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Food and Health - Risks and Benefits

Book of Abstracts

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Effects of electron beam irradiation on antioxidant activity of mushrooms *Amanita* spp.

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A diet rich in natural antioxidant compounds has been linked to a reduced risk of developing chronic oxidative stress-related diseases, including cancer and cardiovascular and neurodegenerative diseases. In addition to their highly appreciated nutritional value, mushrooms could be an interesting source of antioxidant compounds [1]. Nevertheless, their short shelf-life might be a limitation to the distribution and marketing of fresh mushrooms. Drying is one of the most used conservation methods applied to mushrooms [2], but it causes the reduction of vegetative cells of microorganisms, which gives rise to a flora of bacteria and fungi that have the ability to survive for long periods in dried foods, producing toxins harmful to human health [3]. In this sense, electron beam irradiation is a possible way to improve food quality, reduce the incidence of foodborne diseases caused by microorganisms, decontaminate pests, insects or parasites that inflict food spoilage and toxicity, thereby replacing the chemical treatments [3]. Nevertheless, this process should keep the chemical and bioactive characteristics of the matrices. Herein, the effects of electron beam irradiation in the antioxidant potential of *Amanita caesarea* (Scop.) Pers. and *Amanita curtipes* E.-J. Gilbert dried samples were evaluated.

The fruiting bodies were obtained in Trás-os-Montes, in the Northeast of Portugal, in October 2013, and dried at 30 °C in an oven. Subsequently, the samples were divided in four groups with five specimens of each mushroom species: control (non-irradiated, 0 kGy); sample 1 (2 kGy); sample 2 (6 kGy) and sample 3 (10 kGy), kept in polyethylene bags. The irradiation was performed at the Institute of Nuclear Chemistry and Technology, in Warsaw, Poland. The antioxidant properties were evaluated through scavenging activity against 2,2-diphenyl-1-picrylhydrazyl (DPPH) radicals, reducing power, inhibition of lipid peroxidation using thiobarbituric acid reactive substances (TBARS) and β-carotene-linoleate model systems.

With no exception, irradiated samples (especially for the higher doses) showed to be more antioxidant, either as DPPH radical scavengers, ferric reducers and β-carotene bleaching or TBARS formation inhibitors. The higher antioxidant activity was coherent with the levels of phenolics, which also increased with extending irradiation doses. Except for TBARS formation inhibition, *A. caesarea* showed higher antioxidant activity than *A. curtipes,* and besides this action, the assayed mushroom proved to be particularly active as reducing agent.

An increased bioactivity with the doses reflects an additional advantage of irradiating mushrooms. Electron beam irradiation might provide a useful alternative to ensure the quality and extend the life of mushrooms.

Keywords: Wild mushrooms, Amanita spp., Drying, Electron beam, Antioxidant properties.

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