

Antioxidant activity of water extracts of some aromatic plants

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Research Objective: Study the content of antioxidants in extracts of aromatic plants and determination the optimal extraction conditions for obtaining and further use of the extract in the food industry.

Materials and chemicals:

- Dried, grinded leaves (rosemary – oregano) – dried black cumin seeds.
- 2,2-diphenyl-1-picryl-hydrazyl (DPPH).
- Ethanol (97%).
- Distilled water



Rosemary



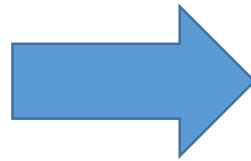
Cumin



Oregano

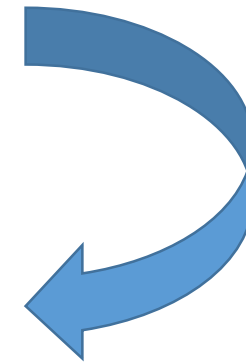
Extraction Procedures

Samples were prepared from different mixtures of herbs (rosemary-cumin-oregano), the amount of herbs (10 g).



Then they were mixed with 200 ml of distilled water, placed in a water bath at (40-60-80 °C) for (10-20-30 min).

The samples were filtered and cooled to (20 °C), then the pH of the extracts and antioxidant activity were determined.



Ultrasonic extraction

(10 g) from different mixtures of herbs (rosemary-cumin-oregano) were mixed with distilled water (500 ml) at (60 °C) , the extraction was carried out using an ultrasonic generator (U-10). Processing parameters: 22.5 kHz, with a power of 100 watts, extraction time (10-20-30 min), then the antioxidant activity and pH of the extracts were determined in the prepared samples.



Determination antioxidant activity (DPPH assay)

- 1 ml of diluted extract was added to 4 ml of a DPPH solution (0,1 mM in ethanol) .
- The reaction mixture was then shaken vigorously and left to stand in the dark at room temperature for 30 min.
- The absorbance was measured at 517 nm.

The ability to scavenge DPPH radicals was calculated by the following equation:

$$\text{DPPH radical scavenging activity (\%)} = \frac{[(\text{Abs control} - \text{Abs sample})]}{(\text{Abs control})} \times 100$$

Where, Abs control is the absorbance of DPPH radical+ solvent; Abs sample is the absorbance of DPPH radical + sample extract.

Results

pH extracts of herbs (rosemary-cumin+oregano) using distilled water .

Sample	The amount of herbs (g)	Extraction time, min	Extraction temperature, °C	pH extract
1 (rosemary)	10	10	60	5.84
2 (rosemary)	10	20	60	5.96
3 (rosemary)	10	30	60	5.86
4 (rosemary)	10	30	40	6.17
5 (rosemary)	10	30	80	5.86
6 (5 g cumin+5 g oregano)	10	30	60	5.94

Results

pH extracts of herbs (rosemary-cumin+oregano) after ultrasonic treatment.

Sample	The amount of herbs (g)	Extraction time, min	Extraction temperature, °C	pH extract
1 (rosemary)	10	10	60	6.53
2 (rosemary)	10	20	60	6.37
3 (rosemary)	10	30	60	6.16
4 (5 g cumin+5 g oregano)	10	30	60	6.04

