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Research Article

A note on *Zingiber zerumbet* (L.) Roscoe ex Sm.: A natural shampoo

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Abstract: The increasing demand for safe, eco-friendly, and sustainable alternatives to chemical-based hair care products has renewed interest in medicinal plants as potential natural shampoos. *Zingiber zerumbet* (shampoo ginger), a perennial herb of the Zingiberaceae family, has long been used in traditional medicine and cosmetics, particularly for its mucilaginous exudate that serves as a natural hair cleanser and conditioner. Rich in saponins, zerumbone, essential oils, and flavonoids, *Z. zerumbet* exhibits cleansing, antimicrobial, antioxidant, and anti-inflammatory properties, making it an ideal candidate for herbal shampoo formulations. Its dual function of scalp health promotion and environmental sustainability highlights its significance in bridging indigenous knowledge with modern cosmetic science. This review discusses the background of screening natural shampoos, the phytochemical profile and applications of *Z. zerumbet*, and evaluates its future potential in standardized formulations, clinical validation, and commercialization.

Keywords: Cosmetic, natural, shampoo

Introduction

In recent years, there has been a growing concern regarding the safety of synthetic shampoos and cosmetic products. Commercial shampoos often contain harsh surfactants, parabens, silicones, and artificial fragrances that may cause scalp irritation, hair damage, allergic reactions, and environmental pollution (Khalid and Abdollahi, 2021). Continuous exposure to these chemical-based shampoos not only strips the scalp of natural oils but also disrupts the ecological balance due to non-biodegradable residues (Sang et al., 2023). This scenario has led to a renewed interest in herbal and plant-based shampoos, which are considered safer, biodegradable, and eco-friendly. Natural products derived from medicinal plants possess bioactive compounds like saponins, flavonoids, and essential oils that provide

cleansing, antimicrobial, and conditioning properties (Chandrashekar et al., 2025; Pradhan et al., 2025). Among such plants, *Zingiber zerumbet* (Figure 1), commonly called shampoo ginger, has gained significant attention for its traditional use as a natural shampoo and conditioner (Chan et al., 2024).

Figure 1. Habit, habitat, and flowers of *Zingiber zerumbet*

Figure 2. Fruits of *Zingiber zerumbet* (Source of Shampoo)

