

bradscholars

Impact of extraction solvents on propolis quality and antioxidant activity

Item Type	Presentation
Authors	Mustafa, Ghaida
Citation	Mustafa G (2025) Impact of extraction solvents on propolis quality and antioxidant activity. Presented at: 49th APIMONDIA Congress. 23-27 Sep 2025, Copenhagen, Denmark.
Rights	© 2025 The Author(s). Reproduced with authors' permission.
Download date	2026-05-14 04:12:56
Link to Item	https://bradscholars.brad.ac.uk/handle/10454/20680



APIMONDIA
SCANDINAVIA
SWEDEN | DENMARK | NORWAY
23-27 SEPTEMBER



BIODLARNA

COPENHAGEN



Impact of Extraction Solvents on Propolis Quality and Antioxidant Activity

Presented by: **Ghaida Mustafa**

Centre for Pharmaceutical Engineering Science, University of Bradford, UK

Propolis

Mumification



Protector

Recent research
Antimicrobial, antioxidant
and anti-inflammatory
activities



Beautification



Glue

The Propolis Opportunity



£ 670 M

Market value by 2030

Global propolis market projection shows massive commercial potential for **beekeepers**



500+

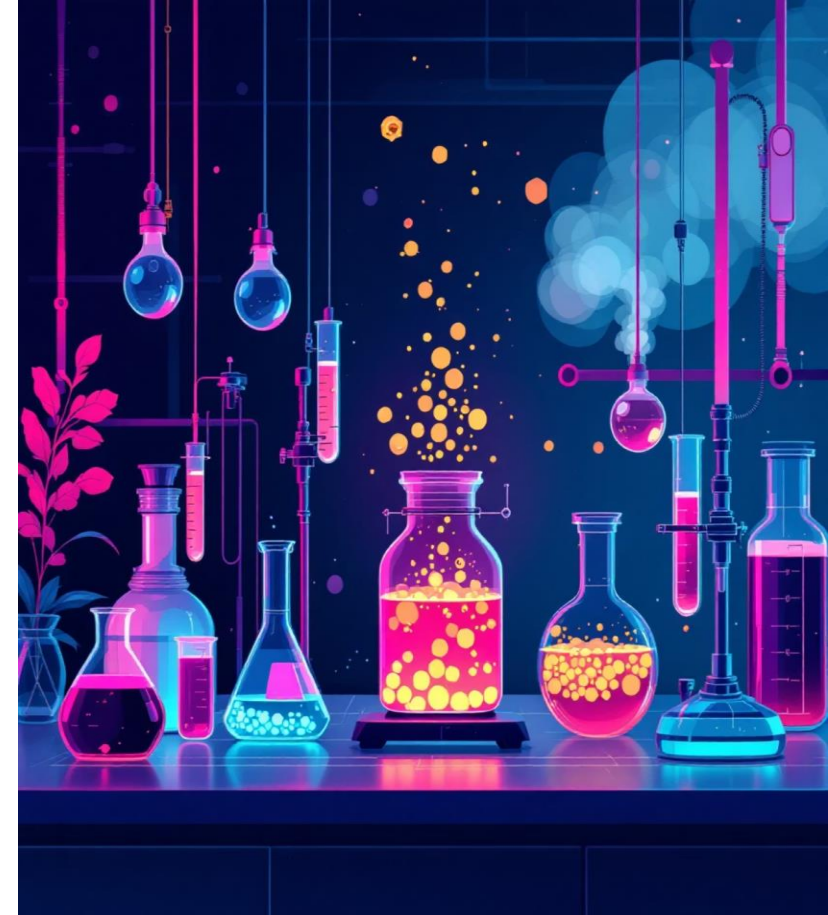
Active Compounds

Phenolic acids and **flavonoids** create propolis's remarkable biological activity

Your bees create this valuable resinous material by processing plant exudates with their enzymes—**nature's own pharmaceutical laboratory.**

