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FORMULATION AND EVALUATION OF ALOE VERA COLD CREAM

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ABSTRACT

Cosmetics are preparations used to improve human appearance. The current study aimed to create and examine aloe cold plant extracts prepared utilizing the water-in-oil method to nourish and moisturize the skin. The cold cream contains rose oil and aloe vera extract. Various approaches were used to examine the quality of the prepared product. The cream's physical qualities remained unchanged after formulation. The cream demonstrated satisfactory consistency, spread ability, pH, and no phase separation during the research period. The designed cream's stability criteria, including visual appearance, nature, viscosity, and scent, were consistent throughout the trial period. The herbal ingredient in cold cream provides cooling and relaxing effects through delayed evaporation of water in the emulsion. Cold creams produce an oily barrier that inhibits water loss from the skin's stratum corneum, making them a more hydrating option. These water-in-oil emulsions can produce localized and systemic effects when applied to the skin or mucous membrane.

KEYWORDS: Aloe vera, Cold cream, Moisturizing Anti inflammation, cosmetic and skin.

1. INTRODUCTION

1.1 *Aloe vera*

Aloe vera is commonly referred to as the 'miracle plant' as well as the 'wound healer' because of its incredible ability to counter numerous human sicknesses and in turn, heal and comfort humans. **(Habeeb *et al*., 2007)** Thus, Aloe vera has become popularly known as a remedy for minor wounds and burns since then, but its mechanism of wound healing is not known. These plants are the shrubs with thick, fleshy leaves that holds water in the form of gel.

(Chandegara *et al.*, 2013) It is also known as Barbadensis miller which is a wonderful plant from the Aloe family that provides a variety of functions. Aloe vera plant was previously assumed to be in the Liliaceae family, but after sometime reclassified it as Alliaceae family in 1982. **(Machado *et al.*, 2017)** In the worldwide, including g India there are various companies who play a major key role in the Aloe vera products namely as NOW Health Group, Inc. (US), Okyalo Co., Ltd (China), Real Aloe Solutions Inc. (US), Patanjali Ayur Ved Limited (India), Herbalife International of America, Inc. (US), Sar living (India). Moreover, studies have shown that the Aloe vera plant can heal skin issues such as mouth sores, dandruff, dry skin, cold sores, and mouth ulcers. **(Salman *et al.*, 2023)**

1.2 History around aloe vera

Aloe vera is referred to as Ghrita Kumari in Sanskrit; Kumari means girl. It was once thought that this plant gave women youthful vitality and revived the feminine essence. Aloe vera, also known as "the silent healer," continues to hold a significant position among the sacred plants mentioned in the Atharva Veda in Hindu tradition. Aloe was regarded by the ancient Indian health and life science Ayurveda as "Vera Ras Ayana," or the organism's rejuvenator. Aloe vera has four flavours, according to Ayurveda: sweet, sour, bitter, and astringent (Svetlana Pasaric). It is also used in Indian ayurvedic medicine for a variety of purposes, including cardiovascular system stabilization, menorrhoea disorders, and revitalizing treatments. Aloe vera balances between pitta, Kapha and Vata that hold these specific qualities. **(Christopher *et al.*, 2015)** Aloe vera is a sturdy, tropical, drought-tolerant, and juicy plant. Aloe vera plays a significant role in traditional pharmacological systems such as Siddha, Unani, Ayurveda, and homeopathy system of medicines. It has conveyed a considerable routine portion in inborn course of action of pharmaceutical system. **(Justin *et al.*, 2010)** It is also known as Aloe barbadensis miller grows well in drier areas of Africa, Asia, Europe, and America. It is also often known as aloe, Caraguata-de-Jardim, or aloe. The word Aloe has a controversial origin, probably from Greek or Arabic, but its literal meaning in both languages is the same: bitter and shining, which are characteristic of its gel. **(Surjushe *et al.*, 2008)** In ancient times, the Egyptians used it as a component for preserving; in fact, they call it "the plant of immortality". It was used as a healing agent as well as for body care and hygiene. More than 2000 years ago, the Greeks regarded Aloe vera as "the universal panacea". There are over 350 species of aloe, of which AV and Aloe arborescens are the most common. Aloe vera is a juicy species that is native to South and East Africa, but due to its highly adaptable nature and popularity, it is now largely utilized in many tropical and subtropical parts of the world as

well as in Mediterranean regions. **(Jangra *et al.*, 2022)** A study had found that using Aloe vera polysaccharides in microparticle formulations dramatically increased nasal insulin delivery for treating dementia and diabetic mellitus**. (Kirby *et al.*, 2023)** the common name of aloe vera as shown in table 1.1.

Names	Languages
Gwar Patha, Musambar	Hindi
Ghrit Kumari	Sanskrit
Kunwar	Gujarati
Lolisara	Kannada
Chirrukattalai	Tamil
Kalabandha	Telugu
Korphad	Marathi

1.3 Anatomy of aloe vera

The description of the Aloe vera plant demonstrates that it has a bitter taste, no odour, and grows up to 60-100 cm in lance-shaped with extended root fibbers that reaches to 30-40 cm in length, while the leaves are green to grey-green flower. **(Dhanalakshmi *et al.*, 2000)** as shown in figure 1.1 The plant has no stem or a short stem (up to 25 cm long), with approximately 20 branches emerging in a dense, straight bunch. The clears out can grow up to 40-50 cm in length and 6-7 cm wide. The leaf has a curved surface with a pale pink border and 2 mm long sharp teeth spaced at 10-20 mm intervals. One leaf can weigh ranging from 1.5 to 2 kilograms. Each leaf has three layers as shown in fig1.1. The outside layer, known as the peel or rind, is made up 15-20 types of cells that aid in carbohydrate and protein synthesis and act as a protective barrier; the middle layer, which contains latex, a bitter yellow sap including anthraquinones and glycosides; and the inner layer, which is translucent and contains 99% water, amino acids, lipids and vitamins. **(Maan *et al.*, 2018)**

Figure 1.1: Aloe vera Plant.

1.4 Medicinal uses of aloe vera

Aloe vera has been shown to have wound-healing properties through a variety of processes, including increased epithelial cell migration, faster collagen maturation, reduced inflammation, and wound moisturization. **(Reynolds *et al.*, 1999)** Aloe vera has six sterile specialists: lupeol, salicylic acid, urea nitrogen, cinnamomic acid, phenols, and sulphur. They all have adverse impacts on organisms, bacteria, and viruses and shows antiseptic property**. (Zhu *et al.*, 2003)** Among the general public, the use of herbal products has been rising quickly. As per the 2007 National Health Interview Survey, over 40% of American adults and children have utilized complementary