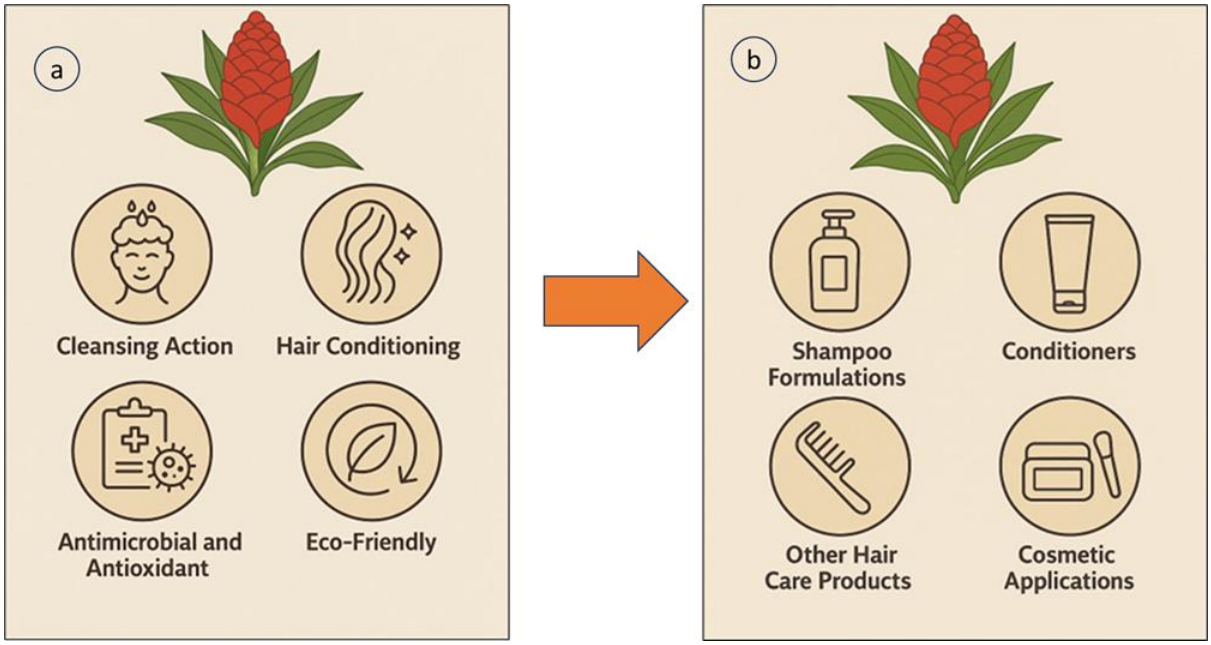

Figure 3. Potential of *Zingiber zerumbet* (a) and future aspects (b)

Z. zerumbet is a perennial herb belonging to the family Zingiberaceae. The plant grows up to 1–1.5 meters in height, with leafy shoots arising from underground rhizomes. Its most distinguishing feature is the red, cone-shaped inflorescence (Figure 2), which produces a clear, aromatic mucilaginous liquid when squeezed. Traditional communities in Hawaii and Southeast Asia have long used the cone exudate as a natural shampoo. The liquid not only cleanses the scalp but also softens the hair, leaving a pleasant fragrance. Rhizomes are used in folk medicine as a remedy for digestive ailments, inflammation, and skin conditions. Decoctions are administered for fever, worm infestations, and rheumatism. Extracts are incorporated into modern herbal shampoos, conditioners, and skincare products due to their antimicrobial and antioxidant effects (Yob et al., 2011; Figure 3a).

Z. zerumbet is rich in bioactive compounds such as:

1. Saponins: Responsible for the foaming and cleansing action, making it a natural surfactant.
2. Zerumbone (a sesquiterpene): Known for anti-inflammatory, antimicrobial, and anticancer properties.
3. Essential oils: Provide fragrance, antioxidant action, and scalp-soothing properties.
4. Flavonoids and terpenoids: Contribute to hair protection and conditioning.

The natural shampoo derived from *Z. zerumbet* offers multiple advantages. The saponin-rich mucilaginous liquid acts as a gentle surfactant, capable of removing dirt, excess oil, and microbial growth without stripping the scalp of its protective oils (Chavan and Dey, 2023). The natural mucilage forms a thin protective layer over hair strands, enhancing smoothness, reducing frizz, and imparting shine. The presence of zerumbone and essential oils provides defence against scalp infections, dandruff, and oxidative stress that contributes to hair fall and premature greying (Ibanez et al., 2023). Unlike chemical shampoos, *Z. zerumbet* extract is biodegradable and safe for the environment, making

it an ideal candidate for sustainable personal care. Its longstanding use in indigenous cultures highlights its safety and effectiveness, aligning with modern interest in evidence-based traditional knowledge.

Future Aspects

Although *Z. zerumbet* holds promising potential, further research and product development are necessary (Figure 3b):

1. Standardization of Extracts: Development of standardized formulations ensuring consistent concentration of active compounds like saponins and zerumbone.
2. Clinical Trials: Rigorous studies to scientifically validate its efficacy and safety for long-term cosmetic use.
3. Formulation Innovation: Incorporating *Z. zerumbet* with other herbal ingredients (e.g., aloe vera, hibiscus, neem) to develop multifunctional herbal shampoos.
4. Commercial Cultivation: Promotion of large-scale, sustainable cultivation to support pharmaceutical and cosmetic industries.
5. Green Cosmetics Market: Integration of *Z. zerumbet*-based products into global herbal cosmetic markets, meeting the demand for natural, eco-conscious consumers.

Conclusion

The rising concerns over chemical-based shampoos have made it imperative to explore safe, effective, and eco-friendly alternatives. Zingiber zerumbet, with its saponin-rich mucilaginous exudate, stands out as a natural shampoo of high cultural, medicinal, and cosmetic relevance. Its multifunctional properties—cleansing, conditioning, antimicrobial, and antioxidant—highlight its potential as a sustainable herbal cosmetic ingredient. With further scientific validation, Z. zerumbet can bridge traditional knowledge with modern cosmetic innovation, contributing significantly to the development of natural and eco-friendly hair care solutions.

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