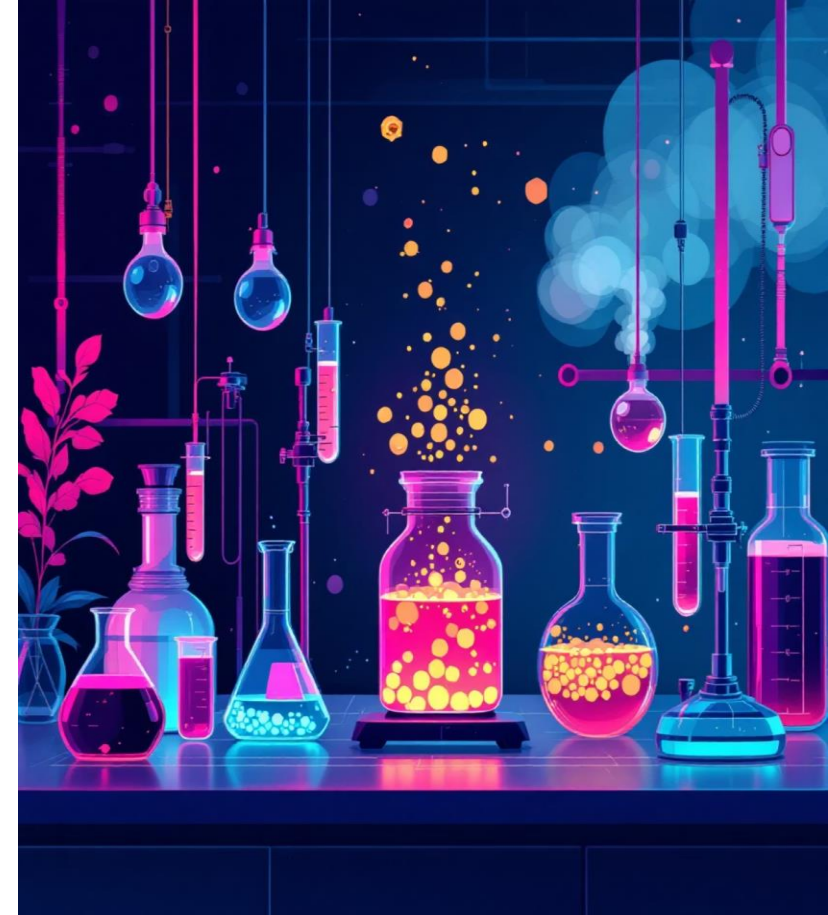
Why Extraction Solvents Matters

- The **solvent** you choose dramatically affects your propolis **extract's quality** and **potential value**.
- Different solvents means **different compounds profile**, directly impacting **antioxidant activity**.



Why Extraction Solvents Matters

- We tested **six common extraction solvents** to find which delivers the best results for **beekeepers** seeking maximum value from their propolis harvest.



Our Testing Approach

01

Raw Propolis Sample

Quality propolis from Nature's Laboratory Ltd., Whitby, UK

02

Six Extraction Solvents

70% ethanol, propylene glycol, lactic acid, acetone, olive oil, and water

03

Scientific Analysis

Measured total phenolics, flavonoids, and antioxidant activity using validated methods

