

Characterization of Nutritional and Bioactive Properties of *Coffea canephora* Pulp and Its Aqueous Extract Using Conventional and Ultrasonic Assisted Extraction

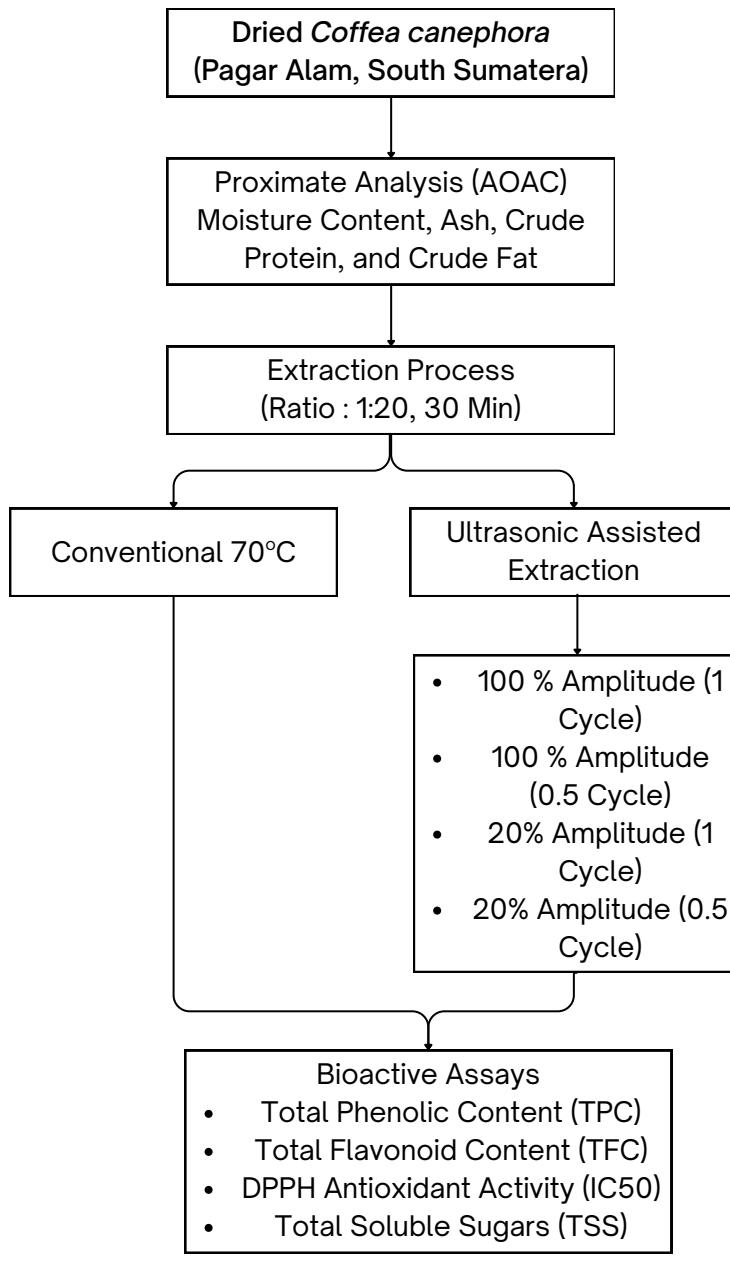
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INTRODUCTION

Coffea canephora coffee pulp is an agro-industrial by-product that remains underutilized despite its potential as a functional food ingredient. It contains phenolics, flavonoids, carbohydrates, and nutrients with possible health-promoting properties. Previous studies have explored the antioxidant and polyphenol content of coffee pulp; however, most research uses Arabica-derived pulp and relies on organic solvents such as ethanol. Comparative studies on water-based extraction and UAE parameters particularly cycle variation remain limited, and nutritional and bioactive characterization is also limited. This study addresses these gaps by evaluating the nutritional and functional properties of Pagar Alam coffee pulp and examining how different ultrasound conditions that influence extraction outcomes using water as a green and potentially halal solvent.

MATERIALS AND METHODS



OBJECTIVE

- Determine the nutritional composition of dried *Coffea canephora* pulp.
- Evaluate phenolic, flavonoid, antioxidant, and soluble sugar contents of aqueous extracts.
- Compare conventional extraction with UAE and assess effects of ultrasound intensity.

SAMPLE COLLECTION

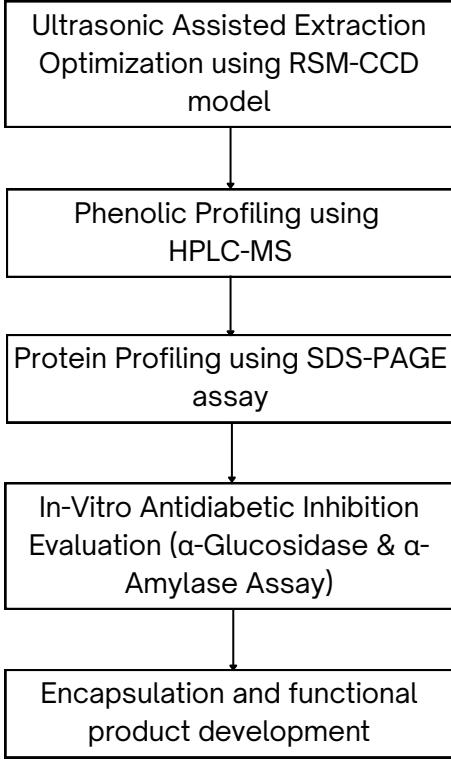


LOCATION: PAGAR ALAM CITY, SOUTH SUMATERA, INDONESIA

EXTRACTION METHOD (UAE)



