The influence of the material drying process on the chemical composition and biological activity of hydrodistilled laurel essential oil (*Laurus nobilis* L.)

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INTRODUCTION & AIM

Laurel (Laurus nobilis L.) is widely used in the culinary, food, and cosmetics industries.

Laurel essential oil (EO) exhibits:

- antimicrobial activity (antibacterial, antifungal, and antiviral);
- anti-inflammatory and analgesic activity;
- expectorant and respiratory activity (promoting clear breathing);
- antioxidant activity (helping to protect cells from oxidative stress);
- insecticidal activity (natural insect repellent).

The aim of this study was to investigate the influence of the bay leaf drying process on essential oil yield, chemical composition, and biological activity.

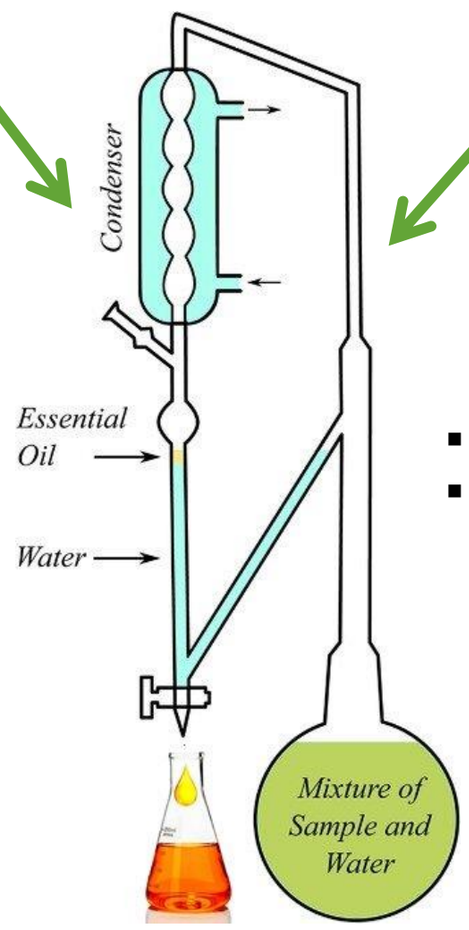
METHOD

drying

Naturally dried (EO_{NDL})

Oven-dried at 45 °C for 72 h (EO_{ODL})

fresh bay leaves (EO_{FL})



- **GC-MS analyses**
- **Biological and pharmacological activity**

Clevenger hydrodistillation (HD)

Ground plant material to solvent ratio=1:10

$$\text{Yield} = \frac{V_{EO} \cdot \rho_{EO}}{m_{PM}} \cdot 100 \quad (\%\,(m/m))$$

CONCLUSION

The laurel leaf drying process significantly affects the EOs yield: the highest yield was obtained from oven-dried material. The dominant components of the EOs are α-terpinyl acetate, sabinene, 1,8-cineole, methyl eugenol, and α-pinene. The best antioxidant activities were achieved with EO from oven-dried laurel leaves. The EO extracted from naturally dried material inhibited the enzymes AChE and BChE. The inhibition of tyrosinase and α-amylase was independent of the drying method used for material preparation.

