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Cultivated Mushrooms: A Comparative Study of Antioxidant Activity and Phenolic Content

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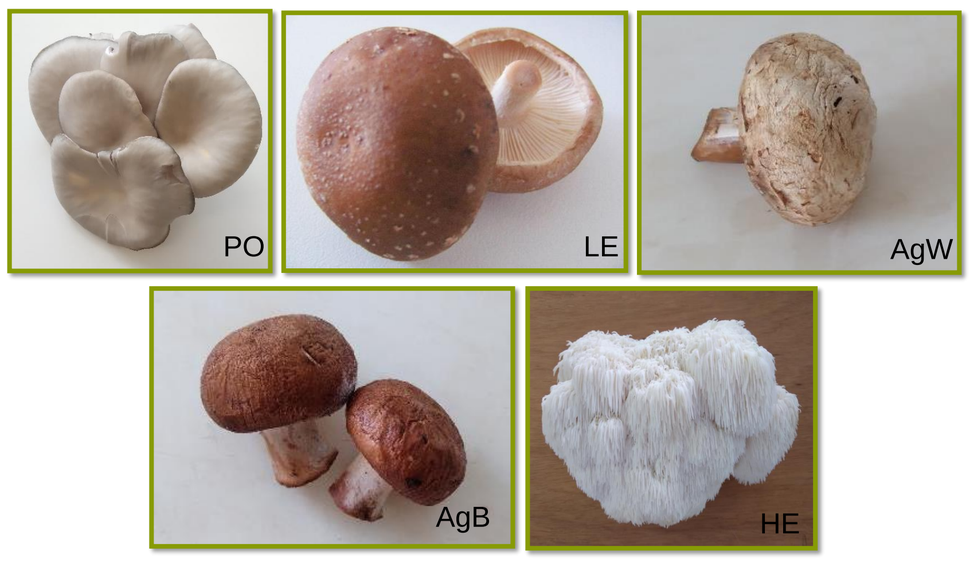
INTRODUCTION & AIM

Mushrooms are increasingly popular not only for their distinctive flavors and rich nutrient profiles but also for their **potent bioactive properties**. These properties, which include **antioxidant**, anti-inflammatory, and anticancer effects, make edible mushrooms a valuable source of natural compounds. Though the concentration and efficacy of these bioactive compounds can vary widely depending on factors such as the species of mushroom.

This study aims to compare the total phenolic content (TPC) and antioxidant activity (AOx) of methanolic extracts from the following cultivated mushrooms: *Lentinula edodes* (LE), *Pleurotus ostreatus* (PO), *Agaricus bisporus*, white and brown varieties (AgW and AgB, respectively) and *Hericium erinaceus* (HE).

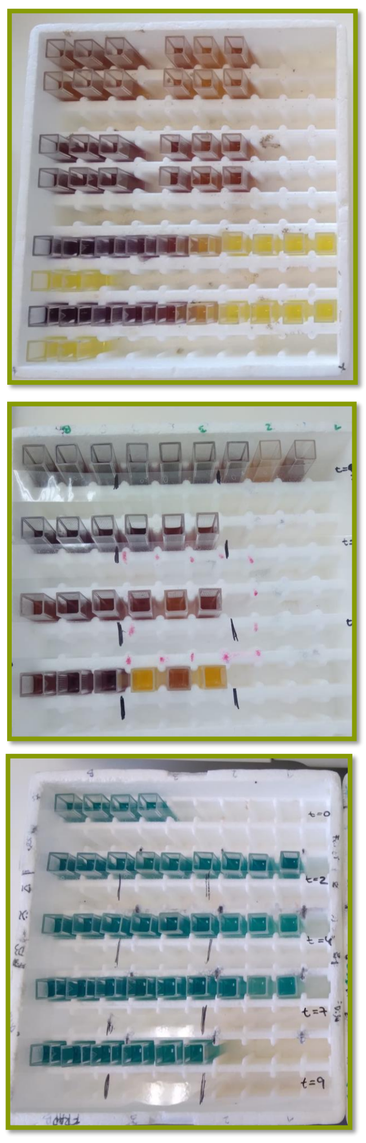


METHOD

Bioactive content and antioxidant activities

The total phenolic content (TPC) was evaluated by the Folin-Ciocalteu method (mg GAE/100 g fresh weight (fw)) at 725 nm. The antioxidant activity (AOx) was assessed through the DPPH radical scavenging assay (µmol TE/100 g fw) at 515 nm, ABTS radical scavenging activity (µmol TE/100 g fw) at 734 nm, and FRAP assay (µmol FeSO4•7H2O/100 g fw) at 593 nm.

Phenolic compounds were characterized by high-performance liquid chromatography (HPLC) coupled to photodiode array detector.



Statistic analysis

All analyses were performed in triplicate.

One-way analyses of variance (ANOVA) were performed using StatisticaTM v.8 software from Statsoft. Means were separated at the 5% significance level by Tukey's HSD test.

RESULTS & DISCUSSION

For all samples, the results of TPC (Figure 1a), AgW presented the higher value (46,2 ± 0,4 mg GAE/100 g fw), approximately twice the amount for LE.

