

Formulation and Evaluation of Aloe Vera-Based Herbal Lotion for Skin Moisturization and Healing

Pratham Ray¹, Prince kumar¹, Tarun Verma¹, Gyanesh Kumar Sahu^{1*}, Harish Sharma²

¹Rungta Institute of Pharmaceutical Sciences & Research

²School of Pharmacy, Anjaneya University, Raipur

Corresponding Author:

Dr Gyanesh Kumar Sahu

Professor & Dean

Rungta Institute of Pharmaceutical Sciences & Research, Bhilai

Email- drgyaneshkumarsahu@gmail.com

Abstract

Background: An alternate treatment for radiodermatitis seems to be the use of herbal extracts, which are a source of antioxidant compounds that can protect against ionizing radiation and neutralize free radicals. Many recommendations about the management and prevention of side effects are predicated on the appropriate experience of radiation centers. We provide an overview of current studies that attempt to lessen radiation-induced skin damage through the application of topical treatments including herbal extracts, such as onco-cosmetics. **Techniques:** The scope of this paper is restricted to a critical evaluation of professional and scientific literature. It deals with preparations in various physicochemical forms, such as ointments, gels, and emulsions. We emphasize the relationship between the characteristics of the herbal extract, the type of skin care product used (preparation type, composition, dosage), and the assessment of the extract's effectiveness in avoiding and treating radiation reactions on the skin. **Conclusions:** Since herbal extracts belong to a class of cosmeceutical supplements, they can be used in recipes and added to preparations without a prescription. Since there are no specific rules, evaluating the efficiency of plant extracts in radiation is a challenging undertaking. Analysis of herbal extracts and recipes in terms of their physicochemical, dermatological, and performance properties should come before any studies.

Keywords: plant extracts for skin care, onco-cosmetics, herbal medicine, radiodermatitis, and radiation treatment.

Introduction

In oncology, radiotherapy is a treatment technique that uses ionizing radiation, most often X-rays, to cure tumors and relieve pain associated with the spread of the tumor process [1]. It aims to maintain the healthy tissue surrounding the tumor while simultaneously halting the growth of the tumor tissue. Tissue ionization results from the application of high frequency waves during treatment, which knock the electron out of the atom's orbit. Additionally, free electrons fuel the production of peroxides and free radicals, which damage proteins, DNA, and cellular membranes [2, 3].

When it comes to free electrons, harm results from direct action, however we discuss indirect effect when the damage to the Large damage may prevent healing from being successful, and apoptosis may cause cells to die. Their partial reconstruction results in long-term alterations or mutations that induce cell dysfunction even if normal cell function is restored [4,6,7].

Examples of common adverse effects of radiation therapy include the following:

overall weakness, decreased appetite, decreased activity, altered bold parameters, skin reaction following radiation, hair loss, and mucosal reactions in the throat, larynx, nasal cavity, and mouth cavities, the heart, the intestines, the bladder, and the respiratory tract's response. Patients may experience complications and adverse effects early on or later [8]. Early issues include skin, digestive tract, urinary tract, and marrow cells that are continuously proliferating [2,6,7,9]. For the most part, those don't have any major effects on patients. The second set of issues manifests months or even years following the radiation exposure. A few months or perhaps years after the radiation, the second set of issues manifests. It affects tissues that grow slowly, such as the liver, kidneys, lungs, blood vessels, and central nervous system [4,6,7]. The area of the body that was exposed to the radiation, the dose of the radiation, and the amount of radiation that the cells accumulated all determine how significant the secondary effects are [4,6,7,9–11].

Only secondary effects on the skin, how to prevent and cure them, and the potential use of topically applied herbal extracts were covered in this article.

