International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

A Review on Formulation of Body Lotion

Gadiya Rushikesh S[1], Sabale Shubham B[2], Salve Pratik D[3], Pandharkar Akash N[4]

[1,3,4]B. Pharm, Ashvin College of Pharmacy, Manchi Hill
[2]M. Pharm, Ashvin College of Pharmacy, Manchi Hill

Abstract:
The body is shielded by protective layers of skin. A plant-based herbal body lotion provides soothing hydration. Common ingredients often feature aloe vera, known for its healing properties, pain relief, and moisture retention. For centuries, it has been used to treat skin burns and wounds. Aloe vera, honey, glycerin, rose water, and triethanolamine were selected for the formulation of the herbal body lotion. Evaluation parameters were conducted to ensure that the formulation is safe for human use. The aloe vera body lotion was created using these ingredients, which include aloe vera known for its antimicrobial and hydrating properties, protecting the skin from microbial damage while providing moisture. In conclusion, this herbal body lotion is designed for topical application. Aloe vera enhances the lotion's synergistic and moisturizing effects on the skin. Herbal remedies are gaining worldwide popularity, and the combination of aloe vera, honey, coconut oil, Lavender oil, and glycerin in this formulation is an excellent approach. These formulations were assessed using various evaluation parameters, including homogeneity, appearance, after-feel, acid value, pH measurement, irritancy test, viscosity, accelerated stability testing, subjective properties, spreadability, type of emulsion test, sensitivity test, washability test, statistical analysis, in vitro permeation studies, thermal stability tests, total fatty matter determination, water content analysis, and patch tests. The aim of this review is to compile information on different herbal lotion formulations and their evaluations. Numerous researchers have studied herbal lotion formulations, and this knowledge can assist other researchers in developing novel herbal cosmetic formulations featuring new ingredients.

Keywords: Lotion, Aloevera, Honey, Coconut Oil

Introduction:

This study develops a Herbal Body Lotion, referred to as "Products" in this document. These Products are carefully crafted using approved cosmetic ingredients combined with one or more herbal components to provide unique cosmetic advantages. In this research, these items are labeled as "Herbal Cosmetics." Herbal lotions incorporate aromatic herbs and their derivatives into cosmetic formulations. This approach has gained popularity among consumers of herbal products, driving the demand for cosmetics that feature natural ingredients and extracts. Lotions are liquid formulations intended for external application, typically applied to the skin with absorbent materials like cotton wool or gauze. They can offer cooling, soothing, or protective effects locally.[1] Herbal Cosmetics, referred to as "Products" in this context, are created using a blend of approved cosmetic ingredients as a base, enhanced with one or more herbal components to offer specific cosmetic benefits. These products utilize natural herbs and their derivatives for their

aromatic qualities, appealing to consumers and fueling the demand for natural ingredients and extracts in cosmetic formulations.[2] Lotions are liquid formulations designed for external use without rubbing. They are typically applied to the skin using absorbent materials like cotton wool or gauze that have been saturated with the lotion. These products can serve various local functions, such as cooling, soothing, or providing protection.

Containers:Lotions should be packaged in colored, fluted bottles to clearly differentiate them from products intended for internal use.

Storage: It's important to store lotions in tightly sealed, airtight containers in a cool environment to maintain their efficacy.[3] A herbal body lotion is a liquid formulation designed for application on the skin to enhance its appearance. These lotions help eliminate sebum and cleanse the skin effectively. The ingredients in these formulations promote better blood circulation, moisturization, astringency, rejuvenation, skin lightening, and provide therapeutic benefits.[4] Turmeric has been utilized for nearly 4,000 years, originating in the Vedic culture of India, where it served both as a culinary spice and held religious importance. It is believed to have arrived in China around 700 AD.[5] Initially, turmeric was used as a dye before being recognized for its alleged medicinal properties in traditional practices. It spread from India to Southeast Asia alongside the teachings of Hinduism and Buddhism, where the yellow dye became associated with the robes of monks and priests.[6]

Benefits of Lotion:[7]

1. Rehydrates Dry Skin: Restores moisture to combat dryness.
2. Nourishes Rough Areas: Targets extra dry or rough patches for a smoother feel.
3. Pleasant Aroma: Many lotions have delightful scents that enhance your mood.
4. Promotes Relaxation: The act of applying lotion can be soothing and calming.
5. Softens Tough Skin: Helps to soften the roughest areas of your body.
6. Enhances Radiance: Gives your skin a healthy, glowing appearance.

