



MENU

Results for OPTIMIZATION ... >

Optimization of Cyperus rotundus L. essential oil extraction and its in vitro ...

 Free Full Text from Publisher

Export ▾

Add To Marked List ▾

< 1 of 1 >

Optimization of Cyperus rotundus L. essential oil extraction and its in vitro α -glucosidase and anti-inflammatory activities

By Masfria (Masfria) ^[1]; Syahputra, H (Syahputra, Hafid) ^[2]; Reveny, J (Reveny, Julia) ^[3]; Marianne (Marianne) ^[4]; Bakhtiar, MTB (Bakhtiar, Muhammad T. B.) ^[5]; Akbar, H (Akbar, Harun) ^[6]; Silalahi, FHH (Silalahi, Fito H. H.) ^[6]; Gea, HH (Gea, Hilmy H.) ^[6]

Are you this author?

Source JOURNAL OF PHARMACY & PHARMACOGNOSY RESEARCH

← View Journal Impact

Volume: 14 Issue: 5

DOI: 10.56499/jppres_14.5.2584

Article Number 2584

Published SEP-OCT 2026

Indexed 2026-09-27

Document Type	Article
Abstract	Context: <i>Cyperus rotundus</i> L. tubers contain essential oils with reported α-glucosidase inhibitory and anti-inflammatory activities. Aims: This study optimized the extraction of essential oil from <i>C. rotundus</i> tubers and evaluated the in vitro inhibitory activities of the resulting oil. Methods: Essential oil was extracted using microwave-assisted hydrodistillation in a Stahl apparatus. A Box-Behnken design with three variables-microwave power, solvent-to-material ratio, and extraction time-was applied within the response surface methodology framework. The responses included essential oil yield, total phenolic content, and total terpenoid content. The optimized oil was characterized by GC-MS and evaluated in vitro using α-glucosidase inhibition and protein-denaturation inhibition assays. Results: The optimal extraction conditions were 600 W microwave power, a 1:7 g/mL solvent-to-material ratio, and 47.41 min extraction time. The optimized oil inhibited α-glucosidase with an IC₅₀ of 171.89 $\pm$ 0.0087 & micro;g/mL, compared with 277.57 $\pm$ 0.0059 & micro;g/mL for acarbose under the same assay conditions. Protein-denaturation inhibition was moderate, with an IC₅₀ of 109.19 $\pm$ 0.43 & micro;g/mL, compared with 9.14 $\pm$ 0.06 & micro;g/mL for sodium diclofenac. Conclusions: The optimized essential oil demonstrated preliminary in vitro α-glucosidase inhibitory and moderate protein-denaturation inhibitory activities. These findings represent screening-level evidence. Further chemical characterization, mechanistic assays, safety evaluation, and in vivo studies are required before any therapeutic or disease-management relevance can be concluded.
Keywords	Author Keywords: alpha-glucosidases; anti-inflammatory agents; distillation; essential oils; plant extracts; terpenes Keywords Plus: ANTIBACTERIAL ACTIVITY; CHEMICAL-COMPOSITION; ANTIOXIDANT
Author Information	Corresponding Address: Masfria (corresponding author) ▼ Univ Sumatera Utara, Fac Pharm, Dept Pharmaceut Chem, Medan 20155, Indonesia E-mail Addresses : masfria@usu.ac.id Addresses :

- ▼ ¹ Univ Sumatera Utara, Fac Pharm, Dept Pharmaceut Chem, Medan 20155, Indonesia
- ▼ ² Univ Sriwijaya, Fac Math & Nat Sci, Dept Pharm, Indralaya 30662, South Sumatra, Indonesia
- ▼ ³ Univ Sumatera Utara, Fac Pharm, Dept Pharmaceut Technol, Medan 20155, Indonesia
- ⁴ Univ Sumatera Utara, Fac Pharm, Dept Pharmaceut Clin & Pharmacol, Medan 20155, Indonesia
- ⁵ Univ Islam Int Malaysia, Fac Pharm, Dept Pharmaceut Formulac Technol, Kuala Lumpur, Selangor, Malaysia

[...more addresses](#)

E-mail Addresses :

masfria@usu.ac.id

Conflict of interest statement

The research was conducted entirely free from any involvement in commercial, financial, or personal matters that might be perceived as a possible conflict of interest or that could have influenced the outcomes or interpretation of the

Categories/ Classification

Research Areas: Pharmacology & Pharmacy

Web of Science Categories

[Pharmacology & Pharmacy](#)

Funding

▼ [View funding text](#)

Funding agency	Grant number
Universitas Sumatera Utara	18589/UN5.1.R/PPM/2024

+ [See more data fields](#)

Journal information

JOURNAL OF PHARMACY & PHARMACOGNOSY RESEARCH

0.3

[← View Journal Impact](#)

ISSN 0719-4250

Current Publisher JOURNAL PHARMACY & PHARMACOGNOSY
RESEARCH-JPPRES, ANGAMOS 0610,
ANTOFAGASTA 00000, CHILE

Research Areas Pharmacology & Pharmacy

Web of Science Categories Pharmacology & Pharmacy

Journal
Citation
Indicator™
(2025)



Citation Network

In Web of Science Core Collection

0 Citations

[Create citation alert](#)

32

Cited References

[→ View Related Records](#)

How does this document's citation
performance compare to peers?

[Open comparison metrics
panel](#)

Use in Web of Science

0

Last 180 Days

0

Since 2013

[Learn more →](#)

This record is from:

Web of Science Core Collection

- Emerging Sources Citation Index (ESCI)

Suggest a correction

If you would like to improve the
quality of the data in this record,
please [Suggest a correction](#)

Data is from InCites Benchmarking &
Analytics

32 Cited References

[View as set
of results](#)

Showing 30 of 32

(from Web of Science Core Collection)