

# Unlocking the potential of minor explored fractions of *Bacopa monnieri*: an optimization study

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## Introduction

*Bacopa monnieri* (L.) Wettst, also known as "Brahmi", is one of the many plants used in ayurvedic medicine for its numerous therapeutic effects. These are associated with its bioactive compounds, particularly saponins [1]. However, few studies have focused on the phenolic portion of this plant.

## Objective

This study aimed to optimize the extraction of phenolic compounds from *B. monnieri* using a central composite design (POBM), determine its phenolic profile through LC-DAD-ESI-MS<sup>n</sup> and the antioxidant activity using the thiobarbituric acid reactive substances (TBARS) and the oxygen radical absorbance capacity (ORAC) methods.

## Material and Methods

Experimental Design		
Time (min)	% ETOH (etanol:water)	Temperature (°C)
10-120	10-90	25-80

Responses		
Total Phenolic Content	Total Flavonoid Content	ORAC

LC-DAD-ESI-MS <sup>n</sup>					
System	Detector	Mass detector	Column	Solvents	Elution gradient
Dionex Ultimate 3000 UPLC	Diode array detector (DAD) (280 nm e 370 nm)	Electrospray (negative mode, mass analyser: LTQ XL linear ion trap)	Spherisorb S3 ODS-2C18 (35 °C)	(A) 0.1% formic acid in water (B) acetonitrile	Isocratic: 15% B (5 minutes), 15% B to 20% B (5 minutes), 20-25% B (10 minutes), 25-35% B (10 minutes), 35-50% B (10 minutes)

## Results

**Best Extraction Condition (0.5 g sample and 10 mL solvent)**

10 min	72:28 (v/v)	51 °C
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Two successive extractions

Total Phenolic Content (mg. Eq. Galic acid/g sample)	19.30 ± 0.56
Total Flavonoid Content (mg. Eq. Catechin/g sample)	15.10 ± 0.15

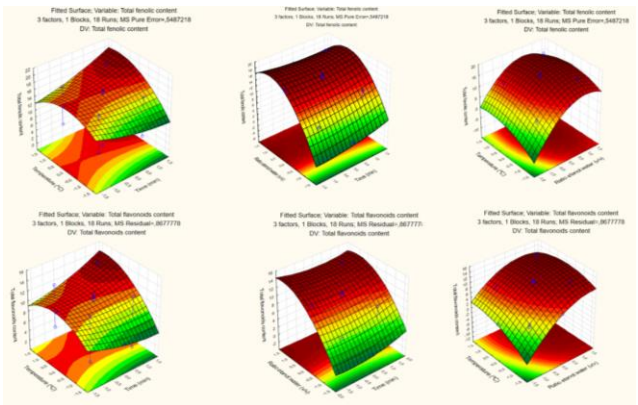


Figure 1- Response surfaces for the central composite design of phenolic compounds from *B. monnieri*

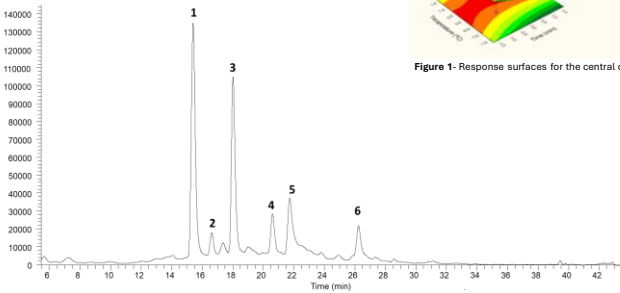


Figure 2- Tentative identification of phenolics compounds in *B. monnieri* extract: 1- Calceariloside A; 2- Verbascoside; 3- Calceariloside B; 4-Caffeic acid derivative; 5- Luteolin-O-glucuronide; 6- Apigenin-O-glucuronide

## Conclusion

The optimization enabled faster, more efficient, and greener preparation conditions for *B. monnieri* extracts. POBM showed promising antioxidant activity. Therefore, our findings pave the way for further studies to understand the role of phenolic compounds from *B. monnieri* as a possible tool for the pharmaceutical and food industries

## References

[1] Sekhar, V. C., Viswanathan, G., & Baby, S. (2018). Insights Into the Molecular Aspects of Neuroprotective Bacoside A and Bacopaside 1. *Current Neuropharmacology*, 17(5), 438-446.

The work carried out was aimed at obtaining an extract using a faster technique and a greener solvent than that traditionally used for the plant under study. The extract obtained shows promise for use in the pharmaceutical or food industries, so that we can move towards a healthier and more sustainable lifestyle.

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