Because of its natural makeup and the rising demand for organic and skin-friendly goods, herbal lotions have been increasingly popular in recent years. Herbal lotions are made with plant-based substances that are known for their calming, moisturizing, and restorative qualities, in contrast to conventional skincare lotions that frequently contain artificial chemicals and preservatives. Herbs including aloe vera, chamomile, lavender, and calendula are frequently used in these products and are highly regarded for their capacity to treat a range of skin issues, including ageing, dryness, irritation, and inflammation. Herbal lotions present an alluring substitute as people look for products with fewer chemicals and negative effects on the environment. These lotions promise to nourish and protect the skin while also supporting ethical and ecological practices in the beauty business, which is in line with the trend towards natural beauty and wellness. This essay seeks to present a thorough analysis of herbal lotions, assessing their components, efficacy, safety, and customer opinions. This review aims to highlight the advantages and possible disadvantages of herbal lotions by looking at user experiences, market trends, and scientific research, ultimately assisting customers in making well-informed skincare decisions.

Human skin:

With a total size of almost 20 square feet, the skin is the biggest organ in the body. The skin allows for touch, heat, and cold sensations, helps control body temperature, and shields us from pathogens and the environment.

Three layers make up our skin: The outermost layer, the epidermis, determines our skin tone and acts as a waterproof barrier.

Beneath the epidermis, the dermis is home to sweat glands, hair follicles, and stiff connective tissue.

The hypodermis, the deeper subcutaneous tissue, is composed of connective tissue and fat. Melanocytes are unique cells that generate the pigment melanin, which gives skin its colour. The epidermis contains melanocytes.

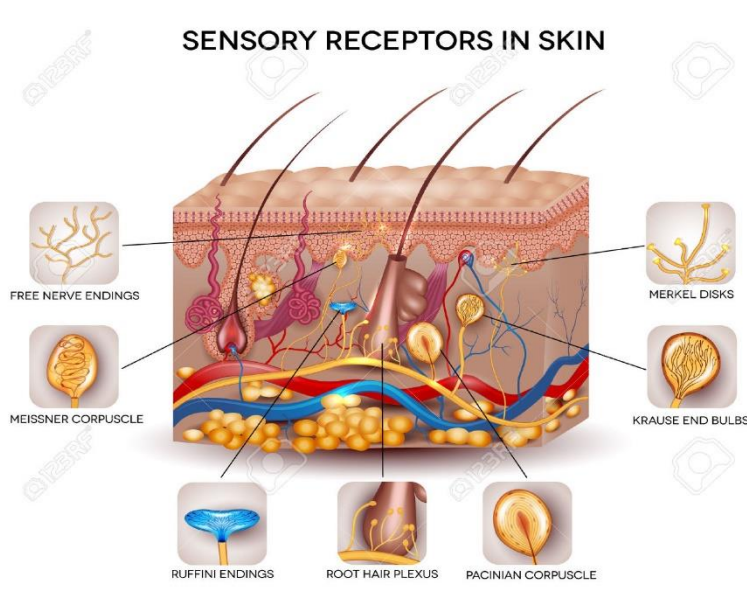


Fig.1 Structure of Human Skin

Components of herbal lotion

1. Aloe vera gel
2. Coconut oil
3. Beeswax
4. Borax
5. Water with rose petals

Ingredient usage in herbal lotion

1. Beeswax
 - it is used in cosmetics to hydrate, condition, and soothe the skin.
 - Exfoliates, fixes damage, and promotes skin healing.

- It prevents the symptoms of ageing, lessens irritation and itching, and builds a protective moisture barrier that lasts for a long time.

- Fighting against environmental contaminants Another great natural exfoliant is beeswax.

Dead skin cells are eliminated.

- Keep skin hydrated and silky. Treat psoriasis and eczema. Beeswax works well for a variety of skin types.



Coconut Oil

- The main benefits of coconut oil for the skin are its anti-inflammatory and moisturising qualities.
- possesses antioxidant properties.
- Coconut oil is excellent for softening and moisturising the face.

Coconut oil is an excellent scrub.



Aloe vera

- is used to lessen skin scarring, pigmentation, redness, and itching in addition to acting as an antifungal and anti-inflammatory.
- Aloe Vera gel not only moisturises the skin but also relieves or calms such conditions.
- Forsibite: Aloe Vera Gel can benefit your skin in both hot and cold climates. If you have minor frostbite and your skin is harmed, Aloe Vera Gel may speed up the healing process and help your tissues develop more quickly.

