STANKEVIČ, Karolina, FUCZYŁO, Kamila, KOPCZYŃSKA, Ewelina, KULEJ, Piotr, BIESIADA, Wiktor, KMIEĆ, Justyna Weronika, WOŹNIAK, Justyna, CHERNYSH, Anna-Mariia, DUSIŃSKA, Aleksandra and WASZCZYŃSKI, Jakub. The Usage of Lion's Mane in Sports and Its Metabolic Impact – a literature review. Quality in Sport. 2025;37:57190. eISSN 2450-3118.
https://doi.org/10.12775/QS.2025.37.57190
https://apcz.umk.pl/QS/article/view/57190

The journal has been 20 points in the Ministry of Higher Education and Science of Poland parametric evaluation. Annex to the announcement of the Minister of Higher Education and Science of 05.01.2024. No. 32553.
Has a Journal's Unique Identifier: 201398. Scientific disciplines assigned: Economics and finance (Field of social sciences); Management and Quality Sciences (Field of social sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 r. Lp. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398.
Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).

The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 19.12.2024. Revised: 20.01.2025. Accepted: 20.01.2025 Published: 21.01.2025.

Short Article

The Usage of Lion's Mane in Sports and Its Metabolic Impact – a literature review

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Abstract

Introduction

Lion's mane (Hericium erinaceus), a medicinal mushroom widely recognized for its neuroprotective and health-promoting properties, has garnered increasing attention in recent years for its potential applications in sports and metabolic health. Known for its bioactive compounds, such as hericenones and erinacines, lion's mane has demonstrated antioxidant, anti-inflammatory, and cognitive-enhancing properties that may benefit athletes. This review explores current research on the metabolic and sports-related effects of lion's mane, highlighting both promising findings and gaps in the literature.

Purpose of the Work: The aim of this study is to review the current data on the usage of Hericium erinaceus in sports performance and metabolic health. The review includes an exploration of the biochemical properties of lion's mane and their relevance to athletic performance, assessment of the evidence gathered from animal and human studies regarding its potential benefits, identifying the gaps in research and proposing directions for future studies.

Materials and Methods

This literature review was conducted by collecting and analyzing peer-reviewed articles, clinical trial results, and relevant research papers from scientific databases such as PubMed and ScienceDirect.

Results

The literature indicates that lion's mane has potential benefits in enhancing cognitive function, reducing oxidative stress, and improving glucose metabolism—all of which are relevant to sports performance and recovery. However, direct evidence on its impact on athletic metrics such as endurance, strength, or recovery times is limited. Preclinical studies are promising but need to be validated in well-designed human trials.

Conclusion

Lion's mane exhibits significant promise as a natural supplement for supporting cognitive function, reducing oxidative stress, and potentially improving metabolic health – these are the factors that are crucial for athletic performance and recovery. However, direct evidence

linking lion's mane to measurable sports performance enhancements is sparse. Future research should focus on clinical trials in athletic populations, standardized supplementation protocols, and long-term safety assessments to fully understand the mushroom's potential as a performance enhancer.

Keywords

Lion's Mane, Hericium erinaceus, sports performance, metabolism, antioxidants, supplementation.

Introduction

Lion's mane (Hericium erinaceus), a medicinal mushroom widely recognized for its neuroprotective and health-promoting properties, has garnered increasing attention in recent years for its potential applications in sports and metabolic health. Known for its bioactive compounds, such as hericenones and erinacines, lion's mane has demonstrated antioxidant, anti-inflammatory, and cognitive-enhancing properties that may benefit athletes.

Athletic performance is influenced by multiple factors, including physical endurance, cognitive focus, metabolic efficiency, and recovery from oxidative stress and inflammation. Supplements that target these domains are highly sought after in the sports industry. Lion's mane's ability to improve glucose metabolism, modulate inflammation, and enhance mitochondrial function positions it as a potential ergogenic aid. Additionally, its cognitive benefits—such as enhanced memory, focus, and stress resilience—may offer advantages in sports requiring quick decision-making and sustained mental effort.

Despite its long-standing use in traditional medicine, modern research on lion's mane's sports-specific applications remains sparse. This review explores current evidence from both animal and human studies, assessing lion's mane's biochemical properties, metabolic impacts, and relevance to athletic performance. By identifying gaps and opportunities in the literature, this

work aims to provide a foundation for future research on lion's mane as a functional supplement for athletes.

The Metabolic Impacts

Hericium erinaceus, also called Yamabushitake, is a unique mushroom species revered for its diverse health benefits, particularly within traditional Chinese and Japanese medicine. Modern science has begun to validate the traditional claims surrounding lion's mane, uncovering a plethora of bioactive compounds that contribute to its therapeutic potential.

