



TITLE: Effect of choline chloride based deep eutectic solvents on extraction kinetic of polyphenols from cocoa (*Theobroma cacao L.*) bean shell.

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ABSTRACT (upto 300 words)

Deep eutectic solvents (DES) are a new generation of solvents which provide several advantages on bioactive compounds extraction. The aim of this work was to analyze in depth the extraction kinetics of total phenolic compounds released from cocoa bean shell (CBS) using choline chloride based deep eutectic solvents. Lactic acid, glycerol and ethylene glycol were used as hydrogen bond acceptor. Physicochemical properties as viscosity, density, pH and FTIR spectrum of solvents and their aqueous dilutions were characterized. Extraction kinetics of total phenolic compounds was modeled by Fick's law equation. Model fit was better for the extraction kinetics of total phenolic compounds in DES with higher percentage of water. Moreover, diffusivity (D_e) increased as water content increased, due to lower viscosity of DES that allows greater mass transfer from the solute to the solvent. Other mechanisms, besides washing/diffusion, influenced the rate of mass transfer when DES were used as solvents. Analysis of chemical composition based on surface

topography determined by scanning electron microscopy corroborated that statement. The DES consisting in choline chloride-lactic acid (1:2 molar ratio) and 50% of water showed the best performance, extracting 114.62 mg/g of total phenolic compounds in 140 min. Antioxidant activity of the extract was 8.94 ± 0.42 mg/g.

BIOGRAPHY (upto 200 words)

Elaine Benítez is a Ph.D. candidate of food engineering program at University of Bio Bio at Republic of Chile. She received a bachelor degree in chemical engineering and a master degree in food engineering at Technological University of Havana, Cuba. She has a large experience on food industry, especially in R&D. Her current field is the application of emerging technologies for obtention of value-added compounds from biosidues. She is interested on bioactive compounds, green methods and circular economy.

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