FUTURE STUDY



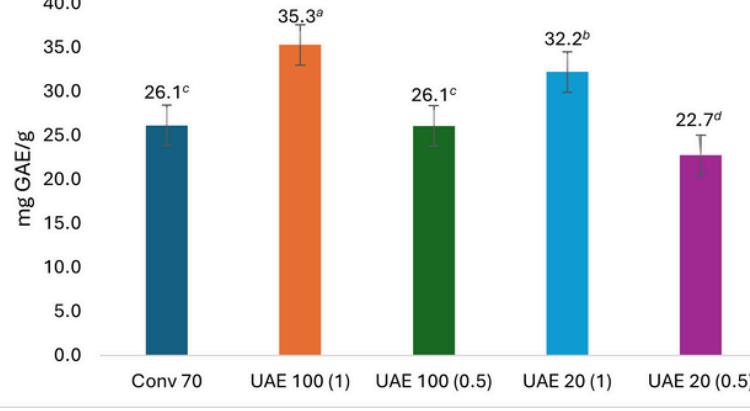
CONCLUSIONS

UAE enhanced the extraction of phenolic and flavonoid compounds compared to conventional hot-water extraction, while antioxidant activity and soluble sugars varied with ultrasound intensity. These findings highlight the potential of UAE to improve the functional quality of *Coffea canephora* pulp extracts.

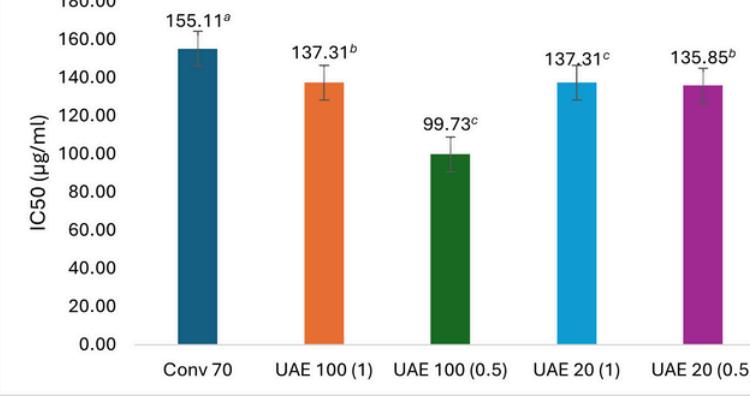
RESULTS

UAE treatments produced higher phenolic and flavonoid contents compared to conventional extraction, while antioxidant activity and soluble sugar levels varied depending on amplitude and cycle settings.

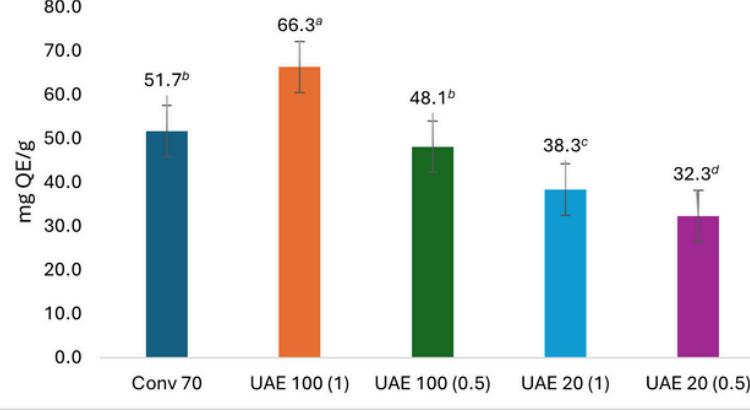
Total Phenolic Content



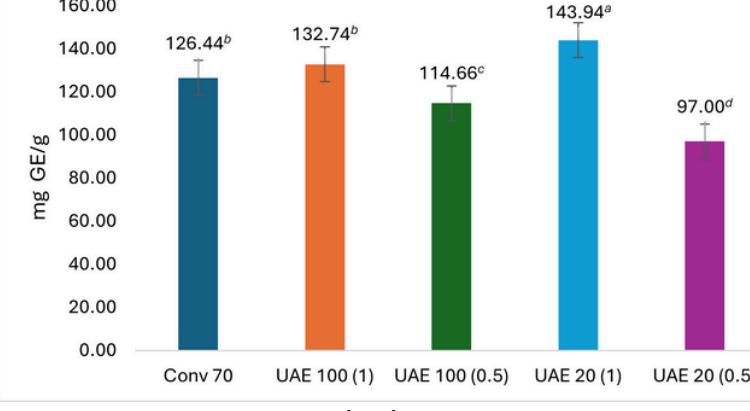
Antioxidant Activity (IC50)



Total Flavonoid Content



Total Soluble Sugar



LEGENDS

- CONVENTIONAL 70 CELCIUS
- UAE 100% AMPLITUDE CYCLE 1
- UAE 100% AMPLITUDE CYCLE 0.5
- UAE 20% AMPLITUDE, CYCLE 1
- UAE 20% AMPLITUDE, CYCLE 0.5

Values are expressed as mean \pm SD (n=5). Different superscript letters indicate significant differences among treatments (one-way ANOVA, Tukey's HSD, $p < 0.05$).

Component	Value (% dry basis)
Moisture	1.35 \pm 0.121
Ash	5.08 \pm 0.099
Protein	9.66 \pm 0.545
Fat	0.88 \pm 0.015

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