To Formulate and Evaluate Multipurposes herbal Aloe Vera Cream

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Abstract: -

Due to their ease of application to the skin and removal, creams have long been an important aspect of cosmetic products as topical preparations. Herbal medicine, often known as herbalism or botanical medicine, is the practise of using plants for therapeutic or medical purposes. Herbal cosmetics are beauty products that contain herbal elements that have desirable activity such as skin healing, smoothing, and appearance, enhancing, and conditioning characteristics. Aloe vera, often known as Barbados or Curacao Aloe, is an herbal remedy that has been used by a variety of cultures for centuries. Nowadays, finding an Aloe vera-containing product at a neighbourhood drugstore is simple. It's used in a variety of healthcare items, including lotions, creams, ointments, and dietary supplements. Millions of individuals have taken aloe vera without incident, and it is used in more cosmetic goods than any other botanical. This project involves the manufacture and testing of an herbal multipurpose aloe vera cream. Because aloe vera is anti-inflammatory and anti-microbial, it is suggested by dermatologists for the treatment of skin rashes.

Keywords: - *Cream, Herbal cream, Medicine, Herbal cosmetic, Aloe barbadensis(gel).*

1.1Introduction: -

Plants are a rich source of bioactive substances that can be used directly or indirectly to treat a variety of ailments. Plants and plant materials have been utilised to treat dangerous diseases since ancient times. Herb refers to a plant portion with medicinal characteristics. The word "herb" comes from the Latin word "herba," which meaning "plant part." Nonwoody plants, such as those found in trees and shrubs, are referred to as herbs. Herbs are plants or plant parts that have medicinal properties. In both developing and developed countries, people's interest in herbal remedies has gradually grown. Herbs are in high demand since they are pure, safe, and effective herbal medication. It is made up of a plant or any portion of a plant that has therapeutic properties. Aerial parts, flowers, fruits, seeds, bark, leaves, rhizomes, and other plant parts are included. Because of its well-known rejuvenating properties, aloe vera has long been used in cosmetics. It accomplishes this in a variety of ways. Polysaccharides hydrate the skin by acting as moisturisers. Aloe is also absorbed into the skin, where it stimulates the fibroblasts. To reproduce more quickly, and it is these cells that make collagen and elastin fibres, making the skin more elastic and wrinkle-free. Because of its cohesive impact on the

superficial peeling epidermal cells by sticking them together, aloe makes the skin's surface smoother. It can also prevent the production of 'liver spots,' which are common in ageing skin, by interfering with the enzyme that generates melanin deposits in the skin. Aloe vera gel has excellent anti-oxidant capabilities, thanks to its vitamin content, particularly vitamins A, E, and C. Aloe vera has the capacity to stimulate the body's own anti-oxidant activities in addition to its innate anti-oxidant characteristics and Constituents. As a result, oxidative stress is reduced, which has been demonstrated to "play a significant role in age-related disorders." Aloe vera appears to boost immunity in a variety of ways. Recent research has discovered particular fractions that boost anti-tumour effectiveness, as well as a second molecular trigger for fibroblast activation. It also revealed the structure of modified aloe polysaccharide (MAP), demonstrating that this promising nutraceutical can protect the skin from UVB radiation damage even when administered after exposure. The gel has been used in the dental industry. It is exceedingly beneficial in the treatment of gum disease; it lowers gum bleeding; it is highly antiseptic in gum pockets; and its antifungal characteristics are exceptionally beneficial in the treatment of denture stomatitis. Vitamin D, according to Mackee, was the healing agent, however Row and Parks reported that it was not present. Morton Suggested a theory stating the Seeming efficacy of aloe pulp may be attributed to its high-water content, i.e., 96%+, providing a means of Making water available for injured tissue without Sealing it off from the air. This recovery would explain. The instant soothing effect of Aloe Vera gel has on Burns, but would not account for the long-term effect of Healing. The action of Aloe Vera is simply due to its Moisturizing and emollient effects, hence, its use in Cosmetics. [1-10]

1.2 Herbal: -

Made from or with herbs.

1.3 Herbal Medicine: -

They include herbs, herbal material, herbal preparation, and finished herbal product.

