

## ULTRASOUND-ASSISTED EXTRACTION OF BIOPOLYMERS FROM VEGETABLE SOURCE WITH REUSE OF RESIDUAL SOLUTION

**Pedro Paulo Saldanha Coimbra<sup>1</sup>, Cristina Yoshie Takeiti<sup>2</sup>, Carlos Wanderlei Piler de Carvalho<sup>2</sup>, Flavio de Souza Neves Cardoso<sup>3</sup>, Édira Castello Branco de Andrade Gonçalves<sup>4</sup>**  
(ediracba.analisedealimentos@unirio.br)

<sup>1</sup>Laboratory of Bioactives, Food and Nutrition Post-Graduate Program, Federal University of Rio de Janeiro State, Rio de Janeiro, Brazil;

<sup>2</sup>Department of Food Science, School of Nutrition, Federal University of Rio de Janeiro State, Rio de Janeiro, Brazil;

<sup>3</sup>Empresa Brasileira de Pesquisa Agropecuária – EMBRAPA Agroindústria, Rio de Janeiro, Brazil.

<sup>4</sup>Center of Nutritional Biochemistry, Food and Nutrition Post-Graduate Program, Federal University of Rio de Janeiro State, Rio de Janeiro, Brazil;

Residues of fruits and vegetables are a source of biopolymers and 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 biopolymers from a fruit and vegetable residues flour (FVRF) as well as to apply the residue solution from the FVRF on encapsulation by spray drying. The FVRF is a valuable source of biopolymers (aprox. 80%) and polyphenols (3,02±0,19mg EAG/g). The FVRF was diluted in distilled water, the pH was adjusted to 2,0 with HCl and kept in a water bath (60°C/10min). After that, it was sonicated at 20kHz for 26min, filtered on a paper filter and centrifuged. The supernatant was recovered, ethanol absolute was added in 1:1 proportion and was set on 8±1°C for 16h to precipitation. The precipitated biopolymers and the residual solution (RS) were both recovered. The biopolymers were oven dried at 50°C for 2h. Maltodextrin was added to RS and was spray dried. The microcapsules (RSM) were analyzed on their antioxidant activity by the Folin-Ciocalteu method. The biopolymer yield was 11%, which is in accordance with the literature, but presents a low recovery from FVRF. The microencapsulation yield was 5%, with polyphenol content of 12,9±0,43mg EAG/g of microcapsule, approx. 40% of polyphenols recovery. The polyphenols were concentrated on the microcapsule by the spray drying. Both, the biopolymer and polyphenols, were successfully extracted from FVRF with the UAE. A higher content of polyphenols was extracted by UAE and can be explained by the mechanical stress caused by the ultrasound on the matrix, releasing the polyphenols in the medium. The results demonstrated that a biopolymer extraction from FVRF can be made with UAE, and that the RS has antioxidant potential.

Keywords: Ultrasound-assisted extraction; biopolymers; polyphenols