

Lion's Mane Mushroom- From Culinary to Medicine

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Abstract: Lion's Mane, a distinctive mushroom found across the Northern Hemisphere, has captivated the world with its unique appearance and potential health benefits. This article explores the diverse facets of Lion's Mane, from its taxonomy and habitat to its rich nutritional composition, including proteins, carbohydrates, fats, vitamins, minerals, and an array of biologically active compounds, notably polysaccharides and phenolic compounds. Lion's Mane is emerging as a potent dietary supplement, with research highlighting its positive impact on brain health, nerve recovery, mood stabilization, gastric health, heart health, blood sugar regulation, cancer prevention, and immunity enhancement. While Lion's Mane offers promising health benefits, it is essential to recognize its role as a complementary dietary addition rather than a substitute for medical treatments. Fortunately, Lion's Mane is generally considered safe for prolonged consumption, with minimal reported side effects. As research continues to unveil the multifaceted potential of Lion's Mane, it stands as a fascinating and versatile natural resource with the promise of contributing to improved well-being and longevity.

Keywords: lion's mane, polyphenols, polysaccharides, medicine uses, nutraceuticals

Introduction

Mushrooms are delicate, beautiful and provided humans with one of the first antibiotics, penicillin. Some are toxic, and most are consumable. Yet, they are wonderful in the way that they have their kingdom. They are neither plant nor animal – they are entirely different beings. The whole body of the mushroom, together with fruit (mushroom) and root (mycelium), is called **fungi**. So, yes, all mushrooms are essentially fungi residing in their distinct class. Fungi emerged as separate unicellular organisms in the Precambrian period (from 4.6 billion to 541 million years ago)[1]. So, mushrooms are distant relatives of humans in some ways. However, they continued their distinct journey of evolution in the Cambrian period.

Humans have consumed mushrooms since they were hunters and gatherers. They learned about their nourishing properties, realized their medicinal value. People also knew that some could be used for recreation, while other mushrooms are toxic. Despite such an old relationship with mushrooms, we are just starting to explore their health benefits fully. In fact, the situation is so absurd that experts are even unsure of how many species of fungi are there in the world. Though estimates vary, but researchers think that there are few million species of fungi. It also means that there are few thousand types of edible and medicinal mushrooms that are widely used[2]. This article explores one such mushroom that is both edible and has many health effects. It is nutritious, and can be source of remedies.

Lion's Mane, a mushroom of many names

Lion's Mane (also called “bearded tooth”) grows in most parts of the Northern Hemisphere, except in tropical or arctic regions. Thus, it has a different name in each language. It is commonly called Lion's Mane due to its appearance. It is called *Hericium Erinaceus* in Latin. “Shishigashira” or “Houtou” in China, and the Japanese call it “Yamabushitake”[3].

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Although it is present in most of Europe, it is among the rare mushrooms in the wilderness. It is more common in North America, China, and Japan. It has a long history of use in traditional medicine in China. China is also among the leading growers of mushrooms globally[4].

Those looking to find these fungi in a natural environment should be careful. It has a protected status in many European nations. Its picking is prohibited in England and Wales[5].

Fungi can be big and small

All fungi are made up of a thread-like filament called hyphae. However, these hyphae combine in different ways to produce so many different fungi. Fungi are further divided into lower fungi (smaller in size) and higher fungi (larger in size). Higher fungi can grow in large as their filament or hyphae are divided into multiple compartments with the help of a wall-like structure called septa[1].

Lion's Mane is a higher fungus or macro-fungi. There are known 14000 species of higher fungi, and out of them, 350 are consumed by humans[6].

Lion's Mane grows mainly on dead and decaying trees

Experts would call it a saprophyte, a kind of mushroom that grows on dead and decaying trees. However, in rare cases, it may be parasitic and grow on living trees[7]. It mostly grows on dying deciduous trees. In some countries like China, people also cultivate it.

It propagates in nature through spores. Its spores are pretty resistant to various climatic conditions and can survive for up to 7 years.

It appears to love warmth, but not heat. It **grows pretty well in temperatures of 25 to 30°C**. It may also grow well in lower temperatures like 20°C, but not in freezing conditions. Its sporulation stops at temperatures between 31-33°C. It explains why it is mainly found in Europe in later summer or Autumn. But, it cannot grow in tropical or sub-tropical regions. Moreover, it does not appear to like very high humidity[7].

Lion's mane constituents

Mushrooms are the best example of food as a medicine. Various varieties of mushrooms are consumed as a food, including Lion's Mane. However, people are significantly more interested in its various biologically active compounds as they are responsible for its numerous health benefits[7-9].

Composition of Lion's Mane:

- 20-22% proteins
- 57-67% carbohydrates
- 2.8-3.5% fats
- Numerous vitamins (like tocopherols) and minerals (trace elements)
- Biologically active compounds

Lion's Mane is definitely quite nutritious and can be an excellent source of proteins for vegans. However, people are more interested in the content of biologically active compounds that confer health benefits.

Most of the compounds responsible for health benefits are polysaccharides (complex carbs) and phenolic compounds. Researchers are particularly interested in polysaccharides other than glucose: ribose, arabinose, xylose, galactose, and mannose. Polysaccharides like

xylans, galactoxyloglucans, heteroxyloglucans, glucoxylans, erinacines, and hericenones have numerous health benefits. However, it is vital to understand that this list is not comprehensive, as researchers have identified hundreds of bio-active compounds[7,9,10].

