

Past and Present Research Systems of Green Chemistry

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Extraction and purification of bioactive compounds by combining supercritical fluids and ultrasound and on-line coupling with solid-phase extraction

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The increasing importance of extracting and purifying bioactive compounds on a timely fashion and with a lower environmental impact is prompting the development of new techniques and methods. Modern techniques, such as ultrasound-assisted extraction (UAE), supercritical-fluid extraction (SFE) and solid phase extraction (SPE), can provide several advantages in terms of efficiency, speed, selectiveness and solvent consumption over conventional extraction techniques. Furthermore, these techniques can also be combined and are suitable for on-line coupling, allowing the whole process to be performed sequentially and with a high level of automation. In this work it was developed an integrated system based on ultrasound-assisted supercritical fluid extraction (UASFE) coupled on-line with solid-phase extraction. The design of the integrated system allows performing different procedures for the extraction, purification and purification individually (UASFE; SPE) or as a single online process (UASFE-SPE). It is also possible to use different solvents to modify the characteristics of the supercritical fluid and for the elution of retained compound in the solid-phase. The system is currently being explored for the purification of bioactive compounds, including anthocyanins, isoflavones, flavonols and curcuminoids. Results indicate that assisting the SFE process with ultrasound improves extraction efficiency and reduces the amount of solvent necessary to perform the extraction. Additionally, it was possible to increase the concentration of the tested bioactive compounds by coupling UASFE and SPE. Funding from the FAPESP (Project 2013/04304-4) is acknowledged.

Biography

Mauricio A Rostagno has obtained his PhD from University of Cádiz (Spain) and Postdoctoral studies from University of Campinas (UNICAMP) at the School of Food Engineering. He is an Assistant Professor of the School of Applied Sciences of UNICAMP lecturing about food composition and analysis. He has published more than 33 papers in reputed journals, and also edited the book "Natural product extraction: Principles and applications" published by Royal Society of Chemistry.

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