

Short Review on Mushrooms and Their Utilization As Nutritional Supplements

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Asian Journal of Complementary and Alternative Medicine. Volume 10 Issue 02

Published on: 28/03/2022

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Cite this article as: Chang SST. *Short Review on Mushrooms and Their Utilization As Nutritional Supplements*. Asian Journal of Complementary and Alternative Medicine, Vol 10(2), 36-37:2022.

WHAT ARE MUSHROOMS?

Mushrooms are fruiting bodies of macrofungi, which with other fungi are something special in the living world, being neither plants nor animals. They have been placed in a kingdom of their own called the kingdom of Mycetozoa. Mushrooms are without buds, without leaves, and without flowers. Yet they produce fruiting bodies [1]. They are without chlorophyll and also devoid of vascular, xylem and phloem. Although they cannot carry out photosynthesis, they can biosynthesize innumerable vital organic products. But their cell wall contain chitin rather than cellulose. A more recent report on mushroom fossilized indicated that a 440 million year-old fossilized mushroom may be the oldest organism to have lived in dry land [2].

NUTRITIONAL AND MEDICINAL VALUE OF MUSHROOMS

The greatest difficulty in feeding man is to supply a sufficient quantity of the body-building material – protein. The protein content of cultivated species ranges from 1.75 to 5.9% of their fresh weight – high compared to other common foods. The other three nutritional categories are: the source of energy food—carbohydrates and fats; accessory food factors – vitamins; and inorganic compounds which are indispensable to good health. Of course, water too, is essential.

The second major attribute of mushrooms, their medicinal properties, has been drawn to a great attention during the last thirty years [3]. Of the 14,000—15,000 species of so-called