1.4 Herbal Cosmetics: -

The word "cosmetic" comes from the Greek word "kosmos," which implies "power, arrangement, and skill in beautifying." Herbal cosmetics are made by combining various cosmetic materials to create a basis for one or more herbal substances. The herbal cosmetic is completely natural and free of any chemical side effects. Cosmeceuticals are cosmetic-pharmaceutical hybrid products that aim to improve the skin's health and beauty. These are cosmetics that are used to treat a variety of diseases in addition to attractiveness. [11-14]

1.5 Advantages of Herbal Cosmetics: -

1. They do not provoke allergic reactions and do not have negative side effects.
2. They are easily incorporated with skin.
3. The small number of herbal cosmetics is effective as compared to synthetic cosmetics.
4. Easily available and found in large variety and quantity.

1.6 Cream: - Creams are defined as "a semisolid dosages form containing one or more drug substance dissolved or dispersed in suitable base".

Type of Cream: -

1. **Oil in water**
2. **Water in oil**

Oil in water: - oil in water (o/w) creams which are composed of small droplets of oil dispersed in a continuous phase. They are more comfortable acceptable as they are less greasy and more easily washed off using water.

Example: - Fluocinolone Acetonide cream.

Water in Oil: - Water in oil (w/o) creams are composed of small droplets of water dispersed in a continuous oily phase. More difficult to handle but many drugs which are incorporated into creams are hydrophobic and will be released more readily from a W/O cream than O/W cream. [15-20]

Example: - Moisturizing cream.

1.7 Cosmetic Creams: - Cosmetic creams are those creams that are used to enhance skin beauty.

1.8 Medicated Cream: - Medicated Creams are those creams that contain active pharmaceutical ingredients.

Example: -

- Cetrimide cream used as antiseptic.
- Zinc oxide cream used as astringent.

1.9 Advantages of Cream: -

1. Easy to use.
2. Non- irritating when applied on the skin.
3. Easily water washable. Easy to wipe away.
4. Less greasy compared to ointment
5. Easy to spread on the skin's surface.

1.10 Herbal Cream: - Herbal creams are cream that contains a natural plant component as the main ingredient.

1.11 Beneficial Role of Ayurveda in Cosmetic

Ayurveda is linked to a healthy body and mind, according to the Cosmetic approach. Beauty and health are equally important in Ayurveda. According to Ayurveda, Bhrajaka pitta is present in the skin and gives it the colour and sheen that it is known for. According to Acharya Charaka, the pitta is responsible for the normal and abnormal temperature of the body, as well as the normal and abnormal colour of the skin, and the variance in skin colour is caused by the bhrajaka pitta present in the skin. Synthetic cosmetics can cause skin responses, irritation,

allergies, and other problems. As a result, in order to maintain a healthy mind and body, we employ herbal cosmetology, which plays a significant role in maintaining mental and physical well-being. VarnyaMahakashya, Chandana, Punnaga, Padmaka, Uehara, MadhukaManjishta, Sariva, Payasyasita, and Lata are Ayurvedic medicines that improve complexion. These pharmaceuticals emphasise the importance of cosmetology during that time period, as well as the importance of adhering to daily dincharya, Ritucharya, and AcharVichara regulations in order to maintain health and beauty. According to Prakriti Ayurveda, cosmetics have an important function. Ayurvedic cosmetics include skin creams, lotions, and nourishing creams, as well as hair care products such as paste, hair fixer, hair gel, hair oil, shampoo, anti-dandruff, conditioners, and colourants. [21-23]

Drug profile

Aloe vera (syn. *Aloe barbadensis Mill., Fam. Liliaceae*), also known as Barbados or Curaçao. Aloe has been used in traditional and folk medicines for thousands of years to treat and cure a variety of diseases. It has rapidly spread across the world because its cultivation is so easy. Aloe vera has triangular, fleshy leaves with serrated edges.

Each leaf of **aloe vera contains three layers: -**

1) inner layer contains a clear gel which is obtained from the plant by slicing the leaf open. The gel is clear, odourless, and tasteless and should be free of leaf skin or yellow parts. The gel contains 99% water and the rest of the gel is made up of glucomannans, amino acids, lipids, sterols, and vitamins.

