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BOOK OF ABSTRACTS

XXII Congress

EuroFoodChem

June 14-16, 2023 | Belgrade, Serbia

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POSTER PRESENTATIONS

T8

Novel methods for food chemistry

Green extraction of phenolic compounds and carotenoids from pulp and peel of mango criollo by ultrasound assisted extraction with deep eutectic solvents

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Introduction. New green solvents and innovative extraction technologies (ultrasound, high-pressure processing, microwave, pulsed electric fields, supercritical fluid extraction, etc.) and combination of both are employed to reduce the use of petroleum-based solvents to obtain safer extracts in line to promote green and sustainable process. Deep eutectic solvents (DES) have been studied as promising green alternatives to replace conventional petroleum derived solvents in the extraction of bioactive compounds from agrifood by-products due to their unique physicochemical properties, such as chemical and thermal stability, no flammability, low toxicity, high electrical conductivity, and a good solubilizing capacity for determined compounds (1). Mango (*Mangifera indica*) criollo is found in the northeast region of Argentina. These under commercialized fruits can be exploited as a source of bioactive compounds (2). **Objective**. To evaluate the capacity of different DES combined with ultrasound-assisted extraction (UAE) for the extraction of phenolic and carotenoid compounds from peel and pulp of mango criollo.

Material & Methods. Peel and pulp products from mango criollo harvested in Corrientes (Argentina) were extracted with four DES (ratio1:60 for pulp and 1:30 (w:w) for peel). DES were prepared by mixing the desired molar proportions of HBA and HBD (table 1) under constant agitation at 70±2 °C (3). Ultrasound equipment (500 Watts-20 kHz) with a probe tip of 19 mm and fixed at 60% of amplitude during 5 min was used. A clean-up phase was done with C-18 sep-pack cartridges. Total phenolic compounds (TPC), polyphenolic and carotenoid compounds by HPLC-DAD and antioxidant activity (AA) ($DPPH^{\cdot}$, $ABTS^{\cdot+}$) were determined. Results were compared with conventional extraction (CE) with MeOH/H_2O (80:20) for polyphenolic compounds and diethyl-ether/petroleum ether (1:1) for carotenoids (4 & 5). **Results**. DES-4 values in pulp for total carotenes by HPLC (38.27±6.62 µg/g dw), mainly ß-carotene, corresponded with a 90% of carotene content recovery respect to CE. DES-4 values in pulp for TPC (12.10±1.08 mg GAE/g dw), $DPPH^{\cdot}$ (49.44±3.44 µmol TEAC/g dw) and $ABTS^{\cdot+}$ (64.05±6.16 µmol TEAC/g dw) were 4, 8 and 6 times higher than those found in CE. In peel, DES-4 was also effective for TPC and AA meanwhile DES-2 provided the best results for total carotenoids, mainly ß-carotene and lutein. DES-2 values in peel for total carotenoids (92.03±4.7 µg/g dw) corresponded with 71% of carotenoid content recovery respect to CE. DES-4 value in peel for TPC (23.06±1.22 mg GAE/g dw), $DPPH^{\cdot}$ (241.12±2.01 µmol TEAC/g dw) and $ABTS^{\cdot+}$ (537.99±2.36 µmol TEAC/g dw) were 4, 10 and 22 times higher than those found in CE. **Conclusions**. DES-4 provided good yields for the extraction of both carotenoids and phenolic compounds and antioxidant activity in pulps, but in peel DES-4 provided better results only for TPC and AA and DES-2 for total carotenoid content.

Table 1. Deep eutectic solvents (DES)

	HBA	HBD	Other	Molar ratio	Viscosity-cps
DES-1	β-alanine	DL-Malic acid	H_2O	1:1:3	750 ± 30
DES-2	β-alanine	Citric acid	H_2O	1:1:3	2350 ± 25
DES-3	Choline chloride	Ethylene glycol	----	1:2	150 ± 15
DES-4	Choline chloride	Glycerol	-----	1:2	450 ± 20

HBA, hydrogen bond acceptors; HBD, hydrogen bond donors.

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Acknowledgments: Grant PID2019-107980RB-100 funded by MCIN/AEI/10.13039/501100011033).

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