

Mushrooms as Natural Antioxidant Agents

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In many parts of the world, secondary metabolites derived from fauna, flora and mycobiota are very important natural resources used in the construction of many medicines. By adapting to abiotic and biotic stress conditions, natural products emerge as a result of years of ongoing evolution of living organisms. These emerging bioactive compounds have been used as medicines for many years and today they continue to be reserves of potential drugs [1]. The pharmacological evaluation of fungi from these bioactive compound sources is increasing day by day. Only about 10% (approximately 14,000) of the mushrooms, which maintain cosmopolitan lives on earth and estimated to include around 140,000 species, are named, although the count is increasing [2]. Since ancient times, people consumed mushrooms as nutrients, especially during the rainy season. In addition to their nutritive properties, mushrooms are considered as significant medical sources due to the biologically active compounds they contain [3]. Fungi are increasingly being used in the treatment of complex and pandemic diseases such as acquired immunodeficiency syndrome (AIDS), especially in the treatment of diseases such as skin diseases, as well as in the use of many medical fields. Today, it is known all over the world that fungi are important biological resources in terms of secondary metabolites they produce in their bodies. These secondary metabolites are chemically quite diverse and have a wide range of biological activity sought in traditional medicines [4]. Their ingredients include several secondary metabolites such as phenolic compounds, polyketides, terpenes and steroids [5]. These secondary metabolites, which do not contain nutritional value, are distinguished by their medical properties. These secondary metabolites play a vital role in the antioxidant defense mechanisms in biological systems [6].

Phenolic compounds consist of hydroxylated compound groups or aromatic rings with more than one hydroxyl group. In addition to function in several reactions as hydrogen or electron donor, polyphenols could also act as antioxidants, as they could balance the chain-breaking reaction and stop the Fenton reaction. There is a positive correlation between antioxidant activities and phenolic compounds in mushrooms. Mushrooms contain phenolic acids as phenolic compounds. Antioxidant capacities of phenolic acids are due to their phenolic hydrogen content. Especially natural mushrooms contain several phenolic acids. These include gallic acid, caffeic acid, quercetin, hesperidin and cinnamic acid. Recent studies indicated that mushrooms have several pharmacological effects including the stimulation of immune system, anti-carcinogen, anti-inflammatory, antimicrobial, anti-allergic, antioxidant, DNA protective properties due to their phenolic acid content [7,8].

Synthetic drugs used by humans could cause adverse effects such as toxic and mutagenic effects. Due to these negative effects, the use of natural products instead of synthetic drugs is preferred for a healthy life and a better physical defense system [9]. Thanks to the antioxidant capacity of phenolic acids that mushrooms generate, they help to reduce the oxidative damage caused by environmental and inherent factors in living organisms. As a result of the oxidative stress caused by free radicals, serious health problems such as neurological disorders, cardiologic diseases, cirrhosis, diabetes, leukemia and necrosis could occur [10]. Antioxidants play an active role in inhibition of the oxidative stress

in living organisms. Antioxidant supplements need to be taken in cases where the antioxidants produced by the living organism are inadequate against the present oxidant compounds. Studies on pharmaceutically significant mushrooms are still very few. Thus, the identification of biological activities in mushrooms is very important for the discovery of new antioxidant agents.

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