- It is used as a moisturiser, to heal burn wounds, and to lessen acne and pimples.



Borax

- In the cosmetics sector, borax is utilised as a preventative measure. This slows the humidifier's bacterial development. body washes, body scrubs, body salts, gels, lotions, shampoos, and creams.
- The maker of cosmetics Employing borax as an emulsifier or buffer
- Prevent product components from separating.
- Using borax as a raw material eliminates dead skin cells and destroys skin microorganisms. and excess fat. Penetration, which limits its use and makes it quite safe for skin.
- The cosmetics business uses borax.
- Stop or reduce the development of microorganisms in humidifiers
- Items like body cleansers, lotions, gels, shampoos, and creams Scrubs, bombs, and bath salts. My creator Cosmetics containing borax are used as emulsifiers or as a short-term fix to preserve product ingredients. It splits apart.



Rose water

- Rose water can clam your skin □ It has anti aging property
- Rose water makes great facial mist

- It can be used to create fragrance
- Rose water is a powerful ingredient in a facial treatment ☐
- May hydrates the skin
- May help balance skin pH level
- Has a Anti-inflammatory effect



The ideal herbal lotion qualities

1. They should have a cooling effect when used.
2. Particles should not be present.
3. They need to have a nourishing impact.
4. After application, they ought to wash away the greasy excretion.
5. Their distribution on the skin's surface should be consistent.
6. They shouldn't irritate the skin.
7. They ought to work with the pH of the skin.

Benefits of Lotion

1. Hydrate your parched skin again.
2. Restore areas of the skin that are particularly dry or rough.
3. Calluses that are smooth.
4. Have a pleasant scent and feel.

5. Give yourself a break.
6. Soften your body's toughest areas.
7. Give your skin a radiant appearance.

Benefits of herbal lotions include:

1. No adverse side effects or allergic reactions are caused.
2. They blend in effortlessly with hair and skin.
3. These work far better than other cosmetics in little amounts.
4. Plant extract provides the right pharmacological effects while reducing the cosmetics' bulk qualities.
5. Convenient and present in a wide range of plants.
6. Their herbal ingredients give them more stability, purity, and potency.
7. Manufacturing is simple
8. Herbal cosmetics can be handled and stored more easily and for longer.
9. Low-cost

Materials and Procedures

Aloe vera herb collection: Aloe vera is the sole herb we mostly employ in this.

A moisturising ingredient gives the skin its smoothing qualities. Gibberellins and auxin are the two hormones found in aloe vera gel. These two hormones have anti-inflammatory qualities that lessen skin irritation and aid in wound healing. Aloe vera is used to treat psoriasis, acne, and eczema, among other chronic skin conditions. The plant utilised in the study was gathered at the Bareilly botanical garden.

Extraction of Aloe vera

To extract aloe vera, we must first gather the leaves from the botanical garden, wash them with distilled water, and then use a knife to cut the outer portion of the leaf longitudinally.

- Next, we withdrew the colourless parenchymatous tissue and placed it in a 400 ml beaker. Next, we had to use a stirrer mixer to stir the aloe vera gel.

The then used a muslin cloth to filter it in order to get rid of different kinds of contaminants.

The Finally, to protect the beaker from microbial development or any environmental effects, cover it with filter paper or silver foil.

Role of ingredients

Sr no.	Ingredients	Use
1	Bees wax	Cosmetics stiffening agen
2	Aloe Vera	An antiseptic moisturising product
3	Coconu oil	Has anti-inflammatory and cooling properties
4	Borax	Anti-inflammatory and antiseptic
5	Rose water	. Vehicle

Formulation

Sr no.	Ingredients	Formulation A	Formulation B	Formulation C
1	Bess wax	2 gm	3gm	4gm
2	Coconut oil	3gm	4gm	5gm
3	Aloevera	0.59 gm	0.60 gm	0.61 gm
4	Borax	0.1 gm	0.2 gm	0.3 gm
5	Rose water	3 ml	4ml	5ml

Dissolve borax in rose water at 70°C on a water bath. Melt the wax and coconut oil together in a different beaker. Keep the temperature at about 70 degrees Celsius. Our borax solution was continually stirred into melted wax at the same temperature.

