

Green Delivery Systems for Fruit Polyphenols

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Abstract : Green solvents are environmentally friendly and greatly improve the sustainability of chemical processes. There is a growing interest in the green extraction of polyphenols from fruits. In this study, we consider three Natural Deep Eutectic Solvents (NADES) systems based on choline chloride as a hydrogen bond acceptor and malic acid, urea, and fructose as hydrogen bond donors. NADES systems were prepared by heating and stirring, ultrasound, and microwave (MW) methods. Sour cherry pomace was used as a natural source of polyphenols. Polyphenol extraction from cherry pomace was performed by ultrasound-assisted extraction and microwave-assisted extraction and compared with conventional heat and stirring method extraction. It was found that MW-assisted preparation of NADES was the fastest, requiring less than 30 s. Also, MW extraction of polyphenols was the most rapid, with less than 5 min necessary for the extract preparation. All three NADES systems were highly efficient for anthocyanin extraction, but the most efficient was the system with malic acid as a hydrogen bond donor (yield of anthocyanin content was enhanced by 62.33% after MW extraction with NADES compared with the conventional solvent).

Keywords : anthocyanins, green extraction, NADES, polyphenols

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