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Research Article

FORMULATION AND EVALUATION OF HERBAL TURMERIC GLOW CREAM FOR TOPICAL SKINCARE APPLICATION

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Abstract

The increasing demand for herbal skincare products has stimulated the development of cosmetic formulations containing plant-derived bioactive ingredients with favorable dermatological safety profiles. Conventional skincare creams often contain synthetic compounds associated with adverse effects such as irritation, hypersensitivity, dryness, and long-term skin barrier disruption. Herbal cosmetic formulations offer a promising alternative by integrating therapeutic botanical agents with modern topical delivery systems (1,2). The present study aimed to formulate and evaluate a herbal turmeric glow cream containing Curcuma longa extract as the principal active ingredient, along with liquorice (Glycyrrhiza glabra) and aloe vera (Aloe barbadensis Miller) to enhance skin-protective, anti-inflammatory, moisturizing, and cosmetic benefits. The cream was prepared as an oil-in-water emulsion using beeswax, borax, liquid paraffin, methyl paraben, rose water, and purified water as supportive formulation components. Two formulations (F1C and F2C) were developed and evaluated for organoleptic properties, pH, spreadability, washability, irritancy, and phase stability. The prepared formulations demonstrated acceptable cosmetic characteristics, including smooth semisolid consistency, pleasant odor, favorable washability, absence of irritation, and stable phase integrity. The pH values of the formulations were 5.3 and 5.0, indicating compatibility with physiological skin pH. The findings suggest that the developed herbal turmeric glow cream is a stable, skin-compatible, and cosmetically acceptable herbal topical preparation with potential utility in skincare applications.

Keywords: Turmeric cream, herbal cosmetics, Curcuma longa, liquorice, aloe vera, topical formulation, skincare, herbal cream

*Corresponding Author: Mr. Rohit mali, student, p. G. College of pharmaceutical science and research, chaupale, tal & dist. – nandurbar (ms), india. Correspondence may be addressed via email at rm0014872@gmail.com. The article titled "formulation and evaluation of herbal turmeric glow cream for topical skincare application" was authored by mr. Rohit mali is final year b. Pharmacy students of p. G. College of pharmaceutical science and research, chaupale, tal & dist. – nandurbar (ms), india. This article is published as an open-access work under the creative commons attribution license, permitting unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Doi: 10.5281/zenodo.20379273.

Introduction

The skin is the largest organ of the human body and serves as a multifunctional protective barrier between the internal physiological environment and external environmental stressors. In addition to its barrier function, the skin contributes to thermoregulation, immune surveillance, sensory perception, metabolic activity, and maintenance of hydration balance (3). Because of its constant exposure to ultraviolet radiation, pollution, microbial contaminants, oxidative stress, and chemical irritants, the skin is particularly susceptible to functional impairment and aesthetic deterioration.

Topical cosmetic formulations play an important role in maintaining skin health and appearance. Creams remain among the most widely used semisolid dosage forms in cosmetic and dermatological applications because of their ease of application, favorable patient acceptability, formulation flexibility, and efficient delivery of active ingredients (4). Oil-in-water creams are especially preferred in facial cosmetic preparations due to their non-greasy texture, ease of Spreadability, rapid absorption, and consumer acceptability.

In recent years, there has been a substantial increase in consumer preference for herbal cosmetic products due to growing awareness regarding the adverse effects associated with synthetic skincare ingredients. Conventional cosmetic formulations may contain artificial preservatives, fragrances, surfactants, bleaching agents, and stabilizers that can provoke skin irritation, allergic reactions, dryness, and barrier disruption, particularly with repeated use (5). Herbal cosmetics offer an attractive alternative because they combine cosmetic benefits with therapeutic phytopharmacological effects while generally exhibiting better dermatological tolerance (6).

Curcuma longa (turmeric) has been extensively used in traditional medicine and cosmetic applications for centuries. The principal active constituent, curcumin, possesses potent anti-inflammatory, antioxidant, antimicrobial, and wound-healing properties that support its use in skincare formulations (7,8). Turmeric has been traditionally used to improve skin brightness, reduce inflammatory lesions, support wound healing, and protect against oxidative damage.

Liquorice (*Glycyrrhiza glabra*) is another valuable herbal ingredient in cosmetic dermatology due to its anti-inflammatory, antioxidant, antimicrobial, and skin-brightening properties. Bioactive constituents such as glycyrrhizic acid and flavonoids contribute to soothing irritated skin, reducing pigmentation, and improving overall skin appearance (9).

Aloe vera (*Aloe barbadensis Miller*) is widely recognized for its moisturizing, soothing, anti-inflammatory, wound-healing, and antimicrobial properties. It contains vitamins, enzymes, polysaccharides, minerals, amino acids, and bioactive phytoconstituents that support skin hydration, repair, and barrier maintenance (10).

The combination of turmeric, liquorice, and aloe vera offers a rational polyherbal strategy for developing a multifunctional skincare cream capable of providing moisturizing, soothing, anti-inflammatory, protective, and cosmetic enhancement benefits.

