

17th International Conference on

Polyphenols Communications 2006

**August 22 - 25, 2006
Winnipeg, Manitoba, Canada**

**Editors
F. Daayf
A. El Hadrami
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P201. PHENOLIC PROFILE AND ANTIOXIDATIVE PROPERTIES OF THE BEEFSTEAK FUNGUS *FISTULINA HEPATICA*

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Abstract

The phenolic composition of the edible beefsteak fungus *Fistulina hepatica* was determined by HPLC/DAD. The results showed a profile composed by caffeic, p-coumaric and ellagic acids, hyperoside and quercetin. Ellagic acid was the main compound in this species. Beefsteak fungus was also investigated for its capacity to act as a scavenger of DPPH radical and reactive oxygen species (superoxide radical, hydroxyl radical and hypochlorous acid). Good results were obtained against DPPH and superoxide radicals and hypochlorous acid but a prooxidant effect was observed for hydroxyl radical.

Introduction

Fistulina hepatica mushroom, commonly known as beefsteak fungus, usually is a saprobic and sometimes a parasitic fungus that lives on the wood of hardwoods (especially oaks and chestnut), during Summer and Autumn. In the past, it was often cooked and eaten as a substitute for meat. The high consumption of this edible wild-growing mushroom demands a better knowledge of their chemical composition and biological potential. So, this work was developed in order to identify and quantify the phenolic compounds of the beefsteak fungus collected in Trás-os-Montes (Portugal) and to evaluate its antioxidant capacity.

Materials and Methods

Extraction. 10 g of powdered mushroom (910 µm) were boiled for 30 min in 500 mL of water and then filtered over a Büchner funnel. The resulting extract was lyophilized.

HPLC analysis of phenolics. The extracts were analysed using an analytical HPLC unit, with a Spherisorb ODS2 column [1].

Antioxidant activity. DPPH [2], superoxide radical [3] and hypochlorous acid scavenging activities [4], effect on xanthine oxidase activity [3] and hydroxyl radical assay [4] were performed according to described procedures.

Results and Discussion

The phenolic profile determined by HPLC/DAD revealed to be composed by five compounds (Fig. 1): caffeic, p-coumaric and ellagic acids, hyperoside and quercetin. Data from the quantification of the identified compounds showed that the phenolics amounts in beefsteak fungus ranged from ca. 367 to 549 mg/kg. The results obtained revealed that ellagic acid was the main compound, representing ca. 49.7% of total identified compounds.

The lyophilized aqueous extract of beefsteak fungus displayed an effective antioxidant capacity in the DPPH assay, in a concentration-dependent manner, with an IC_{25} at 136 µg mL⁻¹.

Beefsteak fungus lyophilized extract revealed to be a potent scavenger of superoxide radical generated in the enzymatic system, and the effect was concentration-dependent (IC_{50} at 114 µg mL⁻¹). In addition, it exerted some inhibitory effect on xanthine oxidase, which was also concentration dependent (IC_{50} at 1444 µg mL⁻¹). Therefore, it was not possible to show a clear-cut scavenging effect on superoxide radical. The capacity of the lyophilized extract to strongly scavenge superoxide radicals in a concentration-dependent way was confirmed when this radical was generated by a chemical system, and an IC_{50} at 105 µg mL⁻¹ was found. So, beefsteak fungus lyophilized extract exhibits antioxidant activity, achieved by its capacity to act as both superoxide radical scavenger and as xanthine oxidase inhibitor.

Regarding hydroxyl radical, a prooxidant effect was noticed, which can be due to the capacity of the extract to reduce iron ions, as it was observed when hydroxyl radicals were generated in the absence of ascorbic acid.

Beefsteak fungus lyophilized extract exhibited a weak antioxidant protective activity against damage by HOCl, with an IC_{15} at 1458 µg mL⁻¹.

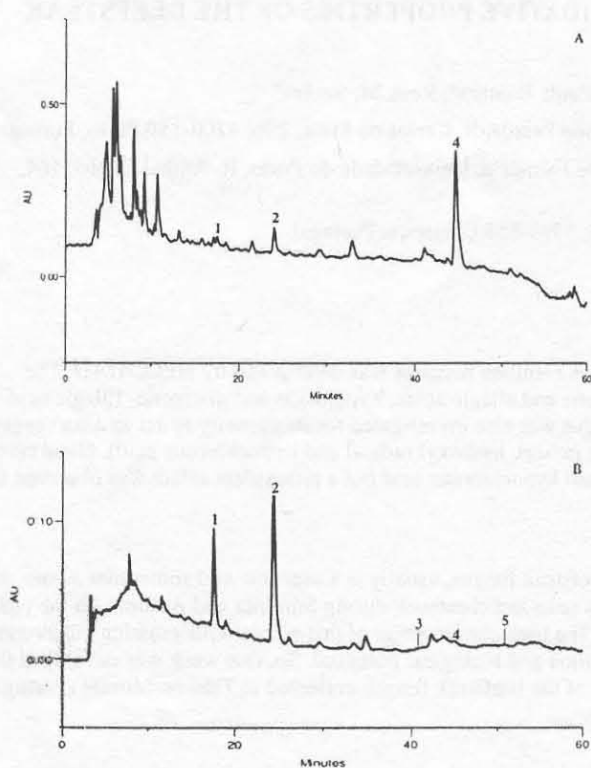


Fig. 1. HPLC phenolic profile of *Fistulina hepatica*. Detection at (A) 250 and (B) 320 nm: (1) caffeic acid; (2) *p*-coumaric acid; (3) hyperoside; (4) ellagic acid; (5) quercetin.

In conclusion, the results obtained in this study indicate that beefsteak fungus constitutes an interesting dietary source of compounds which could be involved in health protection. The protective activities observed against DPPH radical, superoxide radical and hypochlorous acid may be due, at least to some extent, to the presence of these compounds, despite the prooxidant effect noticed for hydroxyl radical.

Acknowledgements

Branca M. Silva and Bárbara Ribeiro are indebted to Fundação Calouste Gulbenkian and to Fundação para a Ciência e a Tecnologia (SFRH/BD/22108/2005), respectively, for their grants.

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