

PREPARATION AND INVESTIGATION OF ARTHROSPIRA PLATENSIS EXTRACT ENCAPSULATED IN MODIFIED STARCH USING DIFFERENT TECHNIQUES

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Arthrospira platensis is one of the most significant cultivated microalgae species, recognized for its high protein content (60–70% based on dry weight) and a wide range of bioactive compounds e.g. vitamins, minerals, unsaturated fatty acids especially gamma-linolenic acid [1-2]. *Arthrospira platensis* is renowned for its pharmacological properties, with phycocyanin (pigment-binding protein) being one of the most effective compounds, showing antioxidant, anticancer, antidiabetic, antibiotic and immune-enhancing effects. Sensitivity of phycocyanin is influenced by various factors such as temperature, pH, moisture, light, and oxygen. To mitigate these challenges, several effective methods have been developed to enhance and protect the bioactivity of these compounds. Encapsulation of phycocyanin into various matrices could help improve resistance to environmental factors, prevent interactions with other compounds, and have controlled release in different media. Encapsulated materials could be applied as nutraceuticals, in food industry, also in biomedical products.

In this study, a crude *Arthrospira platensis* extract was obtained by employing freeze-thaw method. A biomass suspended in distilled water was subjected to three freezing (-20 °C, 12 h) and thawing (25 °C, 12 h) cycles, the cell debris were removed by centrifugation at 8000 rpm for 5 min and filtration through a 160 µm glass filter. Obtained liquid extract was frozen and freeze-dried. For the encapsulation of *Arthrospira platensis* extract, firstly aqueous formulations containing 10 % (w/w) of starch sodium octenyl succinate and 1 or 5 % w/w of *Arthrospira platensis* extract were prepared by homogenizing at 12,000 rpm for 5 min. Encapsulated extract in the form of solid particles were obtained utilizing freeze-drying, as well as conventional and nanospray-drying techniques. SEM analysis of encapsulated *Arthrospira platensis* extract was performed. Also, the release of phycocyanins into saliva medium was studied. Moreover, thermal characteristics, antioxidant activity and total phenolic content of the particles were determined and assessed.

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[2] S. Yagoubi, A. Shahidi, F. Mohebbi, et al. Preparation, characterization and evaluation of physicochemical properties of phycocyanin-loaded solid lipid nanoparticles and nanostructured lipid carriers. *Food Measure* 12, 378–385, (2018).