ISOLATION AND DEPROTEINATION OF BIOACTIVE POLYSACCHARIDES FROM CRASSOSTREA GIGAS USING SUBCRITICAL WATER

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Abstract

Bivalves are an excellent source of high-quality nutrition in South East Asia as well as other parts of the world and have been used as food products and in traditional Chinese medicinal drugs for centuries. Among them, Crassostrea gigas is the most cultured, nutritious, and delicious species and considered as valuable food resources. C. gigas is rich in protein, minerals, and polysaccharides. In recent years, the water-soluble polysaccharides present in C. gigas have got huge interest due to their various bioactivities. Some of the reported bioactivities of C. gigas polysaccharides (CGP) include immunostimulatory, antioxidant, antimicrobial, antitumor, hepatoprotective and antihypertensive activities. Currently, a number of methods for extraction of polysaccharides from different organisms have been developed, such as hydrogen peroxide (H₂O₂)-assisted, microwave-assisted, and enzymatic-assisted extractions. However, these methods have several drawbacks such as the use of a huge amount of toxic chemicals in the case of H₂O₂ assisted methods and low extraction yield and the high cost of production in the case of enzyme-assisted extraction. Thus an alternative method for recovery of bioactive compounds from different organisms is needed. In recent decades recovery of bio-functional materials using subcritical water extraction (SWE) is getting momentum as a green and environmentally friendly method. SWE offers a number of advantages over other conventional extraction methods due to its temperature tunable properties such as low dielectric constant, high diffusion, low viscosity, and low surface tension which enable subcritical water an excellent solvent for recovery of functional materials. Therefore, the aim of this study is to extract CGP using SWE at various extraction conditions of temperature (100-225°C) and pressures (10-50 bar) and to determine the best extraction conditions that maximize the CGP yield. Moreover, the structural, physicochemical and biological properties of the extracted CGP will be evaluated so as to recommend the possible application of the extract.