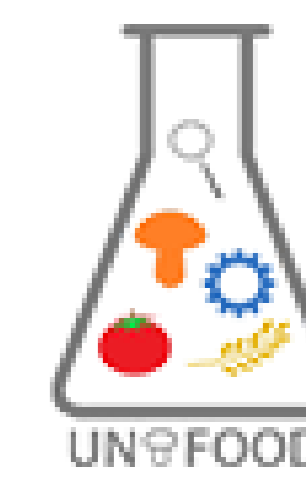




# GENTIAN ROOT: COMPARISON OF OPTIMIZED HEAT-ASSISTED AND ULTRASOUND-ASSISTED EXTRACTION METHODS



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## Introduction

*Gentiana lutea* L. underground parts, also known as gentian root, are used for the preparation of dietary supplements, functional food, pharmaceutical, or cosmetic products. In our previous study, ultrasound-assisted extraction (UAE) and heat-assisted extraction (HAE) procedures were optimized to maximize the yield of the gentiopicroside, isogentisin, and total phenolic content (TPC) from gentian root (Mudrić et al., 2020; Živković et al., 2019).

## Aim

The aim of this study was to compare the influence of two extraction methods (UAE and HAE) on the yield of gentiopicroside, isogentisin, and TPC.

## Materials and methods

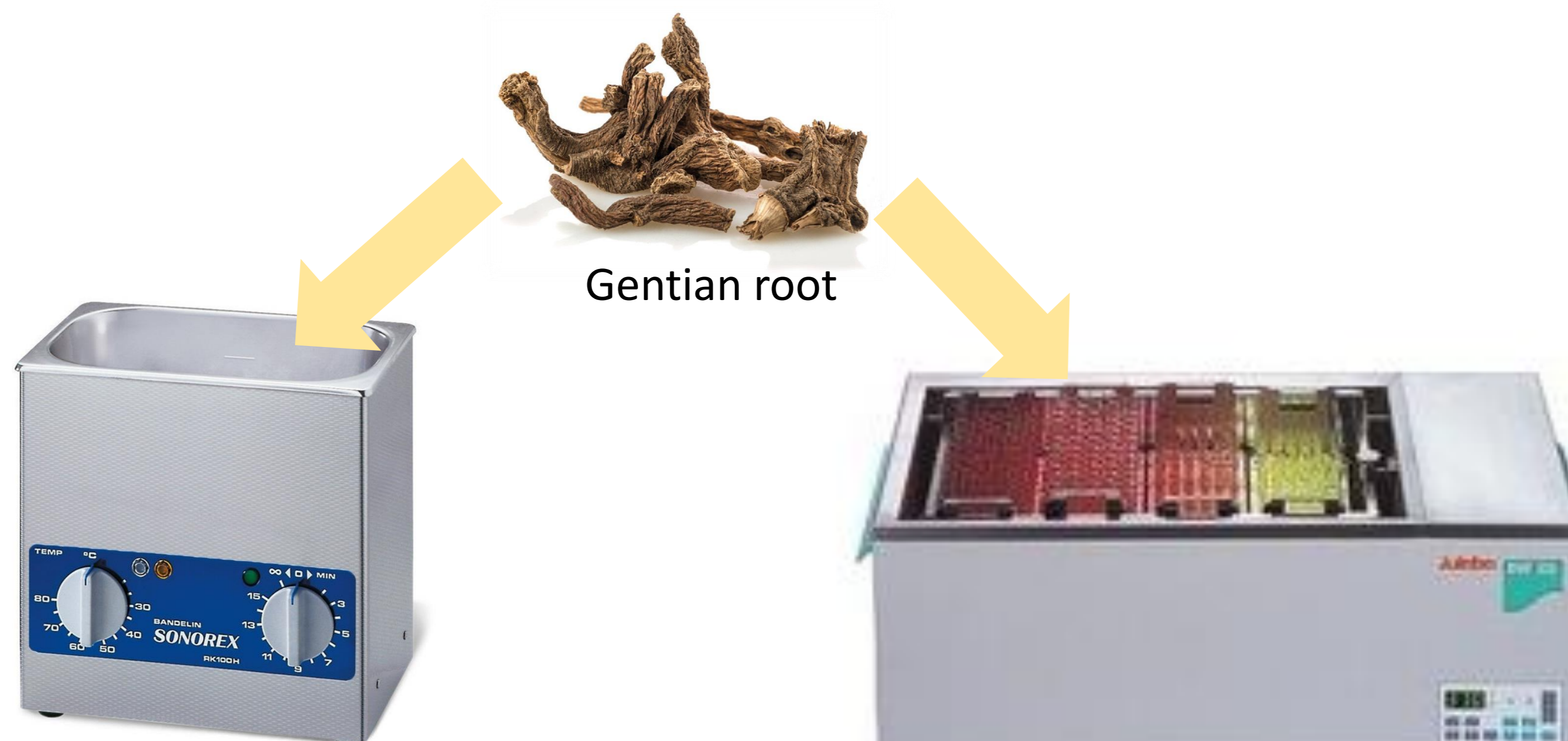
Gentian root extracts were prepared in five replications under the optimal conditions by UAE and by HAE according to the previously reported results by Živković et al. (2019) and Mudrić et al., (2020).



*Gentiana lutea* L., Gentianaceae

### Optimal conditions by UAE

Temperature 80 °C  
Time 31 min  
Solid-to-solvent ratio 1:42  
Ethanol 49 %



### Optimal conditions by HAE

Temperature 65 °C  
Time 129.08 min  
Solid-to-solvent ratio 1:40  
Ethanol 49.33 %

Ultrasound-assisted extraction (UAE)

Heat-assisted extraction (HAE)

Gentiopicroside and isogentisin content were analyzed by HPLC and expressed as mg/g of dry weight (DW). TPC was determined spectrophotometrically using the Folin–Ciocalteu method and expressed as mg of gallic acid equivalents (GAE)/g DW. Results are considered statistically equal, according to the t-test, in the case of a P-value higher than 0.05.

## Results and discussion

According to the obtained results (Table 1), there was no significant difference between the yield of gentiopicroside, isogentisin and TPC from gentian root by ultrasound-assisted extraction and heat-assisted extraction.

Table 1. Yield of gentiopicroside, isogentisine and TPC from gentian root by ultrasound-assisted extraction (UAE) and heat-assisted extraction (HAE)

	UAE	HAE	P-value
Gentiopicroside (mg/g DW)	15.78 ± 1.16	15.16 ± 1.10	0.40
Isogentisin (mg/g DW)	7.87 ± 0.91	8.58 ± 0.51	0.17
TPC (GAE)/g DW	11.29 ± 0.82	11.46 ± 0.22	0.67

## Conclusion

Therefore, both methods (optimized UAE and HAE) are highly effective and comparable and there was no significant difference between the extraction yield of gentian roots target compounds.