Department of Preventive Medicine and Public Health, Food Sciencs, Toxicology and Forensic Medicine

The 2nd International Electronic Conference on Foods - "Future Foods and Food Technologies for a Sustainable World"

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NATURAL DEEP EUTECTIC SOLVENTS AS MAIN SOLVENT FOR THE EXTRACTION OF TOTAL POLYPHENOLS OF ORANGE PEEL

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Introduction

Food Industry produces a large amount of food waste → High biological value

- Food industry
- Cosmetic industry

→ **TOTAL POLYPHENOLS CONTENT**

Green Chemistry

Find alternative to organic solvents

II

Ils (Ionic Liquids)

↓

DES (Deep Eutectic Solvents)

↓

NADES (Natural Deep Eutectic Solvents)

The aim of this study is to optimize the extraction procedure for the total polyphenol content (TPC) with NADES.

Materials and Methods

Molar Ratio

Mixed

60-80ºC

NADES (Transparent liquid)

Table 1: Materials and molar ratios of the NADES

Acronym	HBA	HBD	Molar Ratio
ChChl:Fruc	Choline Chloride	Fructose	1.9:1
ChChl:Gly	Choline Chloride	Glycerol	1:2
Bet:CA	Betaine	Citric Acid	1:1
LP:MA	L-Proline	Malic Acid	1:1

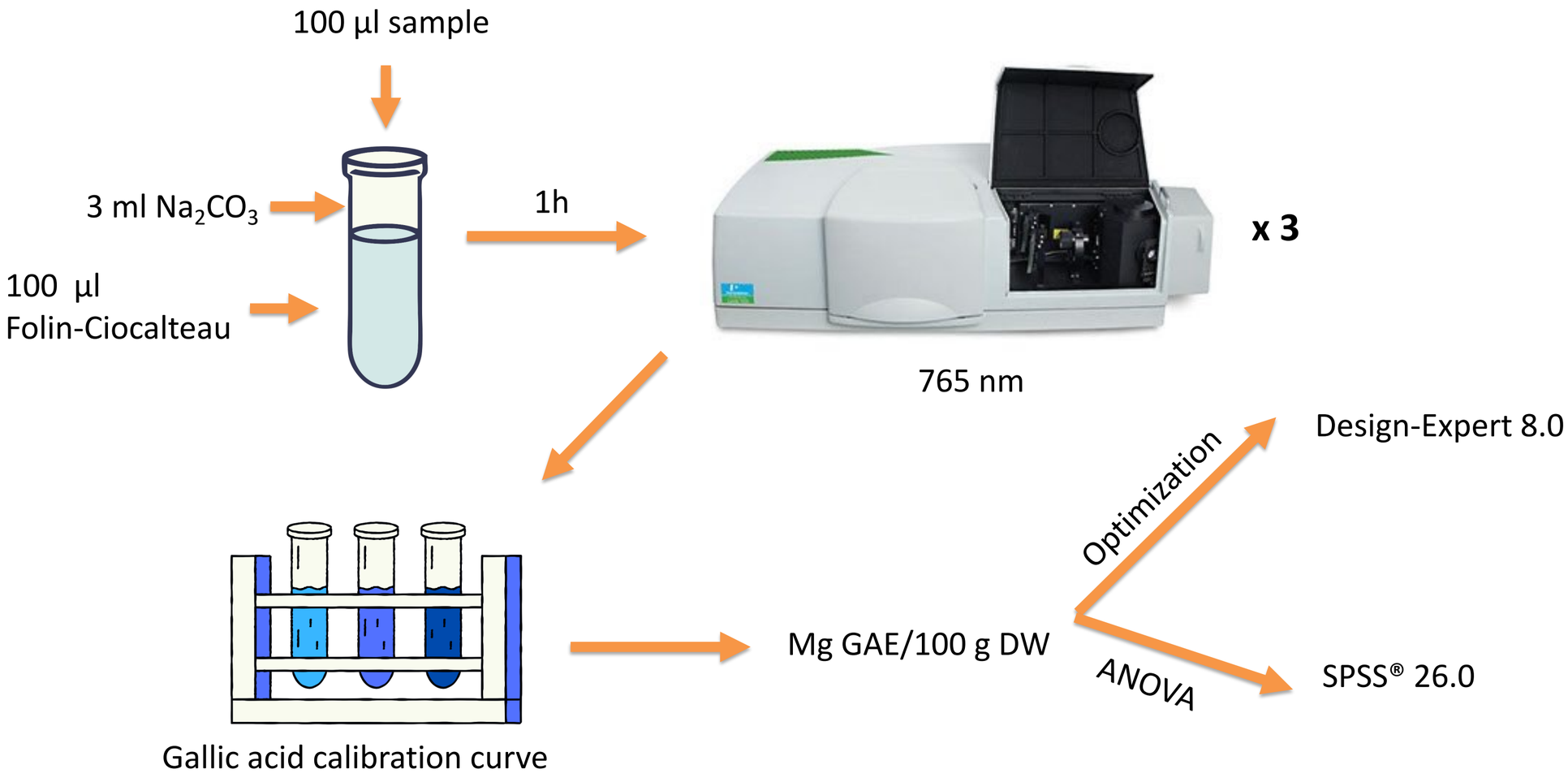
Table 2: Coded levels of independent variables