2)The middle layer is of latex which is yellowish in colour and bitter in taste. It contains anthraquinones and glycoside.

3)The outer thick layer of 15-20 cells which is known as the rind has a protective function and synthesis of carbohydrates and proteins. The rind contains vascular bundles that are responsible for the transportation of substances such as water and starch. [24-28]

Active components of Aloe vera:
In aloe vera, there are 75 active constituents like vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acid, and amino acids.

Vitamins: - It contains vitamins A, C, E, and B12 which are antioxidants. It also contains folic acid and choline.

Enzymes: - It contains 8 enzymes like aliases, alkaline phosphate bradykinesia, amylase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. The enzyme bradykinesia helps to reduce excessive inflammation when applied to the skin topically, while other enzymes help in the breakdown of sugars and fats.

Minerals: - It provides calcium, copper, chromium, magnesium, manganese, potassium, sodium, and zinc. Minerals help in the proper functioning of the enzymes in the different metabolic pathways and a few are antioxidants.

Sugars: -It provides monosaccharides (glucose and fructose) and polysaccharides (glucomannans/polymannose). These are derived from the mucilage layer of the plant and are known as mucopolysaccharides. The most prominent monosaccharide is mannose-6-phosphate, and the most common polysaccharides are called glucomannans [beta-(1,4)-acetylated mannan].
Recently, a glycoprotein with antiallergic properties, called a proven and novel anti-inflammatory compound, C-glucosyl chromone, has been isolated from Aloe vera gel.

Anthraquinones: - It provides us with 12 anthraquinones, which are phenolic compounds that are traditionally known as laxatives. Aloin and emodin act as Analgesic, antibacterial, and antivirals.

Fatty acids: - It provides 4 Steroids, Cholesterol, campesterol, beta-sitosterol, and lupeol possess antiseptic and analgesic properties.

Hormones: - Auxins and gibberellins help in wound healing and have anti-inflammatory action.

Other: - It provides 20 of the 22 human required amino acids and 7 of the 8 essential amino acids. It also contains salicylic acid which possesses anti-inflammatory and antibacterial properties. Lignin, an inert substance, when included in topical preparations, enhances the

penetrative effect of the other ingredients into the skin. Saponins that are soapy substances form about 3% of the gel and have cleansing and antiseptic properties. [29-30]

Therapeutic Effect of Aloe Vera: -

1)Healing Properties: After topical and oral Aloe vera, glucomannan, a mannose-rich polysaccharide, and gibberellin, a growth hormone, interact with growth factor receptors on the fibroblast, promoting its activity and proliferation and, as a result, greatly increasing collagen synthesis. Aloe gel boosted the wound's collagen content while also changing the collagen composition (more type III) and increasing the degree of collagen cross-linking. As a result, wound contraction was expedited, and the breaking strength of the ensuing scar tissue was increased. It has been reported that oral or topical therapy increased hyaluronic acid and dermatan sulphate production in the granulation tissue of a healed wound.

2)Effects on skin exposure to UV and gamma radiation: Aloe vera gel has been shown to protect the skin from the harmful effects of radiation. The specific role is unknown, however after applying aloe vera gel to the skin, an antioxidant protein called metallothionein is produced in the skin, which scavenges hydroxyl radicals and prevents the skin's superoxide dismutase and glutathione peroxidase from being suppressed. It inhibits UV-induced suppression of delayed-type hypersensitivity by reducing the generation and release of immunosuppressive cytokines produced from skin keratinocytes, such as interleukin-10 (IL-10).

3) **Anti-inflammatory Action: -** Aloe vera inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid. Recently, the novel anti-inflammatory compound called C-glucosyl chromone was isolated from gel extracts.

4)Effects on the immune system: Alprogen inhibit calcium influx into mast cells, thereby inhibiting the antigen-antibody-mediated release of histamine and leukotriene from the mast cell. Several low-molecular-weight compounds are also capable of inhibiting the release of reactive oxygen free radicals from activated human neutrophils.