Some bioactive compounds and their action[7]:

| Bioactive compounds | Some known health effects |
|---------------------------------|--|
| Polysaccharides | Anti-inflammatory, immunomodulatory, anticancer, antimicrobial, gastroprotective, hepatoprotective, glucose-lowering, cholesterol-lowering |
| Hericenones A-B | Anticancer or cytotoxic, reduces platelet aggregation |
| Hericenones C-H, erinacines A-I | Neuroprotection, prevention of neurodegenerative disorders |
| Hericirine | Anti-inflammatory |
| Polyphenols | Antioxidants |

Lion's mane health benefits

Lion's mane extract is often used as a health supplement. Researchers are studying its numerous health benefits. It is especially regarded to be good for nerve health. However, it is worth understanding that health supplements cannot claim to diagnose or treat disease conditions.

Brain health/Nootropic/Memory support

Neurodegenerative disorders like dementia are now a significant health threat in the UK. A healthy lifestyle may lower dementia's risk[11]. Adding Lion's Mane to the diet may have certain benefits. Experimental studies suggest synergistic interaction between Lion's mane extract and nerve growth factor (NGF). Lion's mane also appear to help with memory. One of the systemic reviews found that mushroom extracts like that of Lion's Mane have a positive impact on cognition[12–15].

In practice, it means that Lion's Mane is good for brain health. Its regular consumption may be one of the ways of lowering cognitive decline. However, it is not a treatment for brain diseases.

Accelerate recovery from nerve injury

Lion's Mane is also proposed to be good for nerve health. Peripheral nerves may get damaged due to physical injury, toxins, anticancer treatment, or more commonly, diabetes. In experimental studies, Lion's mane extract appears to promote nerve recovery and growth. Thus, it may have a role as a health supplement in preventing neuropathies[13,16,17].

It helps counter mild anxiety and depression

Chronic ingestion of Lion's mane extract promotes nerve growth and modulates the activity of certain neurohormones. Thus, it may exert a mood-stabilizing effect, help prevent anxiety, lower the risk of depression. It may help on regular use for 4 weeks or more. Thus, it may be used as one of the ways of preventing mood disorders. However, it should not be used as a monotherapy for the treatment of severe mood disorders[18–20].

Gastric health

Traditional Chinese medicine regards Lion's Mane as good for gastric health. Modern experimental studies show that it may help prevent damage to gastric cells caused by ethanol. It also suppresses the activity of H. Pylori, a bacteria frequently responsible for gastric ulcers. Thus, regular use of Lion's Mane may help prevent gastric issues[21–23].

Heart health and cholesterol control

Mushrooms are naturally low in fats and do not contribute to hypercholesteremia. Additionally, certain mushrooms like Lion's Mane have compounds that suppress lipid oxidation and exert an antihyperlipidemic effect. Thus, Lion's Mane is regarded as good for cardiovascular health[24,25].

Lower blood sugar levels

Mushrooms can be safely consumed by those living with diabetes, as they are low in glycemic index. Additionally, some mushrooms like Lion's Mane contain compounds that may help lower the risk of metabolic disorders. For example, lion's Mane appears to exert an inhibitory effect on α -amylase and α -glucosidase, thus helping keep blood glucose levels in check[26,27].

Cancer prevention

A balanced diet and the right lifestyle choices may lower cancer risk. Polysaccharides and aromatic compounds in Lion's Mane show anticancer properties in lab studies. Researchers have identified numerous mechanisms of action. Lion's mane extract may suppress the growth of various cancer cells like lung cancer, breast cancer. Researchers are exploring its role as an adjuvant in cancer management[28–30].

Potential Immunity enhancer

Polysaccharides, hericirine, polyphenols, and other compounds in Lion's Mane help suppress inflammation, exert an antioxidant effect, and modulate immune responses. Thus, its prolonged use may help support the immune system[31–33].

Safety and toxicity

Lion's Mane is relatively safe for prolonged use. Quite like other herbal extracts, it may sporadically cause gastrointestinal issues or allergies. Toxicological studies could not identify any severe side effects of the mushroom and concluded it safe for prolonged use[34]. However, there is still a need for more studies regarding its safety. Like most mushrooms, data is limited. Nevertheless, most preliminary data is highly encouraging.

Conclusion

In conclusion, Lion's Mane, a mushroom known by many names across different regions, holds a special place in the world of fungi. Its unique appearance and widespread distribution, especially in North America, China, and Japan, have earned it recognition not only for its culinary uses but also for its potential health benefits. As a member of the higher fungi category, Lion's Mane is just one among thousands of fungal species. Yet, it stands out due to its remarkable constituents, including proteins, carbohydrates, fats, vitamins, minerals, and a plethora of biologically active compounds. These compounds, notably polysaccharides and phenolic compounds, have garnered significant attention for their potential health-promoting effects.

Lion's Mane offers a range of health benefits, from supporting brain health and memory to aiding in nerve recovery and growth. It may also contribute to mood stabilization, gastric health, heart health, cholesterol control, and blood sugar regulation. Moreover, ongoing research suggests its potential role in cancer prevention and immunity enhancement. While Lion's Mane extract is commonly used as a health supplement, it's important to emphasize that it cannot replace medical treatments for diseases. It should be seen as a complementary dietary addition to promote overall well-being.

Fortunately, Lion's Mane is generally considered safe for extended consumption, with few reported side effects. Like any dietary supplement, some individuals may experience mild gastrointestinal issues or allergies, but toxicological studies have not revealed any significant concerns. Intriguing and versatile, Lion's Mane continues to captivate researchers and health enthusiasts alike, offering a promising avenue for natural health support. As our understanding of this remarkable mushroom deepens, it may become an even more valuable addition to our quest for improved well-being and longevity.

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