Chemical and Bioactive Characterization of *Coriolus versicolor*, *Hericium erinaceus* and *Pleurotus ostreatus* mushroom biomass

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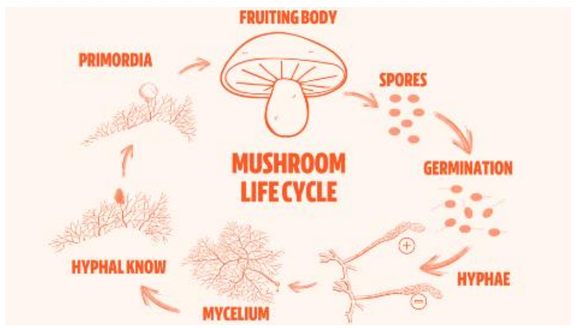
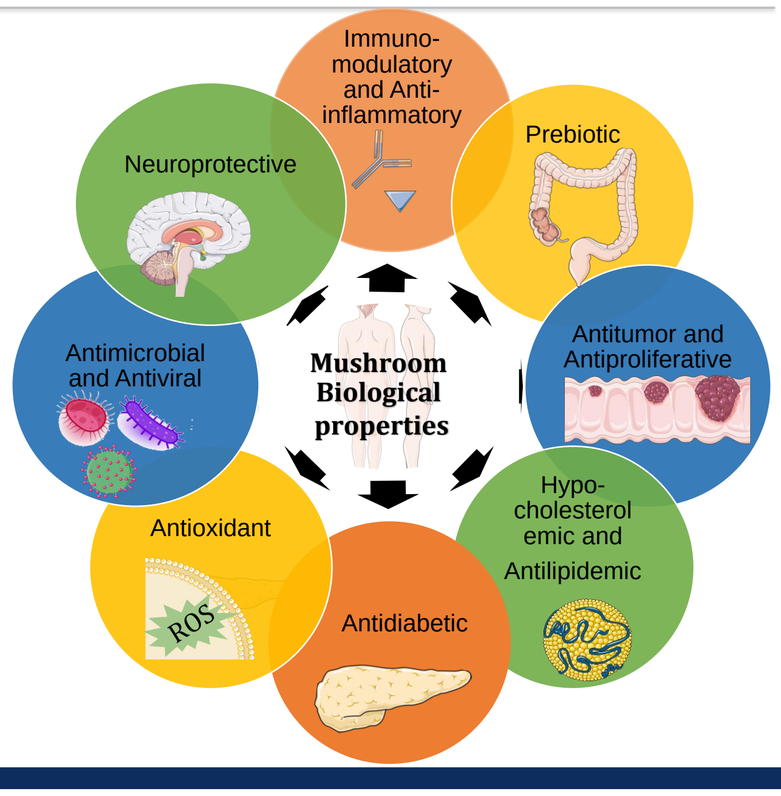
Background

Mushroom biomass

- **Different bioactive molecules**
- Contain all the nutrients and active compounds, including **β-glucans, enzymes** and **secondary metabolites**

- Positive **synergistic effect** between different bioactive compounds
- Entire **mushroom valorization** increase the **economic value** and **minimize waste**