5)Laxative effects: Anthraquinones present in latex are a potent laxative. It increases intestinal water content, stimulates mucus secretion, and increases intestinal peristalsis.

6)Antiviral and antitumor activity: These behaviours could be the result of indirect or direct influence. The indirect impact is caused by immune system stimulation, while the direct effect is caused by anthraquinones. Various enveloped viruses, such as herpes simplex, varicella-zoster, and influenza, are inactivated by the anthraquinone aloin. 18 Recent research has found that a polysaccharide fraction inhibits benzopyrene binding to primary rat hepatocytes, reducing the development of possibly cancer-initiating benzopyrene-DNA adducts. Induction of glutathione S-transferase and suppression of phorbol myristic acetate's tumour-promoting actions have also been documented, suggesting that aloe gel could be useful in cancer chemoprevention.

7)Moisturizing and anti-aging effect: Mucopolysaccharides aid in the absorption of moisture by the skin. Aloe encourages the production of collagen and elastin fibres in the skin, making it more elastic and wrinkle-free. It also has a cohesive action on the surface peeling epidermal cells, which softens the skin by sticking them together. Amino acids soften tough skin cells, while zinc works as an astringent to close pores. Its moisturising properties have also been tested in the treatment of dry skin caused by industrial exposure, where aloe vera gel gloves enhanced skin integrity, reduced fine wrinkle appearance, and reduced erythema. It also has anti-acne properties.

8)Antiseptic effect: Aloe vera contains 6 antiseptic agents: Lupeol, salicylic acid, urea nitrogen, cinnamomic
acid, phenols, and sulphur. They all have an inhibitory action on fungi, bacteria, and viruses. [31-34]

Uses: -

- Psoriasis Vulgaris
- Skin Moisturizer
- Type 2 diabetes
- Malignancies and immunodeficiency viruses in cats
- Oral lichen planus infection
- Angina pectoris
- Ulcerative colitis
- UV-induced erythema14 Kidney stones
- Alveolar osteitis.

How to use Aloe vera

- For burns: Clear mucilaginous gel (pure aloe vera inner gel or preparations containing 10%–70% aloe inner gel). The gel must be stabilized by pasteurization at 75–80°C for less than 3 minutes and applied to the affected area 3 times daily.
- For seborrheic dermatitis: 30% aloe vera in a hydrophilic emulsion twice daily to the affected area.
- For psoriasis and genital herpes: Hydrophilic cream containing 0.5% aloe gel 3 times daily to the affected area.

Pharmacological Actions

- Mild (first degree) to moderate (second degree) burn wounds
- Genital herpes at the first onset.
- Seborrheic dermatitis.
- Oral lichen planus infections.
- Post dermabrasion wound healing.
- Normalization of gastric pH.
- Treatment of diabetes and angina pectoris.

Mechanisms of Action

- It increases collagen and proteoglycan production by stimulating macrophage and fibroblast activity. Mannose-6-phosphate binds to fibroblast growth receptors and increases their activation. Acemannan and other cell wall biomaterials may boost growth factor stability and prolong stimulation of granulation tissue by increasing nitric oxide synthase activity, leading to the release of fibrogenic phagocytosis and fungicidal activity of macrophages.
- Increased glucose metabolism and normalized membrane-bound enzyme activity of phosphatases and hydrolases may promote hypoglycemic impact. The phytosterols lophenol and cycloartenol, as well as their alkylated analogues, are potential active agents. Plant sterols such as lupeol, campesterol, and -sitosterol have anti-inflammatory effects via bradykinesia, prostaglandin F2, and E2, as well as thromboxane A2 inhibition and IL-10 secretion suppression. Reduced intracellular free calcium levels inhibit the release of reactive oxygen species from human neutrophils. Increased mRNA expression of metalloproteinases and plasminogen activators in endothelial cells may contribute to angiogenic activity.

- **Contradictions**

  Known allergy against aloe vera; discontinue use if skin irritation develops or worsens.

Pregnancy and Lactation

It is not recommended to use aloe vera gel during pregnancy or while breastfeeding. There is, however, no evidence that suggests a reproductive or genotoxic effect of topical aloe vera inner gel preparations. Internal use in combination with digoxin is contraindicated due to the possible acceleration of potassium depletion.

