

An alternative to the conventional extraction method for the recovery of bioactive compounds from Bentong ginger

Muhamad Syafiq Hakimi Kamaruddin, Norhidayah Suleiman
Faculty of Food Science and Technology, Universiti Putra Malaysia

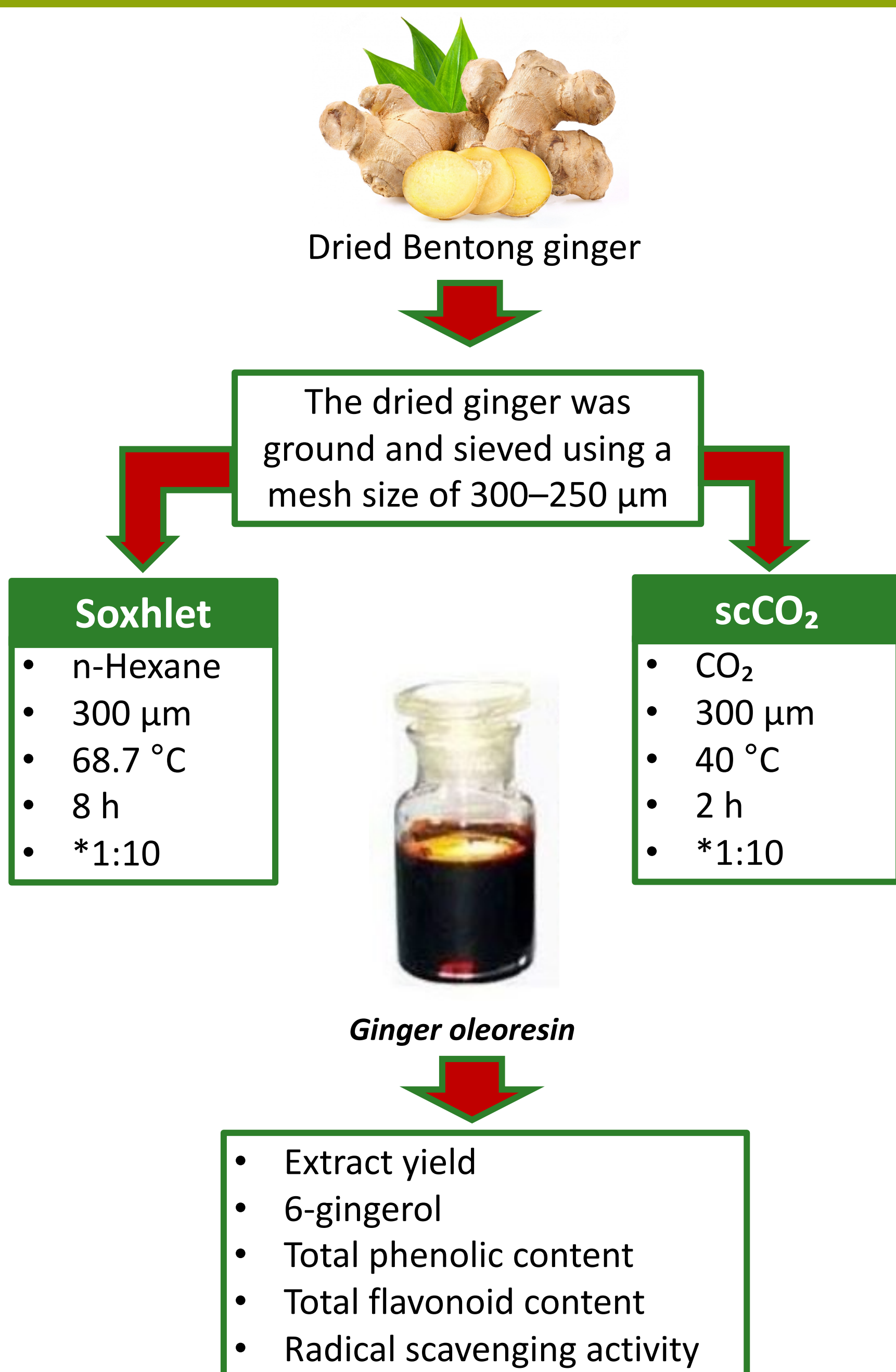
INTRODUCTION

Supercritical carbon dioxide (scCO₂) extraction is an efficient and eco-friendly method for obtaining bioactive compounds from ginger (*Zingiber officinale*). This process selectively extracts high-quality compounds without solvent residues and operates at lower temperatures, preserving gingerol from thermal degradation. As a result, scCO₂ extraction maintains gingerol's antioxidant and anti-inflammatory properties, making it a superior alternative for food applications compared to conventional methods.

OBJECTIVE

To compare the yield and recovery of bioactive compounds from Bentong ginger (*Zingiber officinale* Roscoe var. bentong) using Soxhlet extraction and scCO₂ extraction

METHODOLOGY



*sample to solvent ratio

FINDINGS

	scCO ₂	Soxhlet	p-value
Yield extract (%)	2.56 ± 0.07	4.76 ± 0.08	0.001
6-gingerol (mg/g)	171.26 ± 0.52	131.77 ± 0.20	0.038
TPC (GAE mg/g)	17.84 ± 0.43	15.08 ± 1.16	0.007
TFC (QE mg/g)	74.46 ± 1.72	72.67 ± 0.33	0.034
RSA (%)	91.14 ± 0.06	85.64 ± 0.009	0.046

- **Yield of Extract (%)**: scCO₂ yielded **2.56 ± 0.07%**, significantly lower than **4.76 ± 0.08%** from Soxhlet (p = 0.001), suggesting Soxhlet may extract more compounds.
- **6-gingerol Content (mg/g)**: scCO₂ had **171.26 ± 0.52 mg/g**, compared to **131.77 ± 0.20 mg/g** for Soxhlet (p = 0.038), indicating scCO₂ retains higher 6-gingerol concentration.
- **TPC (GAE mg/g)**: TPC was **17.84 ± 0.43 GAE mg/g** for scCO₂ vs. **15.08 ± 1.16 GAE mg/g** for Soxhlet (p = 0.007), showing scCO₂'s superior extraction of phenolics.
- **TFC (QE mg/g)**: TFC was **74.46 ± 1.72 QE mg/g** for scCO₂ and **72.67 ± 0.33 QE mg/g** for Soxhlet (p = 0.034), favoring scCO₂ for flavonoid extraction.
- **RSA**: RSA was **91.14 ± 0.06%** for scCO₂ compared to **85.64 ± 0.009%** for Soxhlet (p = 0.046), indicating better antioxidant activity in scCO₂ extracts.

OBJECTIVE

scCO₂ extraction is more effective in yielding higher quantities of bioactive compounds, particularly 6-gingerol, phenolics, and flavonoids, and demonstrates superior antioxidant activity compared to Soxhlet extraction, enhancing its potential for use in food technology applications.

FUTURE WORK / REFERENCES

1. Kamaruddin, M. S. H., Chong, G. H., Umanan, F., & Suleiman, N. (2023). Enhancement of 6-gingerol extraction from Bentong ginger using supercritical carbon dioxide. *Journal of CO2 Utilization*, 72(March), 102505.
2. Kamaruddin, M. S. H., Chong, G. H., Daud, N. M., Putra, N. R., Salleh, L. M., & Suleiman, N. (2023). Bioactivities and green advanced extraction technologies of ginger oleoresin extracts: A review. *Food Research International*, 164(August 2022), 112283.