizer, but contains a substantial amount of valuable compounds, particularly alginates, natural biopolymers of high interest for many industrial applications. Alginates are natural polysaccharides present in cell walls of brown seaweed, highly biocompatible, with particular properties that make them of high interest for the food, biotechnology, cosmetics and pharmaceutical industries. Conventional extraction processes are based on thermal treatment. They are lengthy and consume high amounts of energy and solvents. In recent years, microwave-assisted extraction (MAE) has shown enormous potential to overcome major drawbacks that outcome from conventional plant material extraction (thermal and/or solvent based) techniques, being also successfully applied to the extraction of agar, fucoidans and alginates. In the present study, acid pretreatment of brown seaweed *Saccorhiza polyschides* for subsequent microwave-assisted extraction (MAE) of alginate was optimized. Seaweeds were collected in Northwest Portuguese coastal waters of the Atlantic Ocean between May and August, 2014. Experimental design was used to assess the effect of temperature and acid pretreatment time in alginate extraction. Response surface methodology allowed the determination of the optimum MAE conditions: 40 mL of HCl 0.1 M per g of dried seaweed with constant stirring at 20°C during 14h. Optimal acid pretreatment conditions have enhanced significantly MAE of alginates from *Saccorhiza polyschides*, thus contributing for the development of a viable, more environmental friendly alternative to conventional processes.

Keywords : acid pretreatment, alginate, brown seaweed, microwave-assisted extraction, response surface methodology

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