Independent variable		Level		
		-1	0	+1
Liquid/solid ratio	X_1	5	15	25
NADES (%, v/v)	X_2	10	50	85
Extraction time	X_3	5	15	30

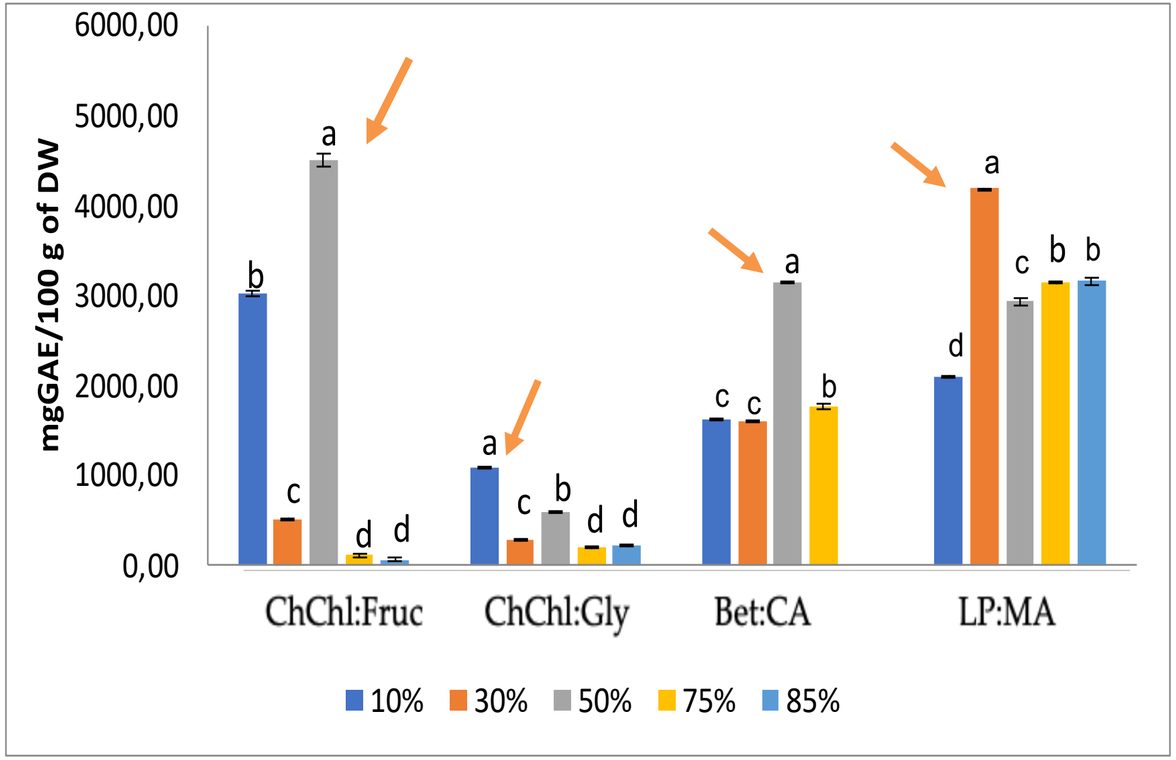
Independent variables of study

Materials and Methods

Determination of total polyphenol content by UV-vis spectroscopy



Results and Discussion



Total phenolic content in NADES extracts with different amount of water. ChChl:Fruc Choline Chloride fructose. ChChl:Gly Choline Chloride Glycerol. Bet:CA Betaine Citric Acid. LP:MA $_{L}$-Proline Malic Acid. a-e: different letters indicate that there are statistically significant differences ($p < 0.05$)

Table 3: Optimum conditions

NADES	RATIO	TIME	MAX	DESIRABILITY
ChChl:Fruc	5.000	30.000	6530.839	0.830
ChChl:Gly	5.234	23.339	1833.512	1.000
Bet:CA	6.000	28.458	3218.766	1.000
L-P:MA	16.689	29.041	5389.107	1.000

Optimum conditions of extraction for TPC

Conclusions

The extraction of total polyphenols content with NADES was viable.

The best percentage of NADES in water was differents for two of the NADES, ChChl:Gly and LP:MA obtained the higher extraction with a high content in water, considering these solvents aqueos solutions, moreover ChChl:Fruc and Bet:CA, both showed the best extraction at 50% (eutectic mixture).

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