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F2.5. Sustainable extraction of bioactive constituents from pea and pea pod residues

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Pea pod residues are an underutilized agro-industrial resource that contains appreciable levels of biologically active compounds, including phenolics, chlorophylls, and carotenoids. Despite their frequent disposal, these by-products have significant potential for valorization within sustainable production chains. In this study, ultrasound-assisted extraction (UAE) was investigated as a green approach for the recovery of bioactive constituents from dried pea pods. The influence of key extraction parameters, namely ethanol concentration, extraction duration, and solvent-to-solid ratio, was systematically evaluated using statistical optimization tools in order to identify conditions that enhance extraction efficiency. The optimized UAE protocol enabled effective isolation of phenols, chlorophylls, and carotenoids, confirming the suitability of ultrasound treatment for processing plant-derived waste materials. The findings highlight the UAE as a viable and environmentally responsible technique for the valorisation of pea pod waste, supporting its conversion into value-added ingredients for potential use in nutraceutical and functional food applications. Overall, this work underscores the role of optimized green extraction technologies in promoting resource efficiency and integrating agricultural by-products into sustainable biorefinery concepts.

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