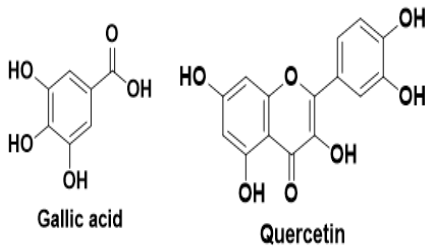


**Adding certain
chemicals to
liquid extracts**

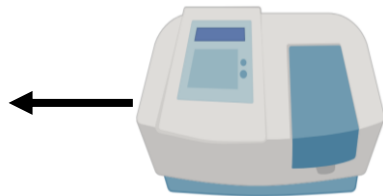


**Incubation in
dark**

**UV
Spectroscopy
analysis**



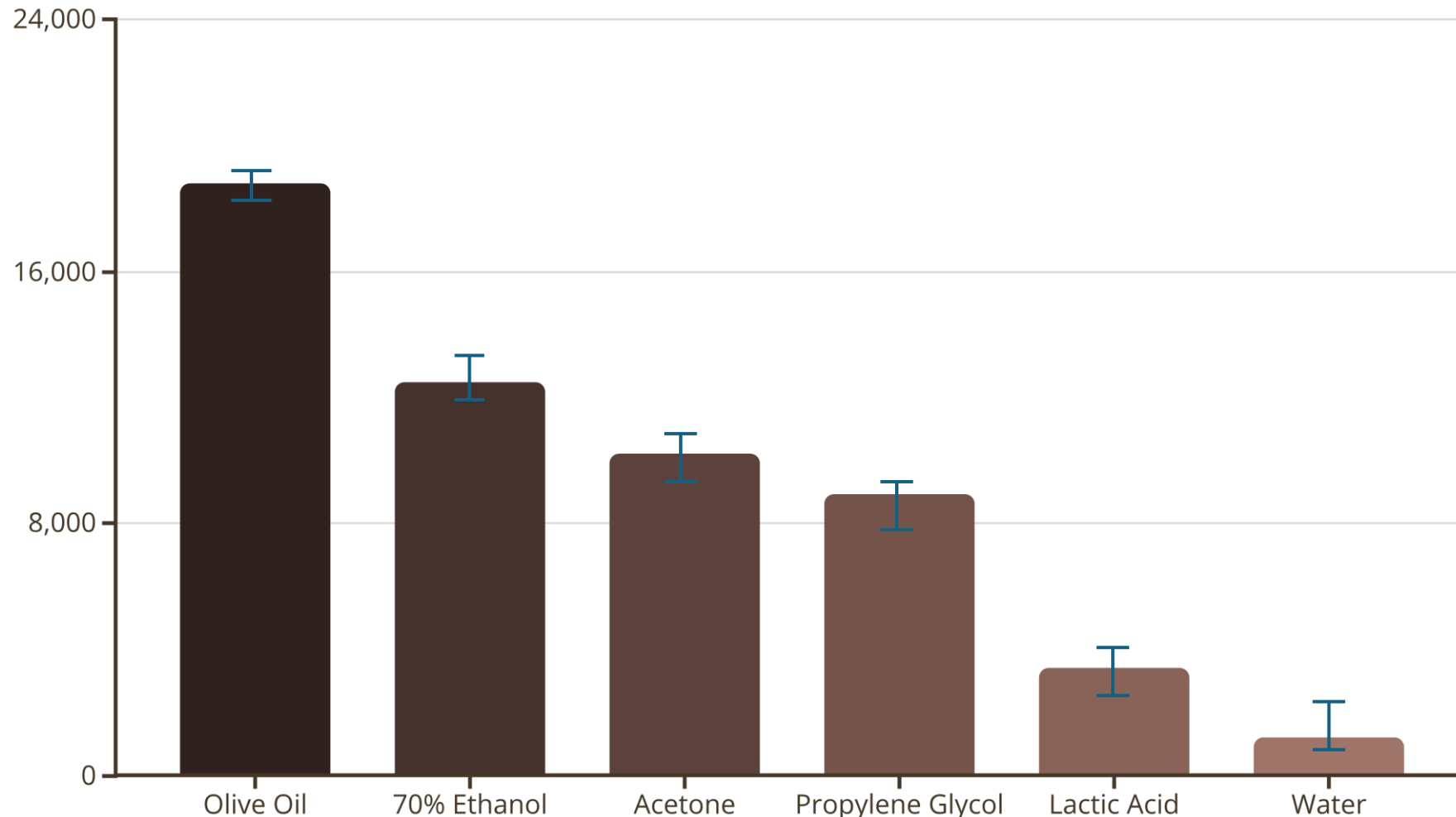
Total phenolics and antioxidant data



Findings

Extraction solvent	Phenolic content (mg GAE/L)	Flavonoid content (mg QE/L)	DPPH EC50 (mg/mL)*
70% ethanol	540.89 ± 0.06	15546.10 ± 0.03	0.0964±0.001
Propylene glycol	382.02 ± 0.08	13184.4 ± 0.03	0.0727±0.003
Lactic acid	53.73 ± 0.03	129.29 ± 0.04	0.2068±0.003
Olive oil	328.47 ± 0.1	18794.33± 0.03	1.1115±0.03
Water	6.13 ±0.28	7.38 ± 0.8	4.4965±0.4
Acetone	511.32 ± 0.04	15971.63 ± 0.03	0.0854±0.001

Flavonoids content results



Olive oil extraction delivered the highest flavonoid content—essential compounds for propolis's therapeutic properties.

*mg QE/L

Phenolic Compounds Data

70% Ethanol

540.89 ± 0.06 mg GAE/L

Highest total phenolic content
achieved

70% Ethanol

Traditional method with good
phenolic extraction

Water Extract

6.13 ± 0.28 mg GAE/L

Lowest phenolic content—
avoid for commercial use

Phenolic compounds determine your propolis's antioxidant power and market value.

Antioxidant Activity: What Really Matters



- We measured antioxidant activity using DPPH assay—lower EC50 values mean stronger antioxidant power and higher commercial value.



Propylene Glycol

Strongest antioxidant activity (**EC50: 0.0727 mg/ml**), excellent for commercial products.



Acetone & Ethanol

Very good activity (**EC50: 0.0854 - 0.0964 mg/ml**) reliable extraction methods.

Surprising Findings

Olive Oil Extract Results

Olive oil had the highest flavonoid content but did not show strong antioxidant activity, revealing complex compound effects (lipidic nature!).

Bioactivity Vs Composition

Quantity of extracted compounds does not always correlate with biological activity, requiring deeper understanding.



Practical Recommendations for Beekeepers



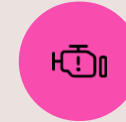
Best Choice: Propylene Glycol

Highest antioxidant activity makes this ideal for premium products



Reliable Option: 70% Ethanol

Traditional method with consistent, good results for commercial use



Avoid: Water Extraction

Poor antioxidant activity reduces commercial value significantly

Maximise Your Propolis Value

- **Choose your extraction solvent wisely**—it directly determines your propolis extract's therapeutic value and market price.
- This research provides evidence-based guidance to help you optimise processing methods and capture the full commercial potential of your hives' natural pharmacy.



Acknowledgment

Ghaida Mustafa, Bhagyashree Kamble, Shankar Katekhaye, James Fearnley, Anant R Paradkar





Ghaida Mustafa
PhD Researcher in
Pharmaceutical Technology at ...



Questions

