

ULTRASOUND-ASSISTED EXTRACTION OF POLYPHENOLS FROM VEGETABLE RESIDUES

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Abstract: Residues of fruits and vegetables are a source of polyphenols and the literature presents ultrasound-assisted extraction (UAE) of these biomolecules. The UAE is a physical method that comes to the vanguard of the environment safety. The aim of this study was to perform a UAE of polyphenols from a fruit and vegetable residues flour (FVRF) and compare with the hydroalcoholic extraction process. The FVRF was obtained from solid residue of Selecta orange (*Citrus sinensis*), passion fruit (*Passiflora edulis*), watermelon (*Citrullus lanatus*), lettuce (*Lactuca sativa*), courgette (*Cucurbita pepo*), carrot (*Daucus carota*), spinach (*Spinacea oleracea*), mint (*Mentha s.p.*), taro (*Colocasia esculenta*), cucumber (*Cucumis sativus*) and rocket (*Eruca sativa*), derived from processing an isotonic drink. The hydroalcoholic extraction of polyphenols (24h, 40°C, ethanol:water 75:25 as extractor) from FVRF (3.02 ± 0.19mg GAE/g) was previously reported on literature. Two extractions were executed: E1, corresponding to an FVRF water solution (5%, m/v) and E2 were the FVRF water solution (5%, m/v) was added with 125µL of Viscozyme®. Both were exposed to a water bath (30°C/30min) and were continuously sonicated at 20kHz with 500w potency for 8min on UIP1000hdT Ultrasound (Hielscher, Germany). The sonicated solutions were filtered on a paper filter and analyzed on their total polyphenol content by Folin-Ciocalteu method. Total phenolics was 14.41 ± 3.65mg GAE/g FVRF for E1 and 18.82 ± 1.81mg GAE/g FVRF for E2. These results demonstrate that UAE can increase the extraction efficiency in 5x, probably due to a break of biopolymers. The use of Viscozyme® does not contributed significantly on the extraction. These results also show that FVRF has higher nutritional potential than previously reported and that different types of extraction must be applied in order to know its nutritional potential.

Keywords: Physical extraction; Solid-liquid extraction; Methods comparison

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