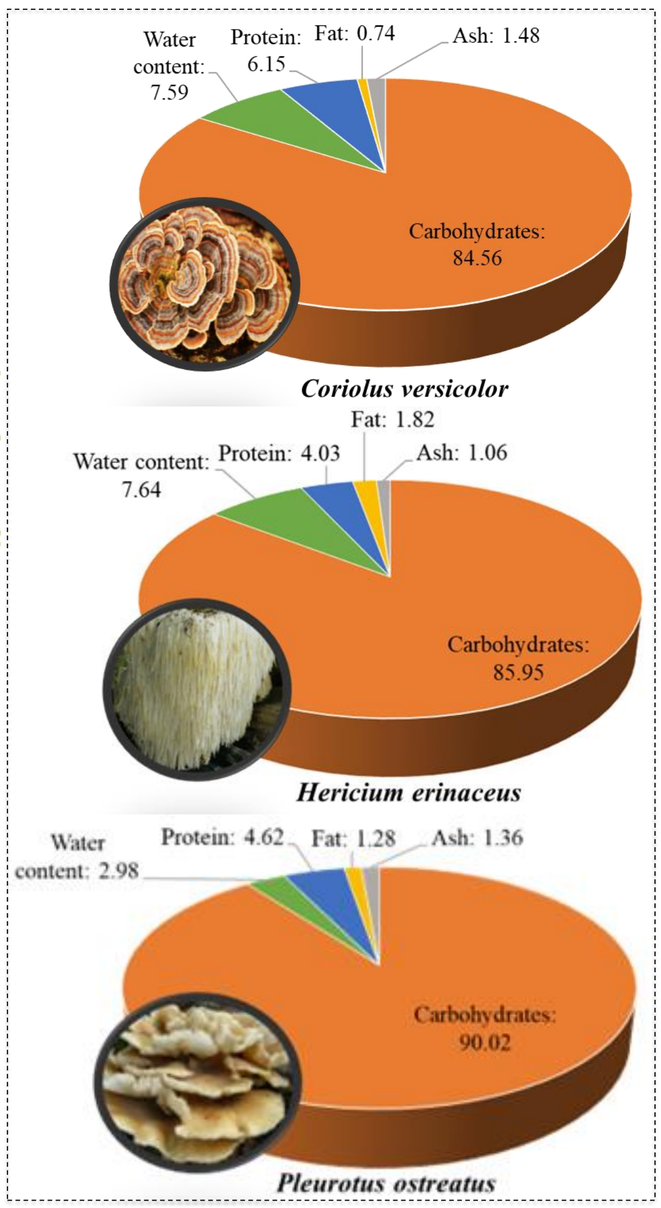
Objective and Methods

Assess chemical composition and identify main bioactive compounds of mushroom biomass

***Coriolus versicolor* (CV)** | ***Hericium erinaceus* (HE)** | ***Pleurotus ostreatus* (PO)**

- Centesimal composition
- α-glucans and β-glucans content
- Total/ free amino acids profile
- Mineral profile
- Fatty acid profile
- Ergoesterol and tocopherols

Results and Discussion



Amino acids (mg/ 100 g DM)

AAs	CV	HE	PO	CV	HE	PO
	Free			Total		
Asp	24.47±2.82[a]	N.D.	3.51±0.41[b]	845.62±82.71[a]	771.90±11.54[a]	806.65±38.07[a]
Glu	42.48±.6.16[a]	3.60±0.55[b]	14.42±1.53[c]	939.24±66.87[a]	797.34±9.50[a]	861.08±66.66[a]
Asn	18.40±2.69[a]	N.D.	0.46±0.11[b]	606.10±41.51[a]	523.51±5.27[a]	614.09±59.52[a]
Ser	N.D.	N.D.	N.D.	N.D.	N.D.	27.49±0.38[a]
His*	0.00±0.00[a]	0.00±0.00[b]	0.00±0.00[b]	0.01±0.00[a]	0.00±0.00[b]	0.01±0.00[a]
Gln	38.95±4.27[a]	N.D.	N.D.	211.65±24.88[a]	N.D.	N.D.
Gyn	21.18±3.26[a]	2.83±0.45[b]	1.07±0.18[b]	317.33±64.18[a]	392.13±0.03[a]	331.20±3.19[a]
Thr*	20.33±2.96[a]	4.20±0.53[b]	0.67±0.04[b]	348.74±40.20[a]	405.55±4.48[a,b]	473.93±31.11[b]
Arg	28.31±1.49[a]	N.D.	16.98±2.18[b]	638.32±61.63[a]	566.27±6.89[a]	626.03±63.10[a]
Ala	34.06±0.99[a]	3.96±0.58[b]	5.07±0.16[b]	615.74±50.21[a]	525.58±3.06[a]	603.51±68.11[a]
Gaba	24.27±3.99[a]	2.88±0.25[b]	3.33±0.04[b]	125.99±12.84[a]	77.62±0.98[b]	80.26±4.29[b]
Tyr	5.15±0.05[a]	0.64±0.02[b]	1.30±0.17[c]	374.56±54.99[a]	342.98±1.92[a]	365.16±44.71[a]
Val*	17.32±0.04[a]	1.38±0.20[b]	0.47±0.04[c]	460.37±47.11[a]	414.47±5.39[a]	490.78±29.87[a]
Met	N.D.	N.D.	N.D.	31.62±1.43[a]	62.03±0.05[b]	34.35±9.51[a]
Trp*	2.32±0.20[a]	0.16±0.01[b]	0.09±0.01[b]	62.92±7.37[a]	58.98±0.69[a]	65.10±2.47[a]
Phe*	18.32±1.03[a]	1.47±0.20[b]	1.15±0.06[b]	325.55±12.07[a]	298.96±2.15[a]	337.91±41.07[a]
Ile*	17.25±0.89[a]	0.83±0.12[b]	N.D.	495.60±37.64[a]	451.66±12.70[a]	590.31±82.28[a]
Leu*	20.38±2.15[a]	4.14±0.00[b]	2.70±0.35[b]	540.79±67.20[a]	511.60±3.61[a]	560.78±51.31[a]
Total	349.75±21.86[a]	28.25±1.75[b]	63.78±2.02[c]	6940.1±318.2[a]	6308.3±494.1[a]	6841.2±444.9[a]

