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EXTRACTION OF PHENOLS FROM PEPPERMINT BY ULTRASONIC PROBE

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INTRODUCTION:

Peppermint (*Mentha piperita* L.) is a widely distributed aromatic and perennial medicinal plant from the *Lamiaceae* family. Due to the outstanding antioxidant activity of leaf, pedicle and flower extracts, rich in phenolic compounds, they are widely used for pharmaceutical, food and cosmetics purposes.

OBJECTIVES:

The main aim of this research was to compare conventional solid/liquid (S/L) extraction with ultrasound assisted extraction of peppermint leaves in respect to yield of polyphenols. Another target was to determine the optimal extraction time and amplitude of ultrasonic extraction at which the highest total phenols and flavonoids contents were provided.

RESULTS:

The maximal TP (413.4698 mg GAE/g DW) value was obtained after 2 min of ultrasonic extraction at 20% amplitude, where as minimal TP (237.9772 mg GAE/g DW) value was obtained after 6 min of extraction at 100% amplitude. The TF varied from 216,1222mg CE/g DW to 368.7847mg CE/g DW. The maximal TF was obtained at the same extraction parameters as maximal TP.

	TP (mg GAE/g DW)	TF (mg CE/g DW)
30% ethanol	3.0288	2.9409
50% ethanol	3.1271	3.0753
70% ethanol	2.4744	2.4425

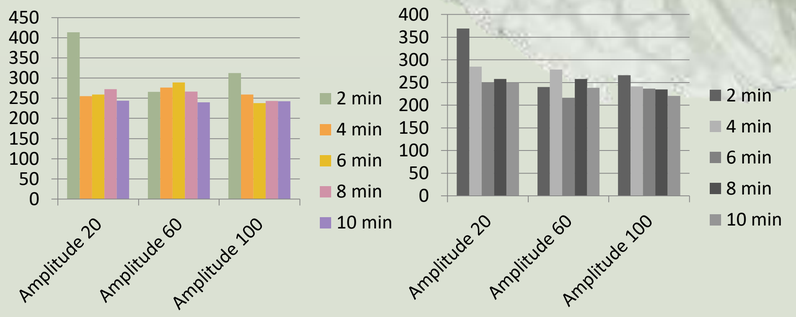

Figure 1. Content of total phenolic compounds (mg GAE/g DW)

Figure 2. Content of total flavonoids (mg CE/g DW)

METHOD / DESIGN:

In all experimental runs, 10 g of peppermint leaves was mixed with 200 mL of solvent (30, 50 and 70% ethanol).

The highest total phenols (TP) and total flavonoids (TF) contents were obtained spectrophotometrically using 50% ethanol as solvent, which was further used as solvent in ultrasonic extractions.

The ultrasonic probe (Hielscher UP400St) at different amplitude levels (20, 60 and 100%) and extraction time (2, 4, 6, 8 and 10 min) was engaged for providing 15 different extracts.

CONCLUSIONS:

Ultrasonic extraction of peppermint leaves with extraction time 2 min and amplitude 20% provided significantly higher TP (413.4698 mg GAE/g DW) and TF (368.7847 mg CE/g DW) values in comparison to S/L extraction which delivered TP (236.8546 mg GAE/g DW) and TF (232.8792 mg CE/g DW) values. Furthermore, ultrasonic extraction with probe lasted only 2 min in comparison with S/L extraction which proceeded for 24 h.