Ideal Properties of Herbal Body Lotion:-

Cooling Effect: The product should provide a soothing sensation upon application.
Particle-Free: It's advisable to eliminate any particles for a smoother experience.
Emollient Qualities: Look for ingredients that offer a potential emollient effect.
Non-Oily Application: Should minimize oily residue during use.
Even Distribution: Must spread uniformly across the skin's surface.
Skin-Friendly: It's essential that the lotion does not cause any adverse reactions.
pH Compatibility: Ensuring compatibility with the skin's pH level is crucial.

Advantages of Herbal Body Lotion:-[8]

1. Non-Irritating: They are unlikely to cause allergic reactions and have no harmful side effects.
2. Skin and Hair Compatibility: Easily blends with both skin and hair.
3. High Efficacy: More effective than conventional cosmetics, even in small amounts.
4. Plant Extract Benefits: The extracts reduce the bulkiness of products while providing targeted pharmacological effects.
5. Enhanced Stability and Purity: Offer greater stability, purity, and efficacy due to their herbal ingredients.
6. Convenient Storage: Easier to store and handle, with a longer shelf life.

Materials

Materials used for lotion as follows

Sr. No.	Ingredient	Uses
1.	Aloevera	Moisturizer
2.	Triethanolamine	Emulsifier
3.	Glycerine	Humectant
4.	Rose Water	Perfume
5.	Distilled water	Diluent
6.	Stearic Acid	Emulsifier
7.	Coconut Milk	Improve of skin texture
8.	Honey	Preservative
9.	Lavender oil	Perfume

Hamman JH (2008). The composition and uses of Aloe vera leaf gel. Molecules, 13(8), 1599-1616.

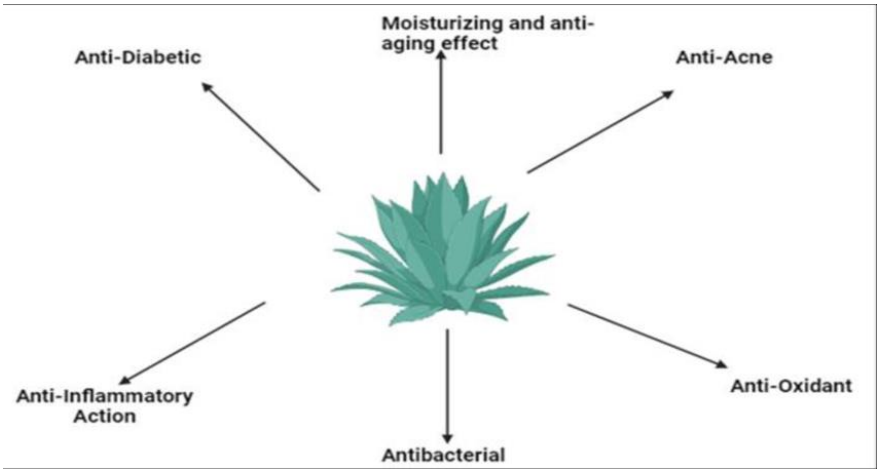

Fig 1: Pharmacological properties of Aloe-Vera.[9]

Aloevera

Aloe vera gel is rich in vitamins C and E, as well as beta carotene, giving it notable anti-aging benefits. Its antimicrobial and anti-inflammatory properties help reduce skin blemishes and minimize fine lines. Additionally, it unclogs pores and softens the skin. Aloe vera gel also offers a cooling sensation and is packed with antioxidants and minerals that promote healing. It effectively moisturizes and soothes the skin as well.[10]

Fig 2:-Aloevera

Honey-

Honey is a natural antiseptic and anti-inflammatory that helps to heal breakouts of acne and prevent extra infections. Honey also reduces the redness and swelling of acne. It control the accumulation of dust in the skin pores and absorbs the impurities from the pores It reduces the dryness of skin by providing long-lasting hydration. Honey moisturizes the top layers of skin and helps to reduce wrinkles and fine lines. It use as wound-healing agent.[11]

Fig 3:-Honey

Rose water-

- Rose water is an excellent source of anti-inflammatory properties.
- It provides a cooling sensation that helps alleviate itchiness and redness.
- It soothes skin irritation effectively.
- Rose water hydrates and moisturizes the skin.
- It helps maintain the skin's pH balance.
- It enhances skin texture and softness.
- It possesses anti-inflammatory benefits.

