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Extraction of phenolic compounds from olive pomace by Deep Eutectic Solvents (DESs)

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Olive pomace, alpeorujo, is the single and pollutant by-product generated during the extraction of virgin olive oil, which is a serious environmental problem. Alpeorujo is rich in phenolic compounds, potent natural antioxidants with bioactive activities. Deep Eutectic Solvents (DESs) are emerging solvents due to its versatility and ability to solubilize organic material such as polyphenols. In this work we studied the capacity of DESs to obtain polyphenols from fresh alpeorujo of the Manzanilla cultivar in different extractive conditions. The effect of temperature (25ºC, 40ºC), time (1 h, 24 h) and ratio alpeorujo : solvent (1:1 and 1:2) on the extraction of polyphenols, was analyzed comparing two DESs prepared with Choline Choride-glycerol (EU-1) and Choline Choride-Xylitol (EU-2) with the conventional solvent methanol in aqueous mixtures 80% v/v (C-1), 50% v/v (C-2) and water (C-3). Phenolic extracts were analyzed in HPLC-DAD and HPLC-ESI IT/TOF-MS. Figure 1 shows the sum of phenolic compounds individually quantified and obtained in different conditions. At the two studied temperatures DESs were most extractive than conventional solvents. The use of 40ºC led to significantly more efficient extractions than to 25ºC for DESs and C-1. Comparing the extractive efficiency of eutectic solvents, DES-2 was more extractive than DES-1 at 40°C. We found that 40°C, ratio solvent:alpeorujo (1:1) and 1h of extraction time were the more effective conditions. When phenols were individually analyzed, we denoted that DESs were able to extract mainly phenols of low polarity and bioactive molecules such as oleocanthal, oleacin, others derivatives of ligstroside and oleuropein and the phenylpropanoid verbascoside. In this study, we have determined the highest efficiency of DESs obtaining polyphenols from alpeorujo when compared to conventional solvents. These results propose DESs as efficient and environment-friendly alternative to conventional methanol extraction of bioactive molecules from olive oil waste

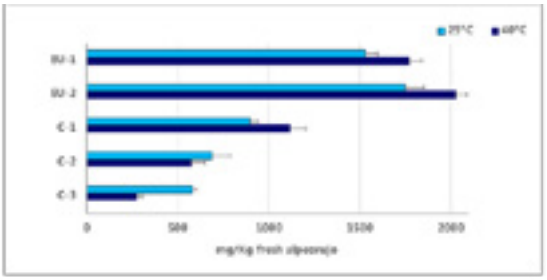

Figure 1: Sum of phenolic compounds extracted with different solvents, EU-1, EU-2, C-1, C-2 and C-3 at 25ºC and 40ºC, ratio solvent : alpeorujo (1:1) and extraction time 1 h. (n=2).

Biography

Aranzazu Garcia Borrego is a Senior Scientist at Instituto de la Grasa, Spanish National Research Council (CSIC), has extensive experience in the extraction and purification of phenolic compounds from virgin olive oil, olive by-products and other plants. She has a wide knowledge in the biological activities of *in vitro* phytochemicals and special interest in strategies that allows the production and use of bioactive substances through environmental friendly techniques and has developed methods for obtaining phytochemicals using green-solvents and is currently involved in the research of new eco-friendly eutectic solvents

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