Results

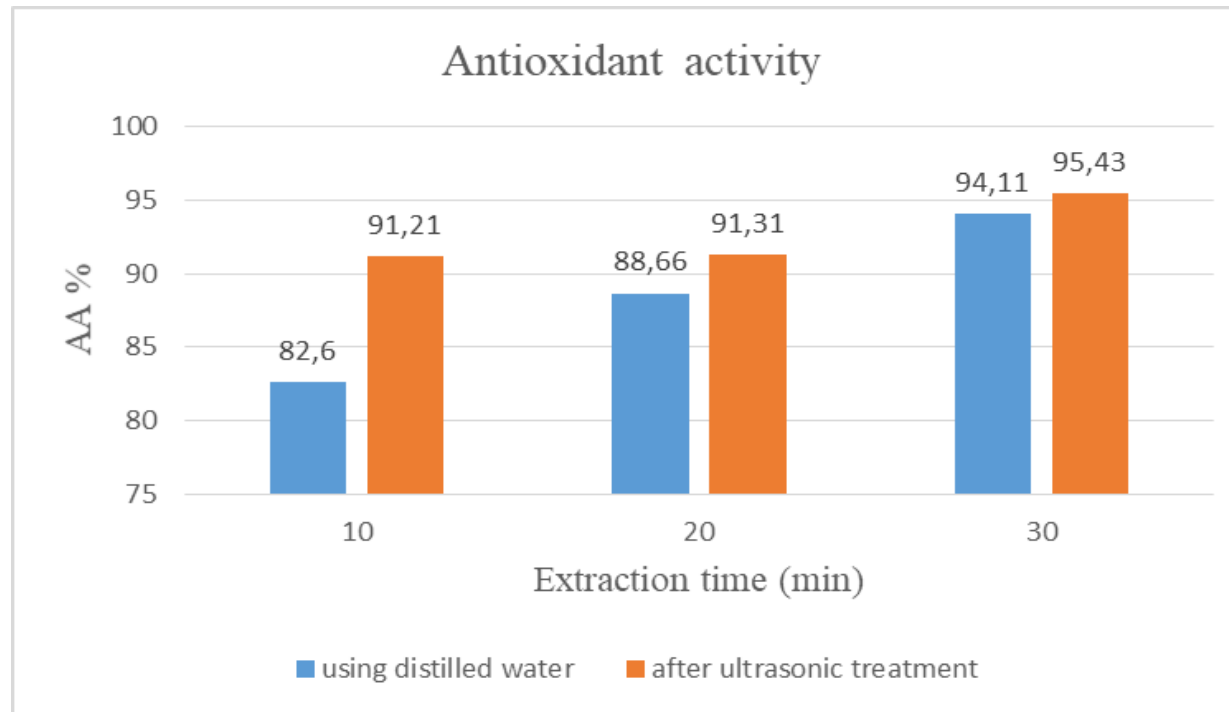


Fig 1: antioxidant activity of rosemary extracts (at 60 °C using distilled water+ after ultrasonic treatment).