Fig 4 :-Rose Water

Coconut Milk

Coconut milk is rich in fat, making it an excellent moisturizer for dry skin when applied topically. It effectively seals in moisture and hydrates the skin. Its easy absorption smooths skin cells, while the fats help maintain elasticity. This makes it an ideal body moisturizer, resulting in soft and textured skin.[12]

Fig 5 :- Cocount milk

Procedure:

1. Place grated beeswax in a double boiler, then add coconut oil and shea butter, heating them together in a water bath until fully melted.
2. Pour the melted ingredients into a blender.
3. Refrigerate for 15 minutes.
4. Blend again and add aloe vera gel.
5. Blend once more, then add peppermint oil.
6. Blend again and store the lotion in an airtight container.

Evaluation of Body Lotion-

1. Homogeneity: The formulations were assessed for homogeneity through visual inspection and tactile evaluation.

2. Appearance: The visual characteristics of the lotion were observed.

3. After Feel: The emollience, slipperiness, and residue left on the skin after applying a fixed amount of lotion were evaluated.

4. Acid Value: Ten grams of the substance was dissolved in 50 ml of a 1:1 mixture of alcohol and ether. The flask was equipped with a reflux condenser and heated gently until the sample was fully dissolved. Afterward, 1 ml of phenolphthalein was added and the solution was titrated with 0.1N NaOH until a faint pink color appeared, which was maintained for 30 seconds.

Acid Value = $(n \times 5.61) / w$

where n is the volume of NaOH used (in ml) and w is the weight of the substance.

5. pH Measurement: The pH meter was calibrated with standard buffer solutions. About 0.5 g of the lotion was dissolved in 50 ml of distilled water, and its pH was measured using a digital pH meter.

6. Irritancy Test: A 1 cm^2 area was marked on the dorsal surface of the left hand. The lotion was applied to this area, and observations for irritancy, erythema, and edema were made at regular intervals up to 24 hours.

7. Viscosity: The viscosity of the formulation was measured using a Brookfield or Ostwald viscometer at 100 RPM with spindle number 7 at a temperature of 25°C. The measurements were taken in triplicate, and the average of the three readings was recorded.

8. Accelerated Stability Testing: Accelerated stability testing was performed on the two most stable formulations at room temperature over 7 days. The formulations were then placed at 40°C ± 1°C for 20 days. Observations for any changes in color or phase separation were recorded on the 0th, 5th, 10th, 15th, and 20th days for both conditions.[13]

9. Spreadability: Two standard glass slides (20 × 5 cm) were used for testing. The formulation was applied to one slide, and the second slide was placed on top, sandwiching the lotion between them over an area of 7.5 cm. A weight of 100 g was then placed on top to create a thin layer. After removing the weight, any excess lotion on the slides was scraped off. The slides were then positioned at a 45° angle in a stand, ensuring minimal disturbance, with the lower slide secured while allowing the upper slide to slide freely. A 60 g weight was carefully attached to the upper slide. The time taken for the upper slide to travel 5 cm and separate from the lower slide under the influence of the weight was recorded. This process was repeated three times, and the average time was calculated. Spreadability was determined using the formula:

\[S = \frac{M \times L}{T} \]

Where:

- \(S \) = Spreadability
- \(L \) = Length of the glass slide
- \(M \) = Weight attached to the upper slide
- \(T \) = Time taken

10.Type of Emulsion Test: Dye solubility and dilution tests were performed to identify the type of emulsion created.

11.Sensitivity Test: A sample of the lotion was applied to the forearms of six volunteers and left for 20 minutes. Any irritation that occurred was noted after this period.

12. Washability Test: A portion of the lotion was applied to the hand and allowed to be rinsed off under running tap water for 10 minutes. The time taken for the lotion to be completely removed was recorded.[14]

13.In Vitro Permeation Studies: In vitro permeation studies of TRA lotions across rabbit skin were conducted using two-chamber Franz-type diffusion cells (constructed in-house) with a receptor volume of approximately 5 ml and a diffusional area of about 0.788 cm^2. The studies utilized abdominal full-thickness skin from male White New Zealand rabbits (3-4 kg), which was carefully excised after euthanizing the rabbit. Any subcutaneous fat and extraneous tissue were meticulously removed using forceps and scissors. The skin was then cleaned with phosphate-buffered saline (PBS) at pH 7.4 and stored in 500 ml of normal saline in a refrigerator at 18–20°C.

