Ultrasonic assisted extraction of Achyrocline satureioides Lam, D.C, (marcela) for enhanced and selective bioactive compound extraction

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Ultrasound Assisted Extraction (UAE) is an emerging sustainable extraction technology which allows to achieve shorter extraction times, reduced organic solvent consumption and lower energy costs in comparison to traditional extraction processes. Application of UAE for revalorization of vegetable material and obtention of enriched bioactive plant extracts is an interesting alternative for this technology.

This work studied UAE to improve aqueous extraction of bioactive compounds from marcela (Achyrocline satureioides Lam.), a native plant from South America. Marcela is rich in flavonols, flavonoids and hydroxycinnamic acids and its extracts could be incorporated in food matrices to increase functional properties and antioxidant potential. It is also consumed as an infusion for the treatment of digestive afflictions and gastrointestinal inflammation. Dried intact marcela inflorescences were extracted using solely water as solvent in an ultrasonic bath, applying 100 and 150 W/L ultrasound power at 40 and 60 °C, respectively. Extraction was followed throughout 30 min by determining antioxidant capacity (AOC) and total polyphenol content (TPC) every 5 min. Extracts were analysed by LC-MS and LC-DAD to identify extracted bioactive compounds and determine the impact of temperature and ultrasound application on compound profile. Traditional solid-liquid extraction at 40 and 60 °C for 30 min were studied as reference extraction methods. UAE extracts were higher in AOC by 140% and 25% at 40 and 60 °C respectively, compared to solid-liquid extraction. For TPC, UAE showed an increase of 110% and 20% at 40 and 60 °C, respectively. LC results indicated that ultrasound application allowed faster and enhanced hydroxycinnamic acids extraction, whereas an increase in temperature resulted in a more diverse compound profile. UAE could be used to extract caffeic acid when applied at 40 °C.