

# Formulation And Evaluation of Ganoderma Mushroom Soap

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**Abstract**—Growing interest in natural and sustainable personal care products has increased attention toward the use of medicinal mushrooms as functional cosmetic ingredients. The present study investigated the formulation and evaluation of a herbal soap incorporating *Ganoderma lucidum* extract and assessed its physicochemical properties, antimicrobial performance, skin compatibility, and storage stability. The soap formulation was prepared using a cold-process saponification technique employing coconut oil, olive oil, and castor oil as base components, while *Ganoderma* extract served as the principal bioactive ingredient.

The formulated product underwent systematic evaluation through organoleptic examination, pH analysis, foam performance assessment, hardness determination, moisture analysis, free alkali estimation, antimicrobial screening, and stability testing. The results indicated acceptable formulation characteristics with stable appearance, favorable cleansing properties, and skin-compatible pH throughout the observation period. Antimicrobial assessment suggested retention of biological activity following incorporation of the extract into the soap matrix. Stability observations demonstrated no major alterations in physical characteristics under storage conditions.

These findings indicate that *Ganoderma lucidum* possesses potential as a multifunctional ingredient in herbal cosmetic formulations and may support the development of value-added natural skincare products. Further dermatological and large-scale validation studies are recommended.

**Index Terms**—*Ganoderma lucidum*, herbal soap, medicinal mushroom, cosmeceuticals, antimicrobial activity, topical formulation

## I. INTRODUCTION

The cosmetic industry has experienced a growing transition toward formulations derived from natural sources because of increasing consumer awareness regarding ingredient safety, sustainability, and skin compatibility. Herbal and bioactive cosmetic products have attracted particular attention due to their potential to provide functional benefits beyond conventional cleansing.<sup>[4]</sup>

Medicinal mushrooms represent an emerging category of natural ingredients with applications extending into pharmaceutical and cosmetic sciences. Among these, *Ganoderma lucidum*, commonly known as Reishi or Lingzhi, has received considerable scientific interest because of its diverse bioactive composition and broad pharmacological relevance.<sup>[9]</sup>

*Ganoderma* contains compounds including polysaccharides, triterpenoids, phenolic substances, proteins, and sterol derivatives that have been associated with antioxidant, antimicrobial, anti-inflammatory, and protective biological activities. These properties suggest potential usefulness in topical formulations intended to support skin health and cosmetic performance.<sup>[1,5]</sup>

Despite extensive investigation of *Ganoderma* in medicinal and nutritional applications, comparatively limited work has focused on its integration into cleansing and skincare products such as herbal soaps. Therefore, developing a stable and functional soap formulation containing *Ganoderma* extract may

contribute to expanding its application in cosmetic product development.

The present study aimed to formulate a Ganoderma-based herbal soap and evaluate its quality characteristics, stability profile, and functional performance through standard cosmetic.<sup>[2,3]</sup>



## II. MATERIALS AND METHODS

### 2.1 Materials

The formulation included:

- Ganoderma lucidum extract (2 g)
- Coconut oil (33 mL)
- Olive oil (44 mL)
- Castor oil (5 mL)
- Sodium hydroxide (14 g)
- Glycerine (3 mL)
- Tea tree essential oil (1 mL)
- Turmeric (1 g)
- Citric acid (1 g)

### 2.2 Preparation of Extract

Dried Ganoderma mushroom material was pulverized and subjected to hydroalcoholic extraction using an ethanol–water solvent system (70:30). The extraction mixture was maintained under controlled conditions to facilitate diffusion of bioactive constituents. Following extraction, the solution was filtered and concentrated prior to incorporation into the formulation.<sup>[12]</sup>

### 2.3 Soap Formulation

The herbal soap was prepared using a cold-process saponification method. A sodium hydroxide solution was prepared separately and gradually combined with the blended oil phase under continuous mixing until trace formation occurred. Ganoderma extract and

auxiliary ingredients were subsequently incorporated. The resulting mixture was transferred into molds and allowed to cure for an appropriate period to ensure completion of saponification and product stabilization.<sup>[15]</sup>

### 2.4 Evaluation Parameters

The formulated Ganoderma mushroom soap was assessed using several quality and performance indicators to determine its acceptability, effectiveness, and stability.

#### 1. Physical Appearance

The soap was examined for visual characteristics including color, texture, shape, and uniformity. Surface smoothness and the absence of cracks or deformities were also considered to evaluate product quality.

#### 2. Odour Evaluation

The fragrance profile of the soap was assessed to determine its acceptability and overall sensory appeal to users.<sup>[12]</sup>

#### 3. pH Determination

The pH level was measured to evaluate the soap's compatibility with human skin and ensure that it falls within a safe and acceptable range for topical application.

#### 4. Foaming Capacity

The ability of the soap to generate and maintain foam was evaluated, as this parameter influences consumer perception and cleansing efficiency.

#### 5. Cleansing Performance

The soap's effectiveness in removing dirt, oil, and impurities from the skin surface was examined to determine its functional performance.<sup>[13]</sup>

#### 6. Hardness and Structural Integrity

Mechanical strength and resistance to breakage were assessed to evaluate durability during storage and regular use.

#### 7. Moisturizing Potential

The soap was evaluated for its capacity to retain skin hydration and minimize excessive dryness after washing.

#### 8. Skin Irritation Assessment

A dermatological observation or patch test was conducted to identify any signs of redness, itching, or adverse skin reactions following application.<sup>[16]</sup>

#### 9. Stability Evaluation

The product was monitored under specified storage conditions to determine changes in appearance, odor, texture, and overall quality over time.