The skin was used within one week of excision. Pieces of skin were cut to an appropriate size (around 1 cm in diameter) and soaked overnight in the receptor solution (PBS). The membrane was positioned between the two compartments of the diffusion cells, with the epidermal side facing the donor compartment and the dermal side exposed to PBS at pH 7.4 (receptor fluid). The donor compartment was filled with PBS at a pH of 7.4 ± 0.1, closely matching human skin pH. The receptor fluid was stirred with a magnetic stirrer at 500 rpm, while maintaining a temperature of 37 ± 0.5°C using a water jacket. Care was taken to eliminate any bubbles between the skin and the receptor solution, and vacuum grease was applied to ensure a leak-proof seal between the membrane and the diffusion cell compartments. To prevent evaporation, the cell arm and donor compartment were covered with parafilm, while consistent mixing in the receptor phase was maintained.

The diffusion cells were placed on a stirring bed immersed in a water bath set at 37 ± 0.05°C to ensure a stable temperature at the membrane surface. After 24 hours, both chambers were cleared of PBS, and the receptor compartment was refilled with pre-warmed PBS, while the skin remained intact. The donor compartment was then loaded with 1 ml of the lotion (test formulation). At specified intervals (5, 15, 30, 60, 90, 120, 180, 240, 360, and 480 minutes), 0.2 ml samples were collected from the receptor solution using a micropipette, and the same volume of pre-warmed PBS was added to maintain sink conditions.
The samples were analyzed spectrophotometrically at 271 nm using a UV/Vis spectrophotometer to determine the amount of TRA permeated through the rabbit skin, following dilution with 1.8 ml of PBS. Due to variability in skin permeability, each analysis was performed in quintuplicate (n = 5). A calibration curve was created by dissolving 500 mg of TRA in 10 ml of PBS in a 100 ml volumetric flask, with the final volume adjusted to 100 ml by adding PBS to prepare a stock solution. Dilutions of 10, 20, 30, 40, 50, 60, 70, and 80 µg/ml were prepared from this stock, and their UV absorbance was measured, with the maximum absorbance of TRA identified at 271 nm. The linear equation for the calibration curve was $y = 0.022x - 0.021$, with a correlation coefficient (R) of 0.998. Steady-state flux was calculated from the slope of the linear portion of the cumulative amount permeated (Q) versus time (t) plot. The input rate of TRA across rabbit skin was determined using the equation:

$$\text{Input rate} = K_p \times C \times A$$

Where:

- K_p = permeability coefficient
- C = amount of drug in the donor compartment (µg)
- A = diffusion area of the Franz cell (approximately 0.788 cm²)

The enhancement ratio (ER) was calculated by dividing the flux of the test formulation by that of the control formulation.

14.Statistical Analysis: Both the receptor and donor compartments were filled with PBS at pH 7.4 ± 0.1. To eliminate air bubbles and prevent air pockets in the receptor phase, PBS was degassed. Results were expressed as mean ± standard deviation (SD, n = 5). Statistical significance among the permeation data was evaluated using F-test, Fisher's least significant difference (LSD), analysis of variance (ANOVA), and multiple range tests at a 95% confidence level.[15]

15. Test for Thermal Stability: The thermal stability of the formulation was assessed using a humidity chamber maintained at 60–70% relative humidity and a temperature of 37 ± 1°C.

16. Determination of Total Fatty Matter: A sample weighing 2 g was placed in a conical flask, followed by the addition of 25 ml of diluted hydrochloric acid (1% v/v). The mixture was refluxed, then transferred to a separating funnel, where 50 ml of ethyl ether was added. The funnel was shaken until two distinct layers formed. The aqueous layer was discarded, and an additional 50 ml portion of ether was added twice. All ether extracts were combined and filtered through filter paper containing dried sodium sulfate. The ether was then distilled off, and the remaining material in the flask was dried at 60 ± 2°C until a constant mass was achieved.

Calculation

$$\text{Total Fatty Matter \%} = \frac{100 \times M_1}{M_2}$$

Where:

- M_1 = mass of residue (in grams)
- M_2 = mass of sample taken for the test (in grams)

17. Determination of Water Content: A 10 g sample was placed into a flask, and 200 ml of toluene

along with a few pieces of pumice stone were added. The flask was connected to a condenser and heated until the toluene began to boil, at which point it was refluxed. Once the water was distilled, the heat source was removed.

