



## ANTIOXIDANT ACTIVITY OF *THUJA OCCIDENTALIS* LEAVES

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**Abstract:** This study evaluates the phytochemical profile and antioxidant activity of three *Thuja occidentalis* leaf varieties. Using fresh and dried leaves, we analysed total polyphenols, flavonoids, and DPPH radical scavenging activity. Results show that drying the plant material influences bioactive compound levels and antioxidant potential, with dried leaves generally exhibiting higher polyphenol and flavonoid content.

### • Introduction

Medicinal plants are rich in bioactive compounds like polyphenols and flavonoids, offering antioxidant, antimicrobial, and anti-inflammatory benefits. *Thuja occidentalis*, known as the "tree of life," is a traditional medicinal plant valued for its high polyphenolic content and therapeutic potential in managing chronic diseases such as diabetes, obesity, and cancer. This study aims to evaluate the phytochemical profile and antioxidant activity of three varieties of *Thuja occidentalis* leaves. For this purpose, we determined the total polyphenolic content, total flavonoid content, DPPH radical scavenging activity, and IC<sub>50</sub>. Additionally, we studied the impact of using fresh or dried plant material for extract preparation on the phytochemical profile and antioxidant activity.

### • Material and method

Fresh and dried leaves from three *Thuja occidentalis* varieties: smaragd (TOS), golden smaragd (TOGS), and fastigiata (TOF), sourced from Liebling, Timiș County, Romania, were extracted with 70% ethanol (1:10 w/v) for 24 hours at room temperature on a magnetic stirrer.

**Total phenolic content (TPC):** determined using Folin-Ciocalteu reagent; absorbance read at 750 nm and results expressed as mg GAE/g.

**Total flavonoid content (TFC):** measured via AlCl<sub>3</sub> and NaNO<sub>2</sub> colourimetric assay; absorbance read at 415 nm and results expressed as mg QUE/g.

Comparisons between fresh and dried samples were made using percentage increase formulas:

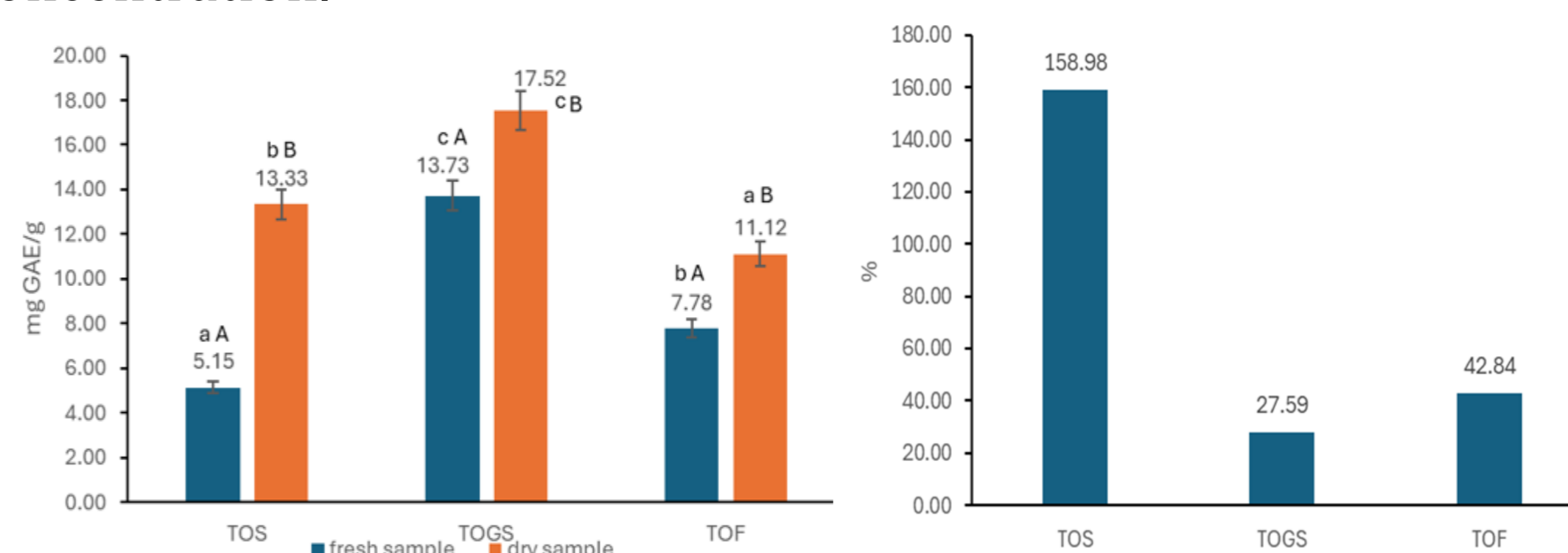
$$\text{Increase (\%)} = \frac{\text{Value dried} - \text{Value fresh}}{\text{Value fresh}} \times 100$$