Stir the bulk constantly once it reaches about 45 degrees Celsius. After that, label the wide-mouth container after pouring the mixture into it.

Assessment of Herbal Lotion

Organoleptic nature

Homeogenicity

PH assessment

Assessing the spreadability

Test of Irritation

Washability

1.Organoleptic nature

Colour: White

Texture: Smooth

Smell: Pleasant

State: Semi-solid

2.Homeogenicity

The uniformity of the formulation was assessed through touch and visual appearance.

3.assessment of PH

The PH was measured using a digital PH meter after 0.5 g of cream had been dissolved in 50 ml of distilled water.

4.Calculating Spreadability

The sample was sandwiched between two glass slides and squeezed for five minutes using a 100g weight to achieve a consistent thickness. The pan was given more weight. Spreadability was measured as the amount of time needed to separate the two slides, or the amount of time it took for the upper glass slide to pass over the lower slide. The following formula was used to calculate it

5. Test of Irritation

On the left dorsal surface, mark the area (2 cm²). After applying the cream to that location, the time was recorded. After that, it is examined for irritability, erythema, and oedema for a maximum of 24 hours and reported.

6. Washability

For ten minutes, a layer of lotion was applied to the hand's skin and left to run under the pressure of running water. It was noted when the lotion was totally gone.

Result and discussion

Assessment of PH

Sr.no.	Formulation	Ph
1	A	6.5
2	B	6.7
3	C	7.2

Assessing the spreadability

Sr .	Formulation	Time	Spreadability (gm ² cm/sec)
1	A	11	22.9
2	B	14	15
3	C	8	32.7

Test of Irritation

Sr no.	Formulation	Irritancy test	Erythema	Edema
1	A	Nil	Nil	Nil
2	B	Nil	Nil	Nil
3	C	Nil	Nil	Nil

Use Instructions

Only for external use

To warm the lotion, rub your palms together. use a dollop (about the size of a 10p coin) to your hand; use more if your skin is extremely dry or on rougher regions like your knees and elbows.

Using tiny circular motions, rub the lotion into your body with your hands.

Result

The three formulations, A, B, and C, all displayed good appearance, PH, and springability determination. Additionally, during the irritation investigation, Formulations A, B, and C did not exhibit any redness, erythema, or irritation, and they were readily washable.

Patent Trends for Herbal Lotions

The demand for herbal and natural skincare products has led to an increase in innovation and research within the herbal lotion industry. As companies and researchers explore the benefits of plant-based ingredients for skin health, there has been a significant rise in patents related to the formulation, production, and application of herbal lotions. Patents in this area generally focus on unique combinations of natural ingredients, extraction methods, and novel uses of herbs to enhance the effectiveness of lotions.

Key areas of herbal lotion patents include:

1. **Ingredient Innovations:** Many patents center around specific herbal extracts and their incorporation into lotions. Popular ingredients such as aloe vera, turmeric, green tea, and essential oils have been patented for their skin benefits, such as moisturizing, anti-aging, anti-inflammatory, and antioxidant properties.
2. **Extraction and Preservation Methods:** Patents have been filed for innovative extraction techniques to maximize the potency and stability of active herbal compounds. Methods for maintaining the efficacy of natural ingredients, without the use of synthetic preservatives, are of particular interest. This also includes sustainable sourcing and eco-friendly practices to ensure the longevity and environmental friendliness of the products.
3. **Combination Formulas:** A significant trend in herbal lotion patents involves the creation of synergistic formulas that combine various plant-based ingredients to target multiple skin concerns. These patents aim to formulate lotions that provide a broad spectrum of benefits, such as enhanced hydration, skin barrier protection, and reduction in irritation or redness.
4. **Cosmetic and Therapeutic Uses:** In addition to cosmetic applications, some herbal lotion patents focus on therapeutic uses, such as treatments for eczema, psoriasis, or sensitive skin. This category includes patents for lotions designed to treat specific skin conditions while still offering a natural and safe alternative to chemical-based treatments.
5. **Packaging and Delivery Systems:** Some patents extend to the packaging and delivery systems for herbal lotions, ensuring the stability and effectiveness of the natural ingredients. This includes patents for airless pumps, biodegradable packaging, or specialized containers that preserve the freshness and potency of the product.