RESULTS & DISCUSSION

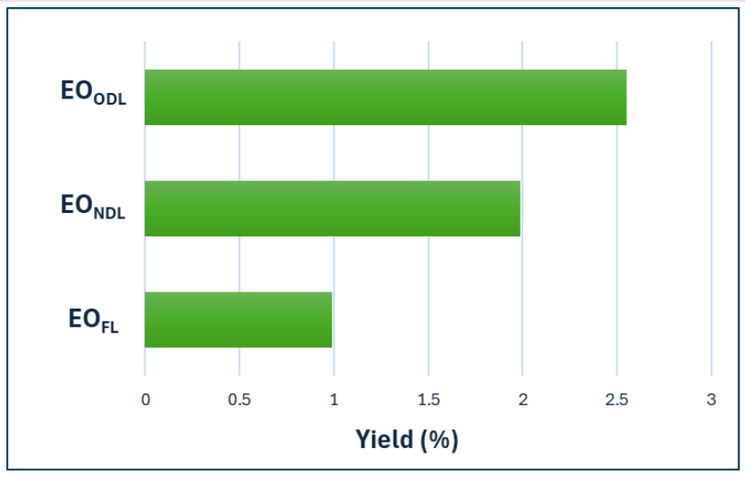


Fig. 1. Yield of laurel essential oil obtained by hydrodistillation from fresh bay leaves (EO_{FL}), naturally dried leaves (EO_{NDL}) and oven-dried leaves at 45 °C for 72 h (EO_{ODL}).

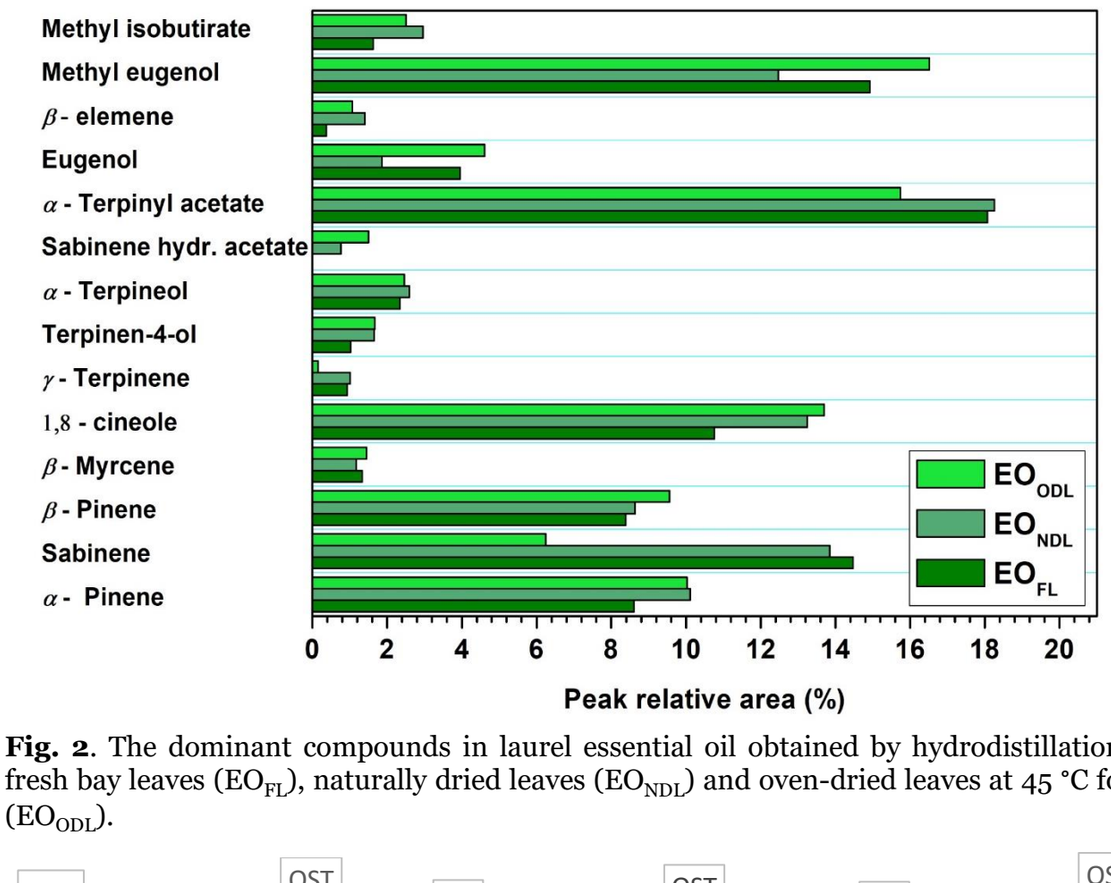


Fig. 2. The dominant compounds in laurel essential oil obtained by hydrodistillation from fresh bay leaves (EO_{FL}), naturally dried leaves (EO_{NDL}) and oven-dried leaves at 45 °C for 72 h (EO_{ODL}).

