Extraction of Active Compounds from Coffee Cherry Husks with Alternative Deep Eutectic Solvent

kanchana.wat@mfu.ac.th

MAE FAH LUANG UNIVERSITY

Leave empty for poster number

Introduction

- Coffee production plays a crucial economic role in Chiang Rai, Thailand. A huge amount of waste including coffee cherry husks (CCHs) which is one of the main by-products.
- CCHs was previously reported that bioactive compounds are significantly present in CCHs (Ribeiro et al., 2013). So, the extracts of active compounds from CCHs are interesting.
- Deep Eutectic Solvents (DESs) are an alternative solvent for green extraction of food and natural products due to their advantages such as non-toxicity and biodegradability.
- The optimal extraction of active compounds from CCHs using DES composed of choline chloride (ChCl) and citric acid monohydrate (CA) called "ChCA" were studied .

Materials/Methods

- DESs or ChCA was prepared by heating ChCl and CA with 1:2 molar ratio, at 80 ° C until it becomes homogeneous.
- The ChCA was characterized by the FTIR. The physical properties of melting point and viscosity were measured using DSC and rheometer, respectively.
- The amount of water additions varied from 20%-50%. The extraction process was assisted with the usage of ultrasound waves at room temperature (30 ° C) for 60 min.
- The extraction efficiency was determined in terms of total phenolic content (TPC), total flavonoid content (TFC) and antioxidant activity (AA) presented in the crude extracts. And compound profile by LC-QTOF.

References:

Ribeiro EF, Luzia DMM, Jorge N (2019) Antioxidant compounds extraction from coffee husks: the influence of solvent type and ultrasound exposure time. Acta Scientiarum. Technology, 41, e36451-e36451.

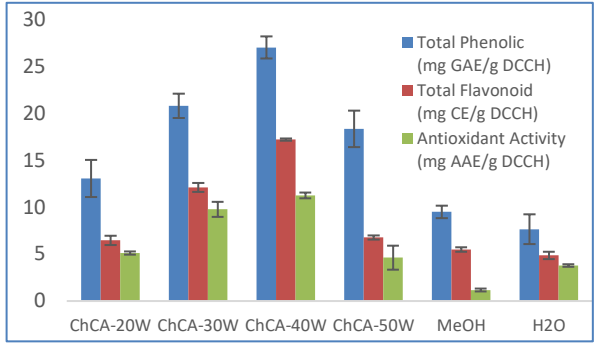

Figure 1: Total phenolic content, total flavonoids, and antioxidant activity in the extracts of dried coffee cherry husk using different solvents (n=3).

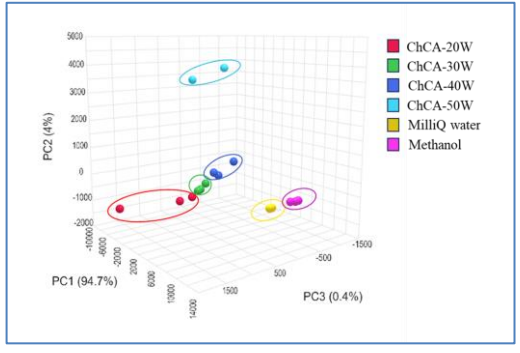

Figure 2: The 3D-scores plot obtained from the PCA according to the compound peak list of the DCCHs crude extracted using different solvents.

Results/Discussion

- The ChCA with 40% by weight water addition is the optimum condition for extraction (Figure 1).
- The levels of TPC, TFC, and AA measured from this condition were found to be 27.00 ± 1.18 mg gallic acid equivalents/g of DCCHs, 17.19 ± 0.12 mg catechin equivalent/g of DCCHs, and 11.24 ± 0.32 mg ascorbic acid equivalent/g of DCCHs.
- A Negative ionization modes (LC-QTOF) is used for the analysis of the phytochemicals extracted from DCCH. A total of 718 compounds significantly differed from other sample groups, and the principal component analysis (PCA) is shown in Figure 2.

Conclusion/Perspectives

- The DES prepared from ChCl and CA with a 1:2 mole ratio mixed with water contents at 40% can be an alternative green solvent for extracting bioactive compounds in DCC.
- Statistical data analysis (PCA) show that some components in crude samples extracted with DES significantly differed from those extracted with methanol and water.
- The DES is green and sustainable extraction method that could be practical for the extraction of active compounds from agricultural wastes.