Results

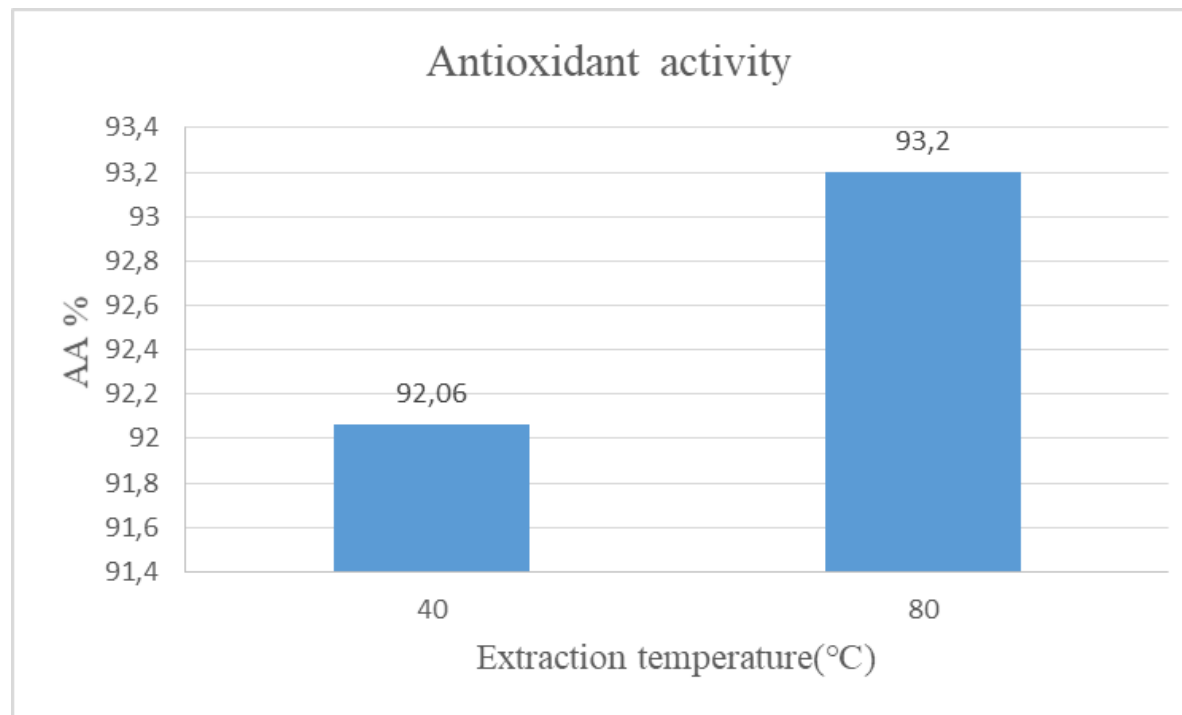


Fig 2: antioxidant activity of rosemary extracts (at 40-80 °C , 30 min using distilled water).

Results

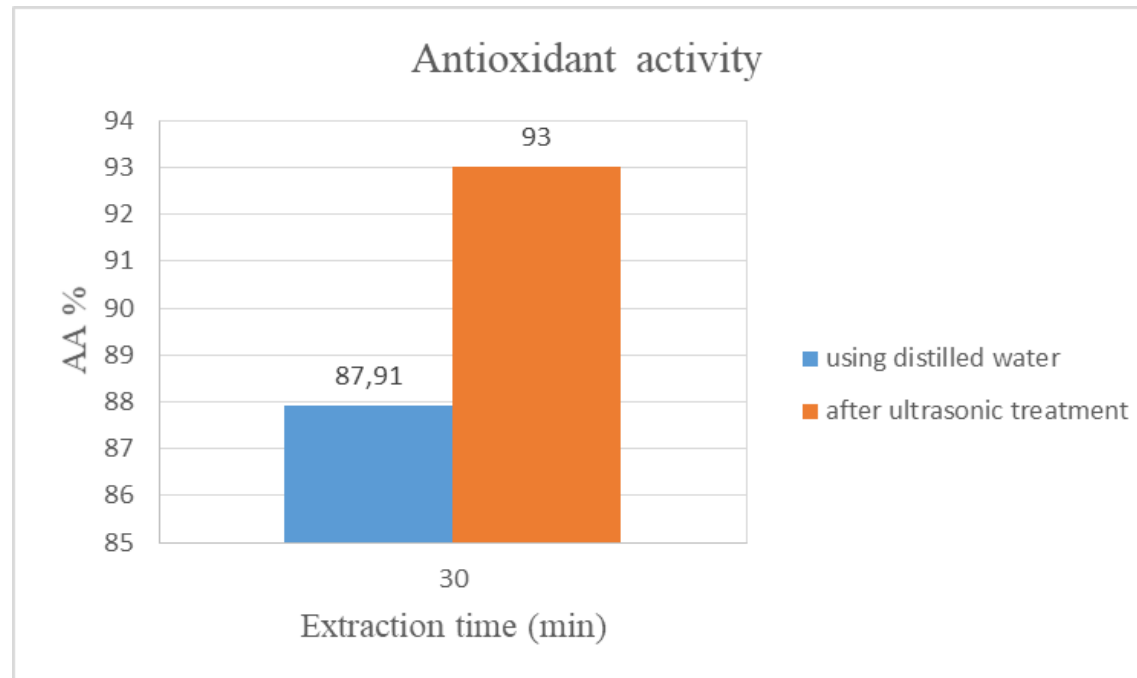


Fig 3: antioxidant activity of (cumin+oregano) extracts (at 60 °C , using distilled water+ after ultrasonic treatment).

Conclusions

- This study demonstrates that it is essential to optimize the extraction method, temperature and time to get a high yield of extraction.
- It was determined that the pH of the extracts decreases when using ultrasonic extraction.
- It was revealed that the highest value of antioxidant activity was observed when obtaining extracts from rosemary using ultrasonic extraction according to the following parameters : (60 °C - 30 min), Processing parameters: 22.5 kHz, power 100 watts.
- Rosemary- cumin and oregano extracts provided antioxidant rich material which would be helpful as natural alternatives to replace synthetic antioxidants in edible and medicinal products and can be used in function foods.

References

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3. Liu X, Dong M, Chen X, Jiang M, Lv X, Yan G. Antioxidant activity and phenolics of an endophytic *Xylaria* sp. *Ginkgo biloba*. *Food Chemistry*. 2007;105(2):548-554.

Thank you for your attention!

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