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EDITORIAL

Ganodermataceae: Taxonomy, Cultivation, Biotechnology, and Therapeutic Potential

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ABSTRACT

The Ganodermataceae family comprises several genera, including *Ganoderma*, *Amauroderma*, and *Sanguinoderma*, which have been the focus of extensive scientific investigations. These genera are recognized in traditional medicine for their therapeutic properties in the treatment of bronchitis, hepatitis, diabetes, and cancer. In addition to their medicinal applications, they possess significant economic value and are incorporated into products such as teas, dietary supplements, and cosmetics.

Recent research on family Ganodermataceae focuses on identifying and characterizing novel bioactive compounds, developing advanced cultivation techniques, and investigating pharmacological mechanisms. Studies increasingly examine the molecular basis of medicinal properties, optimize extraction methods for therapeutic compounds, and evaluate potential applications in addressing emerging health challenges, including immunological disorders and viral infections. Key research questions include clarifying species diversity, elucidating metabolic pathways involved in bioactive compound synthesis, and assessing efficacy and safety in clinical settings. These research directions reflect the increasing scientific interest in the application of Ganodermataceae species for both traditional and contemporary therapeutic purposes. Among these species, *Ganoderma lucidum* has been highly valued in China, Korea, and Japan for centuries for its reputed ability to promote vitality, longevity, and overall health. *G. lucidum* also holds significant commercial value (Plosca et al. 2025). Consequently, we assembled this Special Collection (SC) in recognition of the topic's importance and the expertise of the contributors. In this SC, we provide comprehensive discussions on the taxonomy, cultivation, biotechnology, and therapeutic potential of Ganodermataceae, based on rigorously reviewed papers. The reviews and original articles included here clarify potential advancements in this field, and we expect that these contributions will attract substantial interest.

As the first paper in the SC, Karunarathna, Ediriweera, Prasannath, et al. (2025) provide a comprehensive review of bioactive compounds in *Ganoderma*, elucidating the mechanisms responsible for its immunomodulatory and antitumor activities. The review systematically examines the health benefits of *Ganoderma*, details the bioactive compounds present in various species, and investigates the mechanisms by which these compounds exert antioxidant, immunomodulatory, anti-inflammatory, antitumor, antimicrobial, hepatoprotective, neuroprotective, and cardioprotective effects. Furthermore, the authors discuss potential therapeutic applications and prospects for *Ganoderma*. In a related publication, Karunarathna, Lu, Patabedige, et al. (2025) assess the therapeutic potential of *Ganoderma* in the context of COVID-19, highlighting its promising role in addressing this global health challenge. The review positions *Ganoderma* as a representative example of the potential of natural products in combating emerging infectious diseases, while also emphasizing the necessity for further research and clinical studies to clarify its role in COVID-19 and similar future threats. Ghafoor et al. (2025) report the first successful indoor

cultivation of indigenous *G. lucidum* in Pakistan, identifying significant opportunities for local farmers, growers, and entrepreneurs in the production and marketing of *G. lucidum*-based products. Their study demonstrates that this fungus can be cultivated on a range of locally available, cost-effective lignocellulosic substrates. However, the authors highlight the need for additional research to explore new combinations of media and substrates to enhance vegetative growth rate, yield, and biological efficiency of indigenous *G. lucidum*. Karunarathna, Prasannath, Lu, et al. (2025) review the current status of *Ganoderma* products and the industry, offering recommendations to advance research. The authors note that *Ganoderma*, deeply rooted in traditional medicinal practices across Asia, has garnered renewed interest due to its biotechnological potential and health-promoting properties. The review traces the progression of *Ganoderma* species from their historical significance in traditional medicine to their current prominence in modern industry. Asad et al. (2025) review the biotechnological applications of *Ganoderma*, emphasizing its diverse potential and impact. The authors suggest that *Ganoderma* holds promise for enhancing industrial processes and advancing a more sustainable, bio-based future in biotechnology. They argue that leveraging its unique properties and exploring new applications position *Ganoderma* as a significant opportunity for sustainable development and environmental stewardship. Although some Iranian *Ganoderma* species have been investigated for their therapeutic potential, the medicinal applications of many species in this region remain unexplored. Safavi et al. (2025) describe the anticancer and antibacterial properties of Iranian *Ganoderma* species, supporting their pharmacological role as novel drug sources for various therapeutic purposes. These findings highlight the potential of native *Ganoderma* strains as new sources of drugs for cancer treatment and antibacterial applications. Research on *Ganoderma* diversity and characterization in Sri Lanka remains limited, and species diversity is still poorly understood. Konara et al. (2025) identified three *Ganoderma* species, viz., *G. angustisporum*, *G. ellipsoideum*, and *G. orbiforme*, for the first time in Sri Lanka using morphological and phylogenetic analyses. These findings, supported by robust methodology, significantly advance understanding of *Ganoderma* diversity in Sri Lanka and underscore the need for further research in this field. The genera *Amauroderma*, *Sanguinoderma*, and other understudied members of the Ganodermataceae have attracted attention for their bioactive compounds and untapped pharmacological potential. Rašeta et al. (2026) demonstrate significant variability in the chemical composition and in vitro bioactivities of commercial *Ganoderma* products (GL1–GL3), influenced by formulation and extraction method. These findings advance understanding of how extraction methods, formulation, and raw material type affect the bioactive potential of *Ganoderma* and underscore the importance of selecting optimal extraction techniques and starting materials to maximize therapeutic efficacy. Lu et al. (2026) synthesize current knowledge on the pharmacological potential of *Amauroderma*, *Sanguinoderma*, and related genera, emphasizing their bioactive diversity, therapeutic applications, and the role of biotechnology in overcoming production challenges. By addressing key research gaps, the authors highlight the potential of these genera for product development and integrative medicine. With increasing demand for this fungus, cultivation has become a sustainable approach to satisfy market requirements. In the final paper of the SC, Karunarathna, Patabendige, Wijesundara, et al. (2025) examine the complex methodologies and challenges involved in *Ganoderma* cultivation. This review offers a comprehensive analysis of cultivation techniques, emphasizing essential considerations and recent developments. The authors suggest that by addressing current challenges and implementing innovative strategies, *Ganoderma* cultivation can effectively meet the rising demand for this medicinal mushroom.

Mycologists and students have benefited from a collaborative community motivated by progress in Ganodermataceae researches (Wu et al. 2019; Sun et al. 2020; Niu et al. 2025). The cultivation and maintenance of these fungi have been made possible by the collective efforts of researchers from the past to the present, with Ganodermataceae now cultivated in laboratories worldwide. The authors who have conducted comprehensive reviews and original research have significantly advanced knowledge in this field.

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Conflicts of Interest

No potential conflict of interest was reported by the author (s).

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