Adverse Effects

The Cosmetic Ingredient Review Expert Panel has deemed topical application of aloe vera products to be safe in general. Several case reports of hypersensitivity responses and contact dermatitis following topically applied aloe gel compositions have been recorded, however. Anthraquinone contamination in the gel has been blamed for the majority of adverse reactions. Aloe vera gel taken orally can help reduce blood sugar levels and boost the effectiveness of diabetes medications. Because anthraquinones like aloin may be linked to the development of hypersensitivity reactions, the purity of the aloe vera gel utilized is an important determinant for undesirable effects.

Drug Interactions

When applied topically, Aloe Vera gel is generally considered safe. If administered topically, aloe gel may improve the ability of hydrocortisone to relieve swelling. When combined with oral diabetes medications or insulin, it may cause increased hypoglycemia. The use of Aloe vera gel for systemic administration with antidiabetic, diuretic, or laxative medicines, sevoflurane, or digoxin is not suggested. Due to increased intestinal motility and lower drug absorption, a 2-hour interval between oral drug administration and aloe vera eating is often recommended. If aloe vera gel is combined with another prescription medication, the patient should tell their doctor or pharmacist. [35-38]

1.12 Material and Methods of Preparing Herbal Aloe Vera Cream

Table-1: Excipients and herbal ingredients with their role

S. No	Ingredients	Quantity	Function
1.	Aloe vera gel	4ml	Anti-aging, anti-inflammatory, Moisturizing, reducing acne and pimples
2	White Bee wax	6.2g	Stiffening Agent
3	Borax	2.3g	Emulsifying Agent
4	Rosewater	q.s	Vehicle and solvent of an aqueous phase
5	Oil of rose	q.s	Flavoring agent

- **Aloe Vera gel**

  Healthy mature and fresh leaves of aloe vera were collected and washed with water. After that dry properly the leaves of aloe vera in the hot air oven, then the outer part of the leaf was dissected longitudinally by using a sterile knife. Then the colorless parenchymatous tissue known as the gel is removed with the help of a sterile knife. Then filter it by using a muslin cloth to remove the fibers and impurities. Then the clear aloe vera gel residue was used for the preparation.

1.13 PROCEDURE FOR FORMULATION OF CREAM

1. Take a borosilicate glass beaker & add beeswax and heat it at 75 degrees Celsius temp. (oil phase)
2. In another beaker dissolve borax in water and heat this beaker at 75 degrees Celsius to get a clear sol. (Aqueous Phase)
3. Then slowly add this aqueous phase to the heated oil phase.
4. Then add a measured amt. of aloe vera gel and stir vigorously until it forms a smooth cream.
5. Add a few drops of rose oil as a fragrance.
6. Put this cream on the slab and add a few drops of distilled water if necessary.
7. Mix the cream geometrically on the slab to give a smooth texture to the cream and mix all ingredients properly. [39-44]

1.14 Evaluation parameter of Formulation: -

- **Physical Appearance: -** Physical appearance of the cream can be observed by its color, roughness, and grade.
- **Determination of pH: -** pH of cream can be measured on a standard digital pH meter at room temperature by taking an adequate amount of the formulation diluted with a suitable solvent in a suitable beaker.
- **Spreadability: -** Adequate amount of sample is taken between two glass slides and a weight of 100gm is applied on the slide for 5 minutes. Spreadability can be expressed as,

$$S = m*l/t$$

Where m = weight applied to the upper slide.
l = length moved on the glass slide.
t = time taken

- **Saponification Value: -** Saponification value is the number of mg of potassium hydroxide required to neutralize the free acid and saponify the ester contained in 1.0 g of the fat or oil substance.

  2g of substance refluxed with 25ml of 0.5 N alcoholic KOH for 30 mins, add 1ml of phenolphthalein and titrated immediately, with 0.5N HCL, note this reading as 'a'. Repeat the process to leave out the substance being examined. Note the reading as 'b'.

  Saponification Value = (b-a) *28.05/w

  Where, w = weight of the substance.