where: Value dried = TPC or TFC of the dried sample;  
Value fresh = TPC or TFC of the fresh sample

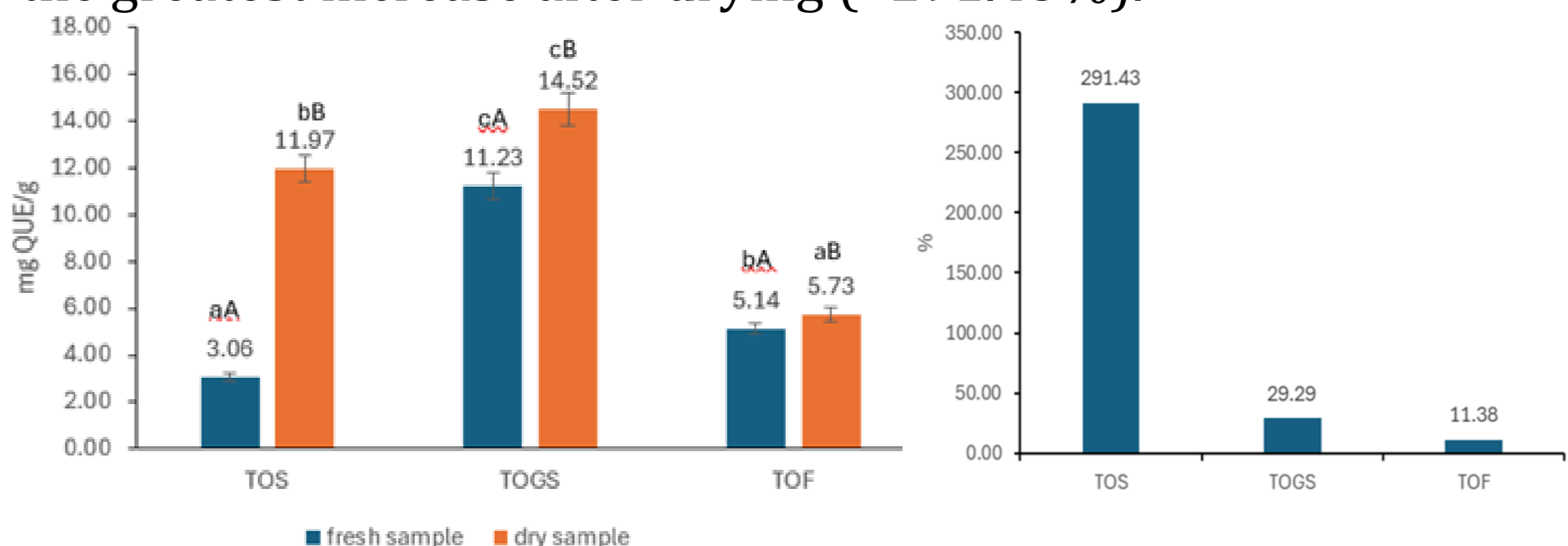
**Antioxidant activity:** a DPPH radical scavenging assay was conducted at various extract concentrations. Absorbance was read at 518 nm, and IC<sub>50</sub> values were calculated and compared to ascorbic acid.