The present study was undertaken to formulate and evaluate a herbal turmeric glow cream using these botanical ingredients and to assess its physicochemical properties, skin compatibility, and formulation stability.

Materials and Methods

The herbal turmeric glow cream was formulated using a combination of herbal extracts and standard cosmetic excipients. The principal herbal ingredients included turmeric (*Curcuma longa*) extract, liquorice (*Glycyrrhiza glabra*) extract, and aloe vera (*Aloe barbadensis Miller*) gel, selected based on their documented dermatological and cosmetic benefits. Additional formulation components included liquid paraffin, beeswax, borax, methyl paraben, rose water, distilled water, and supportive processing solvents.

Turmeric rhizomes were collected locally and processed for extract preparation. Approximately 5 g of turmeric powder was dispersed in 50 mL of distilled water and heated in a water bath at 80–100°C for 5–10 minutes, followed by filtration to obtain the aqueous turmeric extract. Liquorice extract was prepared using a similar aqueous extraction process involving heating and filtration of powdered liquorice material. Aloe vera gel was obtained by harvesting fresh leaves, cleaning thoroughly, longitudinally slicing the leaf, and carefully collecting the internal gel while removing fibrous impurities.

Two cream formulations, designated F1C and F2C, were prepared using variation in active ingredient concentrations. The F1C formulation contained turmeric extract (3.3 g), liquorice extract (3.3 g), aloe vera gel (4.1 g), liquid paraffin (16 g), beeswax (8.3 g), borax (4.1 g), and methyl paraben (1.6 g), with rose water and distilled water added as required. The F2C formulation contained proportionally reduced concentrations of the same ingredients.

The cream was prepared using a standard oil-in-water emulsion method. The oily phase was prepared by heating liquid paraffin and beeswax in a borosilicate

glass vessel at approximately 75°C until complete melting occurred. Separately, the aqueous phase was prepared by dissolving borax and methyl paraben in distilled water while maintaining the same temperature. The heated aqueous phase was gradually added to the oily phase under continuous stirring to facilitate emulsification. Following emulsion formation, turmeric extract and liquorice extract were incorporated with continued mixing until a smooth cream consistency was achieved. Aloe vera gel and rose water were subsequently added to improve moisturizing and sensory properties. Final homogenization was performed using slab mixing techniques to ensure uniform texture and ingredient distribution.

The prepared formulations were evaluated using standard cosmetic assessment methods. Organoleptic evaluation included visual and sensory examination of color, odor, texture, and physical state. The pH was determined by dispersing 1 g of cream in 20 mL of distilled water followed by measurement using a calibrated digital pH meter.

Irritancy testing was performed by applying the formulation to a defined area on the dorsal hand surface and observing for erythema, edema, or visible irritation over 24 hours. Washability testing assessed ease of removal using tap water following topical application. Spreadability was evaluated using the standard glass slide method, where spreading efficiency was determined using the formula $S = M \times L / T$, where M represents applied weight, L represents slide movement length, and T represents time taken. Phase separation testing was conducted by storing the prepared cream at room temperature for 24 hours and visually assessing emulsion integrity.

Results

The prepared herbal turmeric glow cream formulations were successfully developed and evaluated for cosmetic suitability, physicochemical acceptability, and dermatological compatibility. Both formulations demonstrated favorable organoleptic and functional characteristics appropriate for topical skincare application.

Physical evaluation revealed that formulation F1C exhibited a **yellow color**, whereas formulation F2C showed a **faint yellow appearance**, reflecting differences in herbal extract concentration. Both formulations possessed a **pleasant odor**, **smooth texture**, and **semisolid consistency**, indicating successful emulsion formation and acceptable cosmetic appearance. Uniform appearance without visible clumping or phase instability suggested adequate formulation homogeneity.

The pH analysis demonstrated values of **5.3 for F1C** and **5.0 for F2C**, which are within the physiologically acceptable range for human skin application. Maintenance of mildly acidic pH is essential in preserving skin barrier integrity, minimizing irritation risk, and supporting the normal skin microbiome.

Irritancy testing indicated excellent dermatological compatibility. Neither formulation produced erythema, edema, or visible signs of irritation following the 24-hour observation period, suggesting favorable tolerability for topical application.

Washability testing demonstrated satisfactory cosmetic usability, with both formulations being easily removable using water after topical application. This finding suggests practical convenience for routine skincare use.

Spreadability assessment indicated acceptable application behavior, suggesting that the creams could be uniformly distributed over the skin surface without excessive resistance. Appropriate spreadability contributes significantly to therapeutic efficiency and user acceptability in topical preparations (11).

Phase separation testing revealed no evidence of emulsion breakdown in either formulation following storage at room temperature during the observation period. This observation indicates acceptable short-term physical stability of the developed cream formulations.

Overall, formulation F1C demonstrated slightly superior cosmetic characteristics due to its richer consistency, better herbal composition balance, and more favorable visual appeal.

Discussion

The present study successfully demonstrated the formulation and evaluation of a polyherbal turmeric glow cream intended for topical skincare application. The findings indicate that the developed formulations possess acceptable cosmetic, physicochemical, and dermatological characteristics consistent with the requirements of a herbal topical cream.