#### 10. User Acceptability Test

Consumer feedback regarding appearance, fragrance, lather production, skin feel, and overall satisfaction was collected to assess market acceptability.<sup>[10<sup>11</sup>]</sup>

### III. RESULTS AND DISCUSSION

The formulated Ganoderma herbal soap demonstrated acceptable cosmetic and functional characteristics following preparation and evaluation.

Organoleptic assessment revealed a uniform appearance, smooth texture, and favorable sensory properties, indicating successful formulation development. The measured pH remained within the acceptable range for topical cleansing products, suggesting adequate skin compatibility.

Foam generation and retention characteristics indicated satisfactory cleansing performance, while hardness measurements demonstrated adequate structural integrity and resistance to excessive wear during use. Moisture levels remained controlled throughout the evaluation period, supporting physical stability and durability.

Antimicrobial assessment suggested preservation of biological activity after incorporation of Ganoderma extract into the soap matrix. This observation may be associated with naturally occurring bioactive compounds reported in Ganoderma species.

Storage evaluation indicated no major deterioration in appearance, odor, texture, or functional parameters during the observation period, supporting acceptable formulation stability.

Overall, the findings suggest that incorporation of Ganoderma extract did not adversely affect product quality and may provide additional functional value in cosmetic applications.

### IV. CONCLUSION

The present study demonstrated the successful formulation and evaluation of a Ganoderma lucidum-based herbal soap using a cold-process manufacturing approach.

The developed formulation exhibited acceptable physicochemical characteristics, favorable cleansing performance, skin compatibility, and formulation

stability. Incorporation of Ganoderma extract provided additional functional potential associated with its reported antimicrobial and antioxidant properties.

The findings support the feasibility of utilizing medicinal mushroom extracts in herbal cosmetic development and indicate opportunities for future optimization, dermatological validation, and broader commercial application.

Future studies should incorporate larger experimental datasets, comparative formulation studies, and extended stability evaluation to strengthen evidence for cosmetic and therapeutic performance.

### REFERENCES

- [1] Hayati, S. N., Rosyida, V. T., Darsih, C., Nisa, K., Indrianingsih, A. W., Apriyana, W., & Ratih, D. (2020). Physicochemical properties, antimicrobial and antioxidant activity of Ganoderma transparent soap. *IOP Conference Series: Earth and Environmental Science*, 462, 012047.
- [2] Dikmen Küçük, S., Jabet, P., Groso, A., Collet, G., Daniellou, R., & Karadeniz, B. (2026). Cosmetic potential of Ganoderma lucidum (Reishi) extract in a topical cream formulation. *International Journal of Cosmetic Science*.
- [3] Taofiq, O., Heleno, S. A., Calhelha, R. C., et al. (2017). The potential of Ganoderma lucidum extracts as bioactive ingredients in topical formulations, beyond its nutritional benefits. *Food and Chemical Toxicology*, 108(A), 139–147.
- [4] Zhang, G.-P., Pan, Y.-M., Ye, S.-M., Lu, Y.-C., Fan, X.-J., & Zhang, A.-Q. (2025). Bioactive components of Ganoderma lucidum and their efficacy and application in cosmetics. *Food & Medicine Homology*, 2(1), 9420044.
- [5] Wu, Y., et al. (2016). Mushroom Cosmetics: The Present and Future. *Cosmetics*, 3(3), 22.
- [6] Rukhsar, S. (2025). Mushrooms in modern cosmetics: unlocking anti-aging and skin benefits. *European PMC*.
- [7] Novak, A. C. (2013). Potencial cosmético dos esporos de Ganoderma lucidum [Cosmetic potential of G. lucidum spores]. Federal University of Paraná.

- [8] Savin, S., Craciunescu, O., Oancea, A., et al. (2020). Antioxidant, cytotoxic and antimicrobial activity of chitosan preparations extracted from *Ganoderma lucidum* mushroom. *Chemistry & Biodiversity*, 17(7), e2000175.
- [9] Razak, D. L. A., Jamaluddin, A., Rashid, N. Y. A., et al. (2020). Assessment of cosmeceutical potentials of selected mushroom fruitbody extracts through evaluation of antioxidant, anti-hyaluronidase and anti-tyrosinase activity. *Journal of Fungi*, 3(3), 26.
- [10] Kozarski, M., Klaus, A., Jakovljević, D., & Todorović, N. (2018). *Ganoderma lucidum* as a cosmeceutical: antiradical potential and inhibitory effects on skin enzymes. *Archives of Biological Sciences*.
- [11] Zheng, S., Zhang, W., & Liu, S. (2020). Optimization of ultrasonic-assisted extraction of polysaccharides and triterpenoids from *Ganoderma lucidum* and evaluation of their in vitro antioxidant capacities. *PLOS ONE*.
- [12] Kumar, N. V. A. (2023). Potential of mushrooms bioactive for the treatment of skin conditions: antioxidant and anti-inflammatory roles. *International Journal of Dermatology Research*.
- [13] "Assessment of Cosmetic Properties and Safety of Use of Mushroom Extracts." (2022). PMC Article.
- [14] "Status Report on Mushroom Based Cosmetic Products in the Market." (2020). ResearchGate.
- [15] "Lucid *Ganoderma* Soap and Preparation Method Thereof." (n.d.). CN102260608A Patent.
- [16] "Cosmetic composition with the extract of *Ganoderma lucidum*." (n.d.). KR102051057B1 Patent.