The rapid evolution of herbal lotion formulations and the growing market interest in natural skincare products suggest that patent activity in this area will continue to grow. These patents not only protect innovative formulations but also contribute to the ongoing development of products that meet consumer demand for safe, effective, and sustainable skincare solutions.

Future prospects

The future prospects of herbal lotions are very promising due to several key factors, including growing consumer interest in natural products, increasing awareness about the potential side effects of synthetic chemicals, and advancements in plant-based skincare technology. Below are some of the reasons why herbal lotions are expected to have a bright future:

1. Increasing Demand for Natural and Organic Products

- **Consumer Trends:** As consumers become more health-conscious and eco-aware, there is a significant shift towards products with natural ingredients. Many people are moving away from chemical-based products, leading to a growing market for herbal and organic skincare.

- **Sustainability:** Herbal lotions are often perceived as more sustainable and eco-friendly. The use of plant-based ingredients, along with eco-conscious packaging, aligns with the rising demand for environmentally responsible products.

2. Growing Awareness of Skin Health and Wellness

- **Holistic Approach:** Consumers are increasingly seeking products that not only treat skin conditions but also promote overall skin health and wellness. Herbal lotions, which typically contain soothing, nourishing ingredients like aloe vera, chamomile, and lavender, are becoming popular for their gentle, natural healing properties.
- **Fewer Side Effects:** Many people are concerned about the long-term effects of using products with synthetic chemicals like parabens and phthalates. Herbal lotions, which are typically free from these ingredients, offer an appealing alternative.

3. Innovation and Product Development

- **Advanced Formulations:** Researchers are continuously exploring the benefits of various herbs and plants, which allows for more effective and innovative herbal lotions. These innovations include the extraction of active compounds from plants, improving the stability of the formulas, and enhancing their potency for targeted skin conditions like acne, dry skin, and aging.
- **Personalized Products:** The growth of the herbal lotion market could see the introduction of personalized skincare, where lotions are tailored to individual skin types and needs. This could include the use of customized herbal ingredients for each user based on their specific skin concerns.

4. Global Market Expansion

- **International Appeal:** The demand for herbal skincare products is expanding globally, especially in markets like Asia-Pacific, Europe, and North America. In particular, Ayurvedic and traditional Chinese medicine-based skincare products are gaining popularity due to their long-standing historical use and natural appeal.
- **Cultural Influence:** As more people around the world are exposed to diverse cultural skincare traditions, herbal lotions are finding broader appeal, further fueling market growth.

5. Regulatory and Certification Support

- **Organic Certification:** As the demand for organic products rises, herbal lotions that are certified organic or that adhere to recognized natural skincare standards will be in high demand. This certification can serve as a quality assurance for consumers looking for trustworthy products.
- **Regulations:** Governments and regulatory bodies are increasingly putting more focus on ensuring the safety and efficacy of herbal products, which will enhance consumer confidence and further boost the market for herbal lotions.

Conclusion

The potential of plant extracts for cosmetic uses is the main focus of the current study. The personal care system has seen a multiplication in the usage of cosmetics. Using bioactive ingredients in cosmetics affects how the skin operates biologically and supplies the nutrients needed for healthy skin. Naturally occurring herbs come in a wide variety of forms and are used as antioxidants in skincare products. According to the current study, herbal cosmetics are far safer than commercially available cosmetics and do not cause any harmful side effects. Herbal Lotion will help us prevent skin issues. The cream had a multifunctional impact by utilising Aloe Vera gel, Coconut oil, and Rose water, and each of these herbal constituents shown notable distinct actions.

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