GREEN EXTRACTION OF PHENOLIC COMPOUNDS FROM *MATRICARIA CHAMOMILLA* L. HERBAL DUST

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INTRODUCTION

Chamomile (*Matricaria chamomilla* L.) is widely recognised for its rich phytochemical profile. During the industrial processing of dried flowers for tea production, herbal dust is generated in considerable quantities. In this study, chamomile herbal dust was investigated as a potential source of phenolic compounds using two green extraction techniques: ultrasound-assisted extraction (UAE) with a sonotrode and subcritical fluid extraction (SBFE). The effects of solvent composition, and process conditions (temperature in SBFE and extraction time in UAE) were evaluated.

METHODS

Total Phenolic Content (TPC)
Folin–Ciocalteu assay → determination of total phenolic content

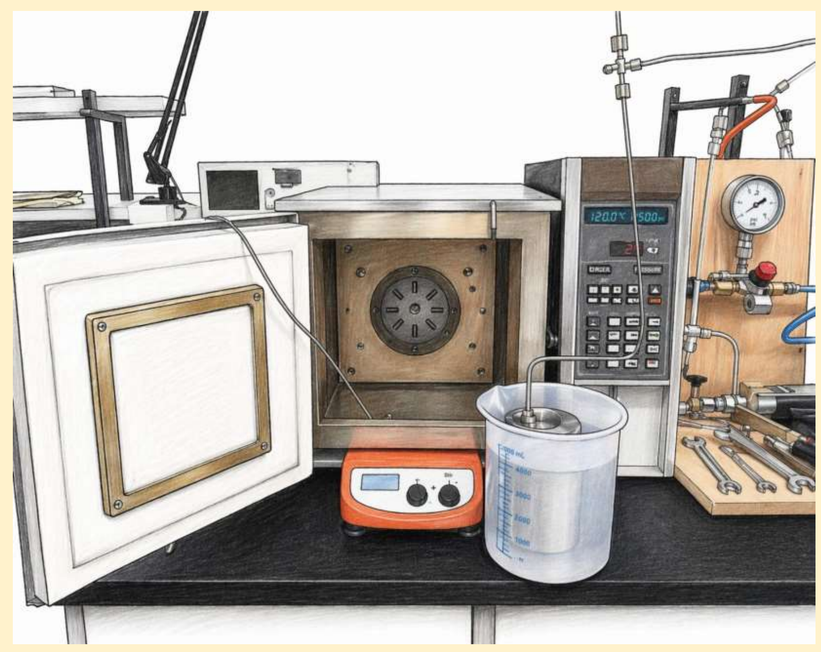
Identification of Individual Phenolic Compounds
LC-ESI-QTOF-MS/MS → qualitative identification based on accurate mass and MS/MS fragmentation patterns

Quantification of Individual Phenolic Compounds
HPLC-PDA → quantitative determination of individual phenolic compounds using calibration curves

96 % ethanol, ethanol–water (50:50, v/v), pure water

Ultrasound-Assisted Extraction (UAE)

Time of extraction:
3 and 10 min

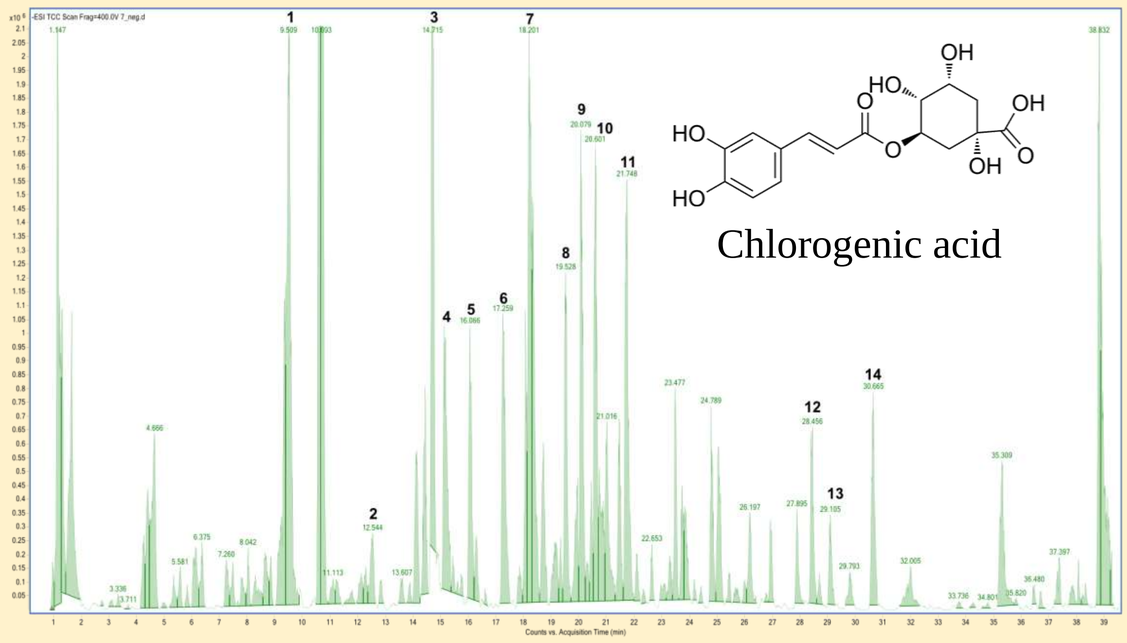


Subcritical Fluids Extraction (SBFE)

Temperature parameters:
120, 140, 160 and 180 °C

RESULTS

The highest TPC was obtained using 50 % (v/v) ethanol in SBFE at 180 °C, reaching 2244.05 mg GAE/L. A total of 14 phenolic compounds were identified, while 6 compounds were successfully quantified. The extracts were characterized by the presence of phenolic acids and flavonoids, with chlorogenic acid, protocatechuic acid, trans-ferulic acid, and quercetin-3-β-D-glucoside among the most abundant compounds. Quercetin-3-β-D-glucoside was not quantified in water extracts obtained by either SBFE or UAE, indicating a strong influence of solvent composition on its recovery.



Chlorogenic acid

LC-MS/MS chromatogram

CONCLUSION

Chamomile herbal dust represents a valuable source of polyphenols, and green extraction with UAE and SBFE offer an efficient way to recover these compounds sustainably.

ACKNOWLEDGEMENT
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