Lion's mane is perhaps best known for its ability to stimulate the synthesis of Nerve Growth Factor (NGF), a protein crucial for the growth, maintenance, and survival of neurons [6]. A study performed by Mori et al. (2008) [2] has shown that the usage of H. erinaceus was linked to a quintuple increase in the level of expression of NGF mRNAs in isolated human astrocytomas. NGF stimulation is attributed to hericenones and erinacines, compounds unique to lion's mane, and these properties have positioned it as a promising agent for cognitive enhancement and neurodegenerative disease management [1][3][4]. For athletes, improved cognitive function translates to better focus, decision-making, and resilience under stress. Moreover, as proven in the study of Nagano et al. (2010) [8] – H. erinaceus can also aid in reducing the signs of depression and anxiety which can also affect athletes' psychosomatic health.

The next matter is H. erinaceus' anti-inflammatory and immunomodulating properties - polysaccharides, such as beta-glucans, present in lion's mane have demonstrated strong anti-inflammatory and immunomodulatory effects [1][6][12]. This can be particularly beneficial for athletes, who often face heightened inflammation and immune suppression due to intense training and competition.

Lion's mane has shown potential in regulating glucose metabolism and enhancing insulin sensitivity, critical factors for sustained energy production and endurance in sports [5][7]. Its beta-glucans may help stabilize blood sugar levels, reducing the risk of fatigue during prolonged physical activity. Lion's mane has also been shown to positively influence lipid metabolism by promoting lipid breakdown and improving lipid profiles. This is particularly relevant in endurance sports, where efficient fat utilization is essential for prolonged performance [7][9].

The oxidative stress generated during intense physical activity can impair performance and delay recovery. Lion's mane's antioxidants, including phenols and flavonoids, help neutralize free radicals, protect cellular integrity, and support recovery processes [5].

In traditional medicine, lion's mane was consumed as a tonic for longevity and vitality. Modern adaptations include capsules, powders, and extracts, allowing for more standardized dosing and easier incorporation into athletic regimens. These advancements have facilitated a resurgence of interest in its applications across various health domains, particularly in sports and exercise science.

Lion's Mane and Sports Performance

Lion's mane's cognitive-enhancing effects have been its most studied benefit, with implications for sports performance:

Mental Clarity and Focus: Several studies [3][10][13] suggest that lion's mane enhances mental clarity, focus, and reaction time, all critical factors in competitive sports. For example, supplementation may support athletes in high-stress environments by improving their ability to concentrate under pressure.

Physical Performance: While direct evidence on endurance or strength improvement is limited, lion's mane's potential role in reducing fatigue through its antioxidant properties warrants investigation [5].

Current research indicates a need for more targeted studies assessing lion's mane's impact on measurable sports performance metrics such as VO2 max, power output, and time-to-exhaustion.

Evidence from Animal and Human Studies

Animal Studies: Research on animal models has provided preliminary evidence of lion's mane's metabolic and cognitive benefits. For instance, studies on mice have demonstrated improved memory, reduced oxidative stress, and better glucose regulation following supplementation. Rossi et al. (2018) [11] found that dietary supplementation of lion's mane improved spatial memory in wild-type mice, supporting its role in enhancing cognitive function. This has implications for athletes in sports requiring strategic thinking and decision-making under pressure. Brandalise et al. (2017) [10] observed increased hippocampal

neurotransmission and recognition memory in wild-type mice supplemented with lion's mane, further strengthening its role in cognitive enhancement relevant to athletic performance.

Human Studies: Few clinical trials have directly explored the effects of lion's mane on athletes. However, some studies indicate improved cognitive function in older adults [3][4], suggesting potential crossover benefits for younger, active populations. One pilot study on lion's mane supplementation showed reduced symptoms of anxiety and depression [8], which could indirectly benefit sports performance by enhancing mental resilience.

The lack of large-scale, placebo-controlled human trials on athletes remains a significant limitation.

The Limitations

Despite its promising properties, research on lion's mane's direct applications in sports is limited. Key gaps include a few of the following: a lack of standardized dosages: current studies use varying dosages and extraction methods, making it difficult to establish optimal protocols for athletic performance; limited human trials – most findings are derived from animal studies or small-scale clinical trials, often not focused on sports-related outcomes and lastly - short-term studies; only a few studies assess the long-term safety and efficacy of lion's mane supplementation, particularly for high-performance athletes.

Further research is essential to validate the preliminary findings and explore lion's mane's ergogenic potential in controlled athletic environments.

Conclusion

Lion's mane exhibits significant promise as a natural supplement for supporting cognitive function, reducing oxidative stress, and potentially improving metabolic health—factors crucial for athletic performance and recovery. However, direct evidence linking lion's mane to measurable sports performance enhancements is sparse. Future research should focus on clinical trials in athletic populations, standardized supplementation protocols, and long-term safety assessments to fully understand the mushroom's potential as a performance enhancer.

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Receiving funding: not applicable

All authors have read and agreed with the published version of the manuscript.

Funding Statement: This Research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The authors confirm that the data supporting the findings of this study are available within the article's bibliography.

Conflicts of Interests: The authors declare no conflict of interest.

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