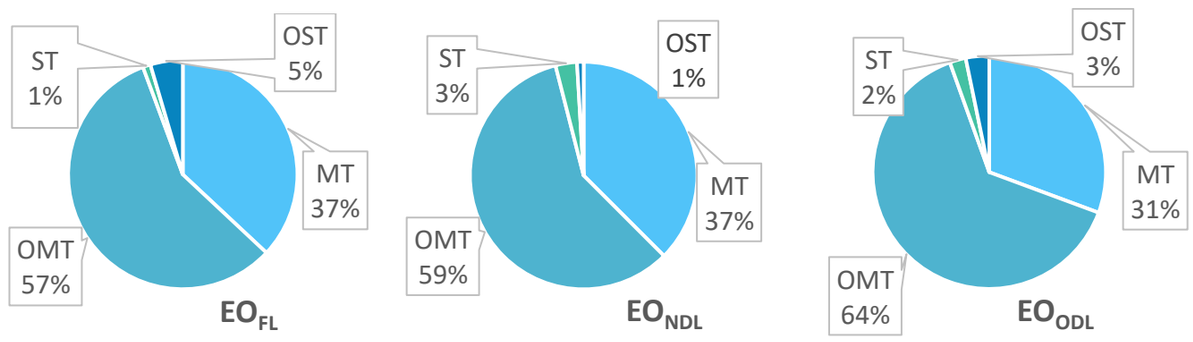


Fig. 3. Chemical composition of laurel essential oil obtained by hydrodistillation from fresh bay leaves (EO_{FL}), naturally dried leaves (EO_{NDL}) and oven-dried leaves at 45 °C for 72 h (EO_{ODL}). MT - Monoterpenes; OMT - oxidized monoterpenes; ST - sesqiterpenes; OST - oxidized sesqiterpenes.

Table 1. Antioxidant and enzyme inhibitor activity of laurel essential oil (*Laurus nobilis* L.) obtained by hydrodistillation of fresh bay leaves (EO_{FL}), naturally dried leaves (EO_{NDL}), oven-dried leaves at 45 °C for 72 h (EO_{ODL}), and laurel hydrolate.

Antioxidant assays	DPPH (mg TE/g)	ABTS (mg TE/g)	CUPRAC (mg TE/g)	FRAP (mg TE/g)	MC (mg EDTA/g)	PBD (mmolTE/g)
EO_{FL}	67.37±0.25	106.74±0.20	496.65±3.80	759.15±4.10	n.a	61.01±1.04
EO_{NDL}	63.06±0.38	106.67±0.26	371.95±11.24	504.96±0.60	n.a	57.61±4.60
EO_{ODL}	69.34±0.04	107.28±0.16	573.23±18.67	833.01±20.69	n.a	69.09±1.03
Laurel hydrolat	51.70±2.64	89.68±1.05	210.37±2.93	255.77±2.38	n.a	5.55±0.52

Enzyme inhibitor assays	Ache (mg GALAE/g)	BChE (mg GALAE/g)	Tyrosinase (mg KAE/g)	α-Amylase (mmol ACAE/g)	α-Glucosidase (mmol ACAE/g)
EO_{FL}	n.a	n.a.	73.89±6.30	0.40±0.01	n.a.
EO_{NDL}	2.54±0.21	2.84±0.28	69.37±0.32	0.53±0.02	n.a.
EO_{ODL}	n.a	n.a	69.22±1.14	0.43±0.02	n.a.
Laurel hydrolat	1.85±0.08	1.49±0.08	13.00±2.09	0.02±0.00	n.a.

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