



***SUSTAINABLE USE OF AGRICULTURAL WASTE: GREEN EXTRACTION
METHODS FOR OBTAINING RESVERATROL FROM PEANUT***

Mirella Thaisa Ferreira Ranzeti^{*1,2}, Gabriela Cremasco², Daniel Rinaldo^{1,2}

mirella.ferreira@unesp.br

1- Instituto de Química, UNESP, Av. Prof. Francisco Degni, 55, Araraquara, SP, Brazil. 2- Green Biotech Network, Faculdade de Ciências, UNESP, Av. Eng. Luís Edmundo Carrijo Coube, 2085, Bauru, SP, Brazil.

Brazil ranks seventh in the world in peanut (*Arachis hypogaea*) production, with the state of São Paulo being the sixth-largest national producer – an activity that, like any agro-industrial chain, generates a significant amount of solid residues, including stems, shells, roots, and other by-products. These residues represent a promising source of bioactive compounds, with resveratrol, a stilbene classified as a secondary metabolite, standing out due to its well-documented anti-inflammatory, antioxidant, and anticancer properties, making it highly attractive to the pharmaceutical, cosmetic, and food industries. In this context, this aims of this study was to develop green and efficient methods for extracting resveratrol from peanut residues, using Natural Deep Eutectic Solvents (NADES) as a sustainable alternative to conventional organic solvents. Three extraction techniques are evaluated: Microwave-Assisted Extraction (MAE), Ultrasound-Assisted Extraction (UAE), and Dynamic Maceration Extraction (DME), each employing eight different NADES at a ratio of 1:20 (peanut residue powder: solvent, w/v). In the preliminary screening with MAE, UAE and DME techniques, the lactic acid/glycerol-based NADES (1:1, mol/mol), with 20% water addition, showed the highest extraction efficiency for resveratrol. The most efficient NADES from each technique were compared with one another and with conventional extraction methods reported in the literature (using methanol and ethanol). The combination of lactic acid/glycerol-based NADES with MAE exhibited the best performance, achieving an extraction efficiency 2 times higher than the NADES used in the other techniques and 2.7 times greater than the conventional solvent-based methods. The results obtained validate the proposed approach, demonstrating the potencial of strategies aligned with principles of Green Chemistry and the Circular Economy. The use of tailored NADES, combined with energy-assisted techniques such as MAE, represents a promising approach for the valorization of agro-industrial residues, contributing to value addition in the peanut production chain.

Keywords: Micro-wave assisted extraction, ultrasound assisted extraction, dynamic maceration extraction, peanut waste, green solvents