- ↑ diversity of AAs
- ↑ [FAA] in CV
- No significant differences in TAAs between species
- The most incident Aas were Glu, Asp, Asn, Arg, Ala and Leu

Minerals (mg/ 100 g DM)

Mineral	CV	HE	PO
Mo	0.04±0.01[a]	0.07±0.01[b]	0.10±0.01[b]
Zn	1.85±0.05[a]	2.03±0.05[b]	2.37±0.03[c]
Cd	0.01±0.00[a]	0.02±0.00[b]	0.01±0.00[a]
P	410.67±8.41[a]	314.00±5.18[b]	397.12±8.05[a]
Ni	0.01±0.00[a]	0.01±0.00[a]	0.05±0.01[b]
Mn	3.87±0.08[a]	2.38±0.03[b]	4.17±0.07[c]
Fe	2.03±0.09[a]	0.39±0.03[b]	0.76±0.04[c]
Mg	163.70±2.12[a]	118.77±1.18[b]	149.57±1.88[c]
Ca	24.41±0.37[a]	22.05±0.26[b]	14.74±0.21[c]
Cu	0.40±0.01[a]	0.27±0.00[b]	0.35±0.01[c]
Na	14.51±0.37[a]	5.01±0.02[b]	0.94±0.10[c]
K	242.70±2.17[a]	164.52±1.63[b]	285.10±3.49[c]
Total	864.19±9.93[a]	629.54±7.21[b]	855.29±12.35[a]

Fatty acids (g/ 100 g DM)

Total FA	CV	HE	PO
SFA	0.22±0.02[a]	0.48±0.05[b]	0.34±0.02[c]
MUFA	0.32±0.03[a]	0.91±0.08[b]	0.57±0.02[c]
PUFA	0.30±0.03[a]	0.72±0.05[b]	0.53±0.03[c]

Tocopherols (g/ 100 g DM)

Bioactive compounds	CV	HE	PO
α-Tocopherol	94.20±2.58[a]	410.81±45.80[b]	16.75±1.82[c]
β-Tocopherol	7.04±1.24[a]	29.17±0.96[b]	0.46±0.01[c]
γ-Tocopherol	79.30±2.02[a]	312.42±10.01[b]	52.69±5.21[c]
δ-Tocoferol	13.26±1.92[a]	64.35±2.48[b]	10.48±2.25[a]
Total	193.81±7.42[a]	816.74±42.17[b]	80.38±5.99[c]

(µg/ 100 g DM)

Ergosterol	8.97±0.68[a]	1.57±0.07[b]	5.20±0.34[c]

Glucans (g/ 100 g DM)

Glucans	CV	HE	PO
Total glucans[1]	76.15±5.06[a]	79.87±0.57[a]	80.45±5.05[a]
α-glucans[1]	71.49±7.26[a]	76.98±4.33[a]	77.49±2.22[a]
β-glucans[1,*]	4.67±1.28[a]	2.89±0.55[a]	2.96±0.52[a]

- α-glucans were the most prevalent group (>75% DM)

- CV possess significant ↑ [Ergosterol] (which is the D vitamin precursor and immuno-active lipid)
- HE showed a significant ↑ [tocopherols] (E vitamin isomers)
- All species possess an interesting mineral profile (P, Mg, Ca and K)

Conclusions and Future Perspectives

- **α-glucans were the most prevalent group, which is a very interesting result due to its reported prebiotic potential, and it is also an opportunity to study their biological properties since the studies are scarcer and more limited compared to β-glucans.**
- **The biochemical characterization showed a considerable presence of amino acids, minerals, unsaturated fatty acids, ergosterol and tocopherols that play important roles in human health including in the brain, cardiovascular and kidney functions.**
- **As future work, the gastrointestinal impact on these bioactive compounds will be assessed as well as the potential on gut microbiota modulation.**

Acknowledgements

We would like to thank the National Funds from FCT—Fundação para a Ciência e a Tecnologia through project UIDB/50016/2020 and FCT individual PhD grant number 2020.05798.BD.

Fundação para a Ciência e a Tecnologia