Cream-based formulations remain highly relevant in dermatological and cosmetic applications due to their ease of application, consumer acceptability, versatility, and ability to deliver active ingredients efficiently to the skin surface (4). The oil-in-water emulsion approach employed in the present study is particularly appropriate for facial skincare products because of its non-greasy texture, easy Spreadability, and favorable washability characteristics.

The observed organoleptic properties support the cosmetic suitability of the formulations. Texture, odor,

appearance, and consistency are important determinants of consumer acceptance, especially in cosmetic products intended for regular facial use. The smooth semisolid texture observed in both formulations suggests successful emulsification and appropriate distribution of the herbal actives within the cream matrix.

The measured pH values of 5.3 and 5.0 are particularly significant. Human skin maintains a mildly acidic surface pH generally ranging between 4.5 and 6.0, commonly referred to as the acid mantle, which plays a critical role in antimicrobial defense, enzymatic regulation, and barrier preservation (12). Topical formulations with inappropriate pH may provoke irritation, dryness, or barrier disruption. The observed pH values indicate that the present formulations are compatible with physiological skin conditions.

The absence of irritation in the irritancy study is an encouraging finding. Herbal formulations are often promoted for improved tolerability compared with synthetic cosmetic products, although this assumption must always be experimentally verified. The lack of erythema and edema observed in this study suggests acceptable short-term skin compatibility.

Turmeric serves as the principal active ingredient and provides strong pharmacological justification for the formulation. Curcumin, the major bioactive constituent of turmeric, possesses well-established anti-inflammatory, antioxidant, antimicrobial, and wound-healing properties (7,8). These activities make turmeric particularly suitable for skincare formulations intended to support skin protection, reduce inflammatory lesions, and improve overall complexion.

Liquorice further strengthens the formulation through its anti-inflammatory and skin-brightening properties. Glycyrrhizic acid and associated flavonoids are known to exhibit soothing, antioxidant, and depigmenting effects, which may contribute to improved cosmetic performance and skin appearance (9).

Aloe vera serves as a multifunctional supportive herbal agent by enhancing hydration, soothing irritation, supporting barrier repair, and contributing antimicrobial activity (10). The inclusion of aloe vera likely improved both the functional and sensory properties of the cream.

The satisfactory washability observed in the study is particularly important for practical consumer use. Facial skincare products that are difficult to remove may reduce compliance and increase residue accumulation. Easy washability enhances user convenience and product acceptability.

The absence of phase separation suggests acceptable short-term emulsion stability. Stable emulsions require balanced interactions among the oil phase, aqueous phase, emulsifying agents, and incorporated active ingredients. Beeswax and borax likely played essential roles in maintaining emulsion integrity and cream consistency.

Formulation F1C appeared to demonstrate superior characteristics compared with F2C, likely due to its higher active ingredient concentration and optimized excipient balance. This suggests that formulation composition significantly influences the final cosmetic performance of herbal topical products.

The results align with previous studies demonstrating the effectiveness of turmeric-containing herbal creams in cosmetic and dermatological applications (13,14).

Limitations of the Study

Despite the encouraging findings of the present investigation, several limitations should be acknowledged. The study primarily focused on preliminary cosmetic evaluation and did not include advanced physicochemical characterization such as rheological profiling, viscosity quantification, droplet size analysis, or instrumental texture assessment. The stability evaluation was limited to short-term physical observation, which does not establish long-term shelf-life performance or accelerated environmental stability under varying temperature and humidity conditions. Although irritancy testing demonstrated favorable short-term skin compatibility, controlled clinical studies involving larger human populations were not conducted, limiting broader conclusions regarding long-term dermatological safety and efficacy. Quantitative efficacy endpoints such as objective skin hydration measurement, pigmentation reduction assessment, antimicrobial performance, and anti-inflammatory biomarker evaluation were not instrumentally assessed. Additionally, microbiological challenge testing to evaluate preservative effectiveness and microbial resistance was not performed. Future investigations should incorporate advanced analytical characterization, extended stability studies, controlled dermatological trials, and objective efficacy measurements to strengthen scientific validation and support commercial development.

Conclusion

The present study successfully formulated and evaluated a polyherbal turmeric glow cream containing turmeric, liquorice, and aloe vera for

topical skincare application. The developed formulations demonstrated acceptable cosmetic characteristics including smooth semisolid consistency, pleasant odor, favorable washability, skin-compatible pH, absence of irritation, and satisfactory short-term phase stability.

The polyherbal combination provides a rational therapeutic and cosmetic approach by integrating the anti-inflammatory, antioxidant, antimicrobial, moisturizing, and soothing properties of the selected botanical ingredients. These characteristics suggest that the developed cream has potential as a safe and effective herbal cosmetic skincare preparation.

Among the evaluated formulations, F1C demonstrated comparatively superior overall performance, suggesting that formulation optimization plays a significant role in cosmetic effectiveness.

The findings support the growing importance of herbal cosmetic science in developing safer alternatives to synthetic skincare formulations. Further analytical, clinical, and stability investigations are recommended to establish broader therapeutic and commercial applicability.

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