Calculation

$$\text{Water \% by mass} = \frac{V \times D \times 100}{M}$$

Where:

- V = volume of water collected (in ml) at room temperature
- D = density of water at room temperature
- M = mass of the sample taken for the test (in grams)

18. Patch Test: Approximately 1–3 g of the test material was placed on a piece of fabric or funnel and applied to a sensitive area of the skin, such as behind the ears. The cosmetic was applied to an area of 1 cm^2 of skin. Control patches of a similar, known-brand cosmetic were also used. The test site was inspected after 24 hours. If no reaction occurred, the test was repeated two more times. If no reactions were observed after the third application, the individual was considered not hypersensitive.[16]

Conclusion

Herbal substances offer superior relief for skin dryness compared to synthetic bases and can serve as partial replacements. It is essential for cosmetologists to advocate for natural cosmetics. These herbal formulations are easy to apply to the skin, allowing for effective absorption, while the skin's natural properties help mitigate adverse effects on its surface. There is a growing demand for herbal formulations in the global market, as herbal compounds exhibit unique and significant benefits.

This study focused on the development and evaluation of an herbal lotion. Key organoleptic properties such as appearance, color, and fragrance were assessed alongside physiological parameters like pH, spreadability, ease of removal, and irritancy.

The formulation of an herbal body lotion is the central theme of this research, aiming to provide essential nutrients for skin health. Various natural herbs, each with distinct properties, are particularly beneficial in skincare formulations, especially for their antioxidant effects. The findings indicate that herbal cosmetics are safe and do not pose harm, with herbal lotions effectively preventing skin issues.

The personal care industry is increasingly utilizing cosmetics that incorporate bioactive substances, which enhance the skin's biological activity and supply vital nutrients for skin health.

Reference

1. Nikita M. Rathi, Shital V. Sirsat, Surekha S. Tayade, Abhijit S. Khot; Akshay C. Deshmukh Formulation and Standardization of Herbal Lotion 4 April 2022;7.
2. Saudagar R. B.* 1 and Sisodiya M. H., Review on Herbal Cosmetics, World Journal of Pharmaceutical Research, Volume 7, Issue 7, 573-591.
3. R. M. Mehta, Pharmaceutics-II, Fourth Edition, (119-120) Vallabh Prakashan 2015.
4. Dr.Kuntal Das, Nirali Prakashan. A review of herbal lotion, First Edition: February 2020
   Manisha Yogesh Sonalkar, Sachin Annasaheb Nitave. Formulation and evaluation of polyherbal cosmetic cream. World J Pharm Pharm Sci 2016;5:772-9
5. T Reynolds, AC Dweck. Aloe vera leaf gel: a review update. J Ethno Pharmacol 1999;68:3-37.
6. Miller LG. Herbal Medicinals: selected clinical considerations focusing on known or potential drug herb interactions. Arch Intern Med. 1998;158:2200–11.

7. Dr. Kuntal Das, Nirali Prakashan. A review of herbal lotion, first edition: February 2020.
8. Surjushe, Resham Vasani, DG Saple. Aloe Vera: A Short Review Amar. A review on herbal cosmetics Lovepreet Kaur, Ajeet Pal Singh, Amar Pal Singh, Taranjit Kaur St. Soldier Institute of Pharmacy, Lidhran Campus, Behind NIT (R.E.C), Jalandhar-Amritsar by pass NH-1 Jalandhar, Punjab, India. 2021;9:3.
9. Sajjad A, Sajjad SS. Aloe Vera: An Ancient Herb for Modern dentistry-A Literature Review. 2014:01-06
10. Snowdon JA, Cliver DO. Microorganisms in honey. Int J Food Microbiol. 1996;31:1–26
11. Ravindra RP, Muslim PK. Comparison of physical characteristics of vanishing Cream base. Cow ghee and shata-dhautaghrita as per pharmacopoeial standards. International Journal of Pharma and BioSciences. 2013;4(4):14-21.
12. Dr. Sweta Srivastava Koka; Ms. Surpriya Shidhaye, Handbook of Experimental- Herbal Drug Technology, S. Vikas & Company- Medical Publishers,Editio 2020, P. No. 16,18,19
13. Vishakha Shinde; Kundan Tiwari; Formulation and Evaluation of Lemongrass Lotion International Journal of PharmaO2Vol.2/Issue6/Nov.-Dec. 2020
14. SNH Shah et.al. Effect of Permeation Enhancers on the Release Behavior and Permeation Kinetics of Novel Tramadol Lotions Tropical Journal of Pharmaceutical Research February 2013; 12 (1): 27-32
15. Namita and Nimisha Development and Evaluation of Herbal Cosmeceutical for Skin Care Int J Pharm Bio Sci 2013 Apr; 4(2): (P) 86 - 92