- **Acid Value: -** It is defined as the number of mg of alkali (KOH, NaOH) required to completely neutralize the free fatty acids present in one gram of oil or fat substance.

  Acid value = n*5.61/w

  Where,
  n= the no. of ml of 0.1N KOH solution.
  W = the weight of the substance in grams.

- **Viscosity: -** The viscosity of formulated creams can be determined by using Brookfield Viscometer.

- **Homogeneity:** - The formulation was tested for homogeneity by usual appearance and by touch.

- **Removal:** - The ease of removal of cream applied was examined by washing the applied part with the tap water.

- **Dye test:** - The scarlet dye is mixed with the cream. Place a drop on a slide and cover it with a coverslip and examine it under a microscope. If the disperse globule appears red and the ground colorless then it is o/w type and the reverse condition appears in w/o type of creams.

- **After Feel:** - Emolliency, slipperiness, and the amount of residue left after the application of the fixed amount of cream was checked.

- **Type of Smear:** - After the application of the cream, the type of film or smear formed on the skin was checked.

- **Irritancy Study:** - Mark an area of 1sq.cm on the left-hand dorsal surface. The cream was applied to the specified area and the time was moted. Irritancy, erythema, and edema were checked, if any, for regular intervals up to 24hrs and reported. [45-51]

1.15 Results -

- **Physical Evaluation: -** In this we evaluate the colour, texture and state of the formulation.

Table-2: - Physical evaluation

S.no	Parameters	Formualtion1	Formulation 2	Formulation 3
1.	Colour	Faint green	Faint green	Faint green
2.	Odour	Pleasant	Pleasant	Pleasant
3.	Texture	Smooth	Smooth	Smooth
4.	State	Semisolid	Semisolid	Semisolid

- **Irritancy: -** On left hand dorsal surface mark 1cm. After that apply the cream on that area and the note the time.

Table-3: -Irritancy study observation: -

S. No.	Formulation	Irritant effect
1.	Formulation 1	Nil
2.	Formulation 2	Nil
3.	Formulation 3	Nil

- **Washability: -** Washability test was carried out by applying a small amount of cream on the hand and then was it with tap water.

Table-4: - Washability observation

S. NO.	Formulation	Washability
1.	Formualtion1	Easily washable
2.	Formualtion2	Easily washable
3.	Formualtion3	Easily washable

- **pH: -** According to the observation, the pH of the all the samples of formulation is found nearer to the pH of the skin so it is safe for skin.

Table-5: - pH Observation table

S. No.	Formulation	pH
1.	Formulation 1	6.6
2.	Formulation 2	6.4
3.	Formulation 3	6.7

- **Viscosity: -** By using Brooke field viscometer at 25-degree temperature or spindle No. 63 at 2.5 RPM. According to the observation all the formulations shows adequate viscosity.

Table-6: - Viscosity observation table

S. No.	Formulation	Viscosity
1.	Formulation 1	1167
2.	Formulation 2	1158
3.	Formulation 3	1097

- **Spreadability: -** For Spreadability of all the formulation we take all the samples and out of which formulation 2 take lesser time to separate so according to that result formulation 2 shows better Spreadability.
- **Greasiness: -** Apply the cream on the skin surface in the form of smear and observe if smear was oily or greasy like. According to this all the three formulations are non-greasy.

Table 7: - Greasiness Observation table

S. No.	Formulation	Greasiness
1.	Formulation 1	Non-greasy
2.	Formulation 2	Non-greasy
3.	Formulation 3	Non-greasy

1.16 Conclusion

It is concluded the formulation we made is physically stable and has no harmful effect after application. The Application of Aloe vera herbal cream has been proven to treat rashes and reduce inflammation. Aloe vera is a medicinal plant and due to its extensive medicinal, nutraceutical and other uses it enjoys a great demand in the world. With the progress in the pharmaceutical field, it is clear that the creams will still an interesting and attractive area for research. The demand of herbal creams is also increased day by day. By using the herbal aloe vera Cream showed an anti-inflammatory action and reduce the effect of rashes on the skin. On the basis of result and discussion, the formulation1,2,3 is stable at room temperature and can be safely used on the skin.

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