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EXPLORING BIOACTIVE COMPOUNDS, NATURAL ANTIOXIDANTS, AND EXTRACTION TECHNIQUES FROM WATERMELON (*CITRULLUS LANATUS*) FOR HEALTH AND FOOD APPLICATIONS

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ABSTRACT

Watermelon (Citrullus lanatus) is a globally cherished fruit celebrated for its succulent sweetness. This article delves into the bioactive potential of watermelon, spotlighting its antioxidant-rich seeds, rind, and skin byproducts. Researchers are increasingly exploring the extraction of natural antioxidants from these byproducts due to their therapeutic potential. Watermelon's vibrant color and robust nutritional profile are attributed to compounds such as lycopene, carotenoids, phenolic compounds, and flavonoids, which act as crucial defenders against oxidative stress and its implications in various diseases. Various extraction methods are discussed, with ultrasound-assisted extraction (UAE) standing out for its efficient cavitation-driven mechanism. The pivotal role of phenolic compounds, particularly flavonoids, in plant antioxidant defense systems is underscored, exploring the distinct contributions of flavonoid and non-flavonoid phenolic compounds to plant health and coloration. Carotenoids like β-carotene and lycopene not only lend watermelon its vivid hues but also offer considerable health benefits. Techniques for evaluating antioxidant capacity, such as the DPPH assay, are explored, along with the application of bioactive natural compounds to enhance the stability of plant-based oils, addressing oxidation-related quality issues. The article also illuminates the potential anti-inflammatory and anti-diabetic properties of cucurbitacins, oxygenated steroidal triterpenes found in watermelon. Various extraction techniques, including maceration, infusion, percolation, and decoction, are briefly explored. In essence, this study highlights the significance of bioactive compounds in promoting human health and improving food quality, contributing to the harnessing of natural compounds from watermelon for health and food applications.