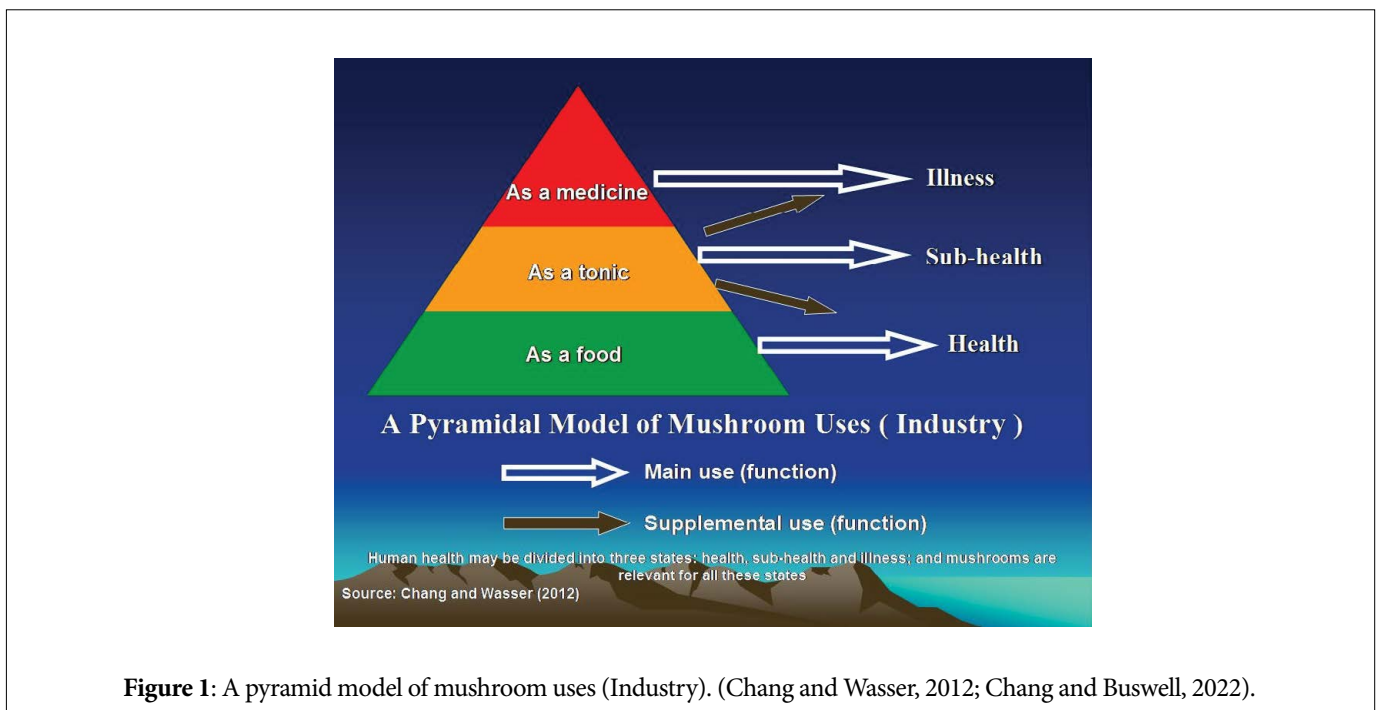


Figure 1: A pyramid model of mushroom uses (Industry). (Chang and Wasser, 2012; Chang and Buswell, 2022).

mushrooms in the world, around 1,800 species of mushrooms have potential medicinal properties. Both these mushrooms and their root-like structure (called mycelium) produce several medicinal or nutraceutical/ nutraceutical (general immune enhancing) compounds, central of which are the polysaccharides (high molecular weight strings of sugars), triterpenes and immunomodulatory proteins.

MUSHROOM BIOLOGY: THE IMPACT ON MUSHROOM PRODUCTION AND MUSHROOM PRODUCTS.

Principles of mushroom Cultivation and production.

The cultivation of mushrooms ranges from a relatively primitive farming activity to a highly technological industry. In each case, however, continuous production of successful crops requires both practical experience and scientific knowledge. Mushroom cultivation is both a science and an art. The science is developed through research; and the art is perfected through curiosity and practical experience [2].

The Pyramid Model of the Mushroom Industry.

It has been noted that a nutritious balance of foods and an active lifestyle under a friendly environment can help achieve optimal health throughout life. The pyramidal model of mushroom uses (Figure 1) conforms fully to an old Chinese saying ‘Medicine and food have a common origin’. This statement is particularly applicable to mushrooms, whose nutritional qualities and tonic effects as nutraceuticals [4] or as dietary supplements (DSs) and medicinal attributes have long been recognized [5,8]. Human health may be divided into three states: health, sub-health, and illness. Mushrooms

can be used mainly as food for a healthy state, as a medicine for illnesses and as DSs for a sub-healthy state, as well as for both healthy and ill states as indicated [6,7].

REFERENCES

1. Chang ST, Miles PG. (2004) *Mushrooms—Cultivation, Nutritional value, Meditational effect, and Environmental Impact* (second edition). CRC Press. pp 451
2. Chang ST, Wasser SP (2017) The cultivation and environmental impact of mushrooms. *Oxford Research Encyclopedia of Environmental Science*. : <http://environmentalscience.oxfordre.com/view/10.1093/acrefore/9780199389414.001.0001/acrefore-9780199389414-e-231> 228.
3. Chang ST, Buswell JA (2003) Medicinal mushrooms—a prominent source of nutraceuticals for the 21st century. *Curr Topics Nutraceut Res*, 1(3), 257–280.
4. Chang ST, Buswell JA (1996) Mushroom nutraceuticals. *World J Microbiol Biotechnol*, 12, 473–476.
5. Wasser SP (2017) Medicinal mushrooms in human clinical studies. Part I. Anticancer, oncoimmunological, and immunomodulatory activities: A review. *Int J Med Mushr* 19(4): 279-317.
6. Chang ST, Wasser SP (2012) The role of culinary-medicinal mushrooms on human welfare with a pyramid model for human health. *Int J Med Mushr* 14 (2):95-134.
7. Chang ST, Buswell JA (2022) Medicinal Mushrooms – Past, Present and Future. In “Medicinal Mushroom Bioengineering and Biotechnology edited by M. Berovic and J. j. Zhong. Springer.
8. Wasser SP (2010) Medicinal mushroom science: Current status, future trends and unsolved problems. *Int J Med Mushr* 12(1): 1-16.