### • Results and discussions

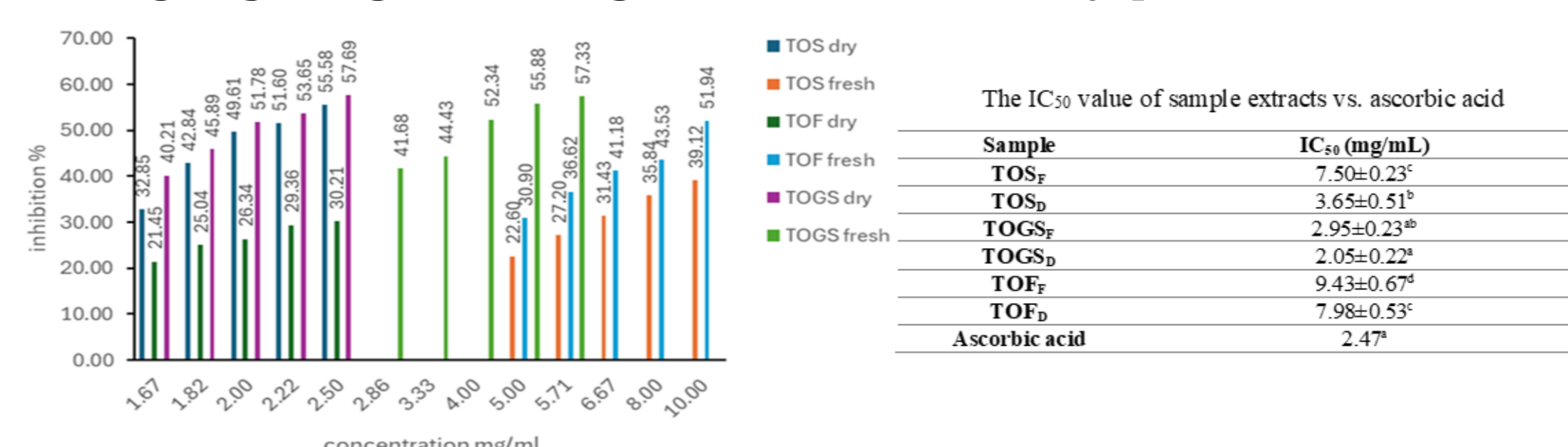
TPC was higher in dried plant extracts compared to fresh ones, with the TOGS dried sample showing the highest value (17.52 mg GAE/g). The TOS sample showed the largest increase after drying (+158.98%), indicating a strong impact of drying on phenolic concentration.



TFC followed a similar trend, with dried extracts showing significantly higher values. The TOGS dried sample had the highest flavonoid content (14.52 mg QUE/g), while the TOS sample showed the greatest increase after drying (+291.43%).



The results show that the highest radical scavenging activity occurred at 10 mg/mL, 4 mg/mL, and 2.5 mg/mL for all samples. The IC<sub>50</sub> values indicate that the highest antioxidant activity was in dried samples, with the fresh sample lagging behind. Notably, TOGSD had the lowest IC<sub>50</sub> at 2.05 mg/ml, surpassing ascorbic acid and highlighting its strong antioxidant activity potential.



### • Conclusions

This research shows that plant processing methods significantly affect the phytochemical composition of *Thuja occidentalis* leaf extracts. Dried leaves had higher levels of polyphenols and flavonoids than fresh leaves, with consistent antioxidant activity, indicating maintained bioactivity. Among all extracts, TOGS had the highest antioxidant capacity, making it a promising option for natural antioxidant formulations. These results emphasise the need for appropriate processing techniques to enhance the therapeutic potential of herbal extracts. Further in vivo studies are suggested to confirm these findings.

