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ABSTRACT BOOK



Sustainable Extraction of Polysaccharides from Grape Byproducts Using Emerging Green Technologies: A Circular Economy Approach

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The efficient management of winemaking by-products, particularly grape pomace, is essential for promoting sustainability and a circular economy. Grape pomace is rich in bioactive compounds, such as polyphenols and polysaccharides, and has applications in the pharmaceutical, food, and cosmetic industries. Polysaccharides (PS) are currently being studied for the extraction of various agro-industrial wastes and their potential applications in the oenological industry. In addition, their technological role as protective colloids in wine provides an interesting tool for their application in the winemaking process. The extraction of these compounds has been carried out over the years using conventional techniques such as solvent, energy, and time. Because of these disadvantages, environmentally friendly extraction techniques are being developed to reduce solvent use and energy consumption. These emerging techniques considered “green techniques” are mainly: supercritical fluid extraction (SFE), accelerated solvent extraction (ASE), microwave assisted extraction (MAE), ultrasound assisted extraction (UAE), pulsed electric field (PEF) and high hydrostatic pressure (HHP) among others. The aim of this work was to study PS extraction from grape pomace using the new emerging ASE, MAE, and UAE technologies under different conditions of time, temperature, and specific extraction parameters. All extractions were carried out with an acid solvent, and after application, the polysaccharides were precipitated with ethanol and then freeze-dried. The extracts obtained were characterized by HPSEC-RID to estimate the polysaccharide content and molecular weight. The results showed statistically significant differences between treatments, suggesting that these methods not only reduce processing time but also provide a sustainable and effective approach for obtaining PS from grape pomace. This study highlights the potential of green extraction strategies to promote by-product valorization in the wine industry.

Keywords: polysaccharides, grape pomace, circular economy

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