Similarly, AgW exhibited greater antioxidant capacity in the AOx assessment, particularly for the DPPH and FRAP methods. However, in the ABTS assay, HE recorded a significantly higher value (7708 ± 200 µmol TE/100 g fw).

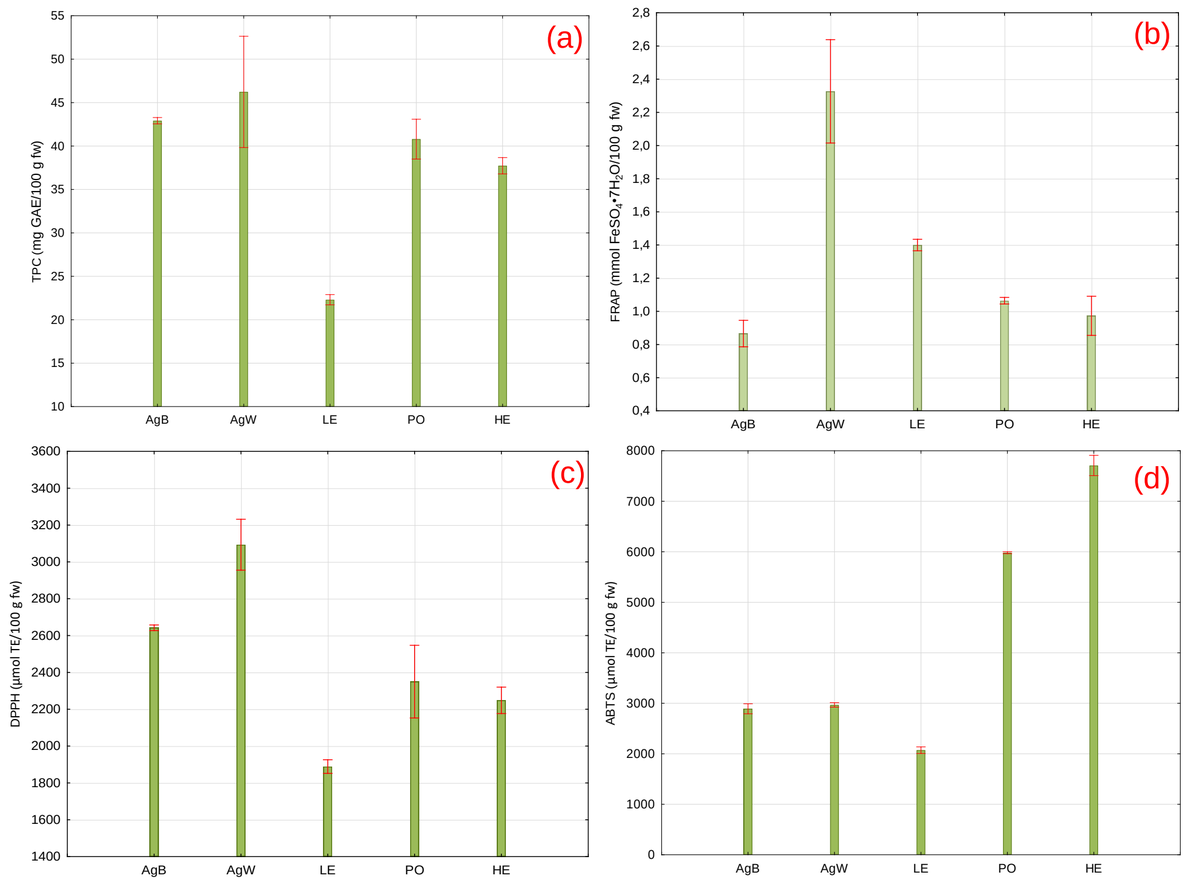


Figure 1. Phenolics and AOx quantification according to different methods. (a) TPC; (b) FRAP; (c) DPPH; (d) ABTS.

The TPC of the methanolic extracts of mushroom species was highly correlated with AOx_DPPH ($r=0.85$; $p<0.05$).

Table 1. Phenolics composition for PO, LE, AgW and AgB.

Sample	Ascorbic acid	Gallic acid	Protocatechuic acid	Catechin	Caffeine	Caffeic acid	Hydroxybenzoic acid	Vanillic acid	Chlorogenic acid	Coumaric acid
P. ostreatus	√	√	√	√	√	√	x	x	x	√
L. edodes	√	√	x	x	√	√	x	x	x	√
A. bisporus white	√	√	√	x	x	x	√	√	√	x
A. bisporus brown	√	√	√	x	x	x	x	x	√	√

Ascorbic acid and Gallic acid were found in the four samples, being the main compounds. Both compounds were found in descending order of AgW > PO > AgB > LE.

CONCLUSION

This study contributes to the growing knowledge about fresh cultivated mushroom species as sources of natural antioxidants, highlighting their potential as valuable functional foods with significant health-promoting benefits.

FUTURE WORK / REFERENCES

For future work, we intend to characterize HE phenolic profile and carry out a complete nutritional characterization.

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