The Maitake Mushroom

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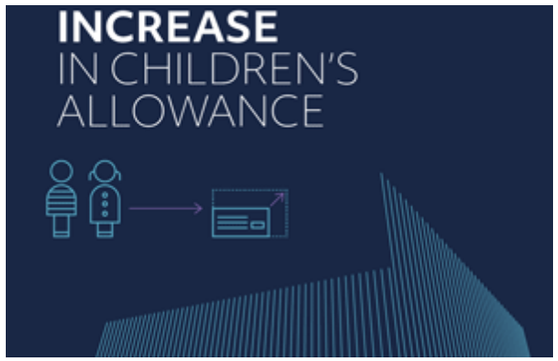

The maitake mushroom is scientifically known as *Grifola frondrosa* and is native to Japan. This wild mushroom may also be found in China and North America too. The word "maitake" in Japanese means "dancing mushroom". This mushroom was probably denoted this name since, upon discovering it, people started dancing with happiness and joy due to its wonderful taste and outstanding health benefits. Others believe that it is named "maitake" since it looks like dancing butterflies. While, the Latin name *Grifola frondose* refers to the mythological monster, Grypas, who had the body of a lion and the head and wings of an eagle. Furthermore, its feathery morphological appearance has also contributed to its other common name "hen of woods" or *"hui-shu-hua"* (grey tree flower) in Chinese. All these striking names show how important and special this mushroom was to many people. In fact, back in the day, this exquisite mushroom had monetary value in Japan, and was worth its weight in silver!

The maitake mushroom is typically composed of several fans that are tan, grey and white. Maitake mushrooms are massive and able to produce clusters of over 40kg which is not considered abnormal. These mushrooms can measure up to a meter wide and is a cluster of overlapping, spoon-shaped caps that are individually about 2 to 7cm across and are about half a centimetre thick. The top of the caps are typically brown-grey while being white underneath. The caps are fleshy to the touch but the underside has tiny pores. Its fruiting body sprouts from the underground tuber and is roughly the size of a fist. Maitake has a central stem too which has a complicated branch structure coming off of it. Wild maitake mushrooms are typically seen growing at the bottom of Oak, Elm and Maple trees during the autumn months.

Maitake mushrooms are considered a highly healthy food due to their rich protein, carbohydrate, dietary fibre, vitamin D_2 and mineral content. It is also cholesterol and fat-free and is low in calories. This species' distinctive sweet and umami flavour has contributed to its increased use in cuisine. These flavours are a result of their high trehalose, glutamic and aspartic amino acids and 5' nucleotide content. Apart from being used as a food ingredient, they are used as a food-flavouring substance in their dried powder form. Furthermore, maitake mushrooms have several health benefits and therapeutic applications in the pharmacological and medicinal industries.

Traditionally maitake mushrooms are used as an adaptogen, a tonic that balances the entire body and improves stress resilience. It is also used in managing hypertension, hypercholesteremia, cancer and diabetes as well as an immune boosting agent. The D-fraction, a beta-glucan complex with about 30% protein, is one of the prominent bioactive components in maitake. Other bioactive polysaccharide fractions isolated from this species like X-fraction, Grifolan and MZ-fraction possess numerous therapeutic effects like immunomodulation, antitumour, antivirus and anti-inflammation activity. Maitake polysaccharides can influence the gut microbiome too which plays a role in maintaining immune

 eostasis.

endothelial cells, fibroblasts and so forth. Studies have also shown the cell differentiation properties of the D-fraction. As in a study using human umbilical cord blood cells, the extract stimulated the differentiation of these cells into CFU-GM and reduced doxorubicin-induced hematopoietic toxicity. This suggests that maitake extract might be capable of inducing hematopoietic cell differentiation and protecting them from the toxic effects of chemotherapy. In particular, maitake extract or D-fraction may have clinical implications in the treatment of myelosuppression and other hematopoietic diseases. Furthermore, a non-randomised study of D-fraction in 165 patients with various types of advanced cancer revealed the extract's anti-cancer activity too. This study had shown that tumour regression and/or symptomatic improvements were observed in 73% of breast cancer patients, 67% of lung cancer patients and 47% of liver cancer patients.

Additionally, apart from maitake promoting healthy blood glucose levels and fertility, it is also an antiviral agent. In 1992, a report on an in-vitro anti-HIV screening test for D-fraction showed that D-fraction was effective in combating HIV and preventing HIV-mediated destruction of CD4+ cells up to 97%. Furthermore, D-fraction was found to be as potent as azidothymidine which is a common Aids drug but with certain side effects. Another study of D-fraction on Aids patients showed that oral administration of it led to an increase in CD4+ cell counts to 1.4-1.8 folds. Thus, it is safe to say that D-fraction extracted from maitake mushrooms is considered a potential anti-HIV agent since it is believed to directly inhibit HIV replication while concurrently stimulating the body's defence system against the virus. Similarly, antiviral activity against other viruses like hepatitis and influenza is also observed by maitake.

Although most individuals tolerate maitake mushrooms and extracts well, some mild digestive issues have been observed in some as a common side effect. In rare cases, maitake may provoke an allergic reaction with a rash, swelling and breathing difficulties too. Presently, not enough studies have been conducted to verify the safety of maitake consumption during pregnancy or breastfeeding. Furthermore, as reported in one case, it is believed that maitake D-fraction can interact with the blood thinner, warfarin, leading to an increase in INR. INR is a test performed to measure the time for the blood clot. This is also known as prothrombin time (PT) and is used to monitor blood-thinning medicines. Thus, if INR increases, the time taken for blood to clot increases which can lead to bleeding. Some evidence suggests that maitake mushroom extracts can interact with blood sugar regulators that are used in managing diabetes too.

Therefore, although this mushroom has supreme health and nutritional qualities, sufficient data on its safety is not present yet and although its medicinal potential is evident, further clinical studies are urged to unveil its full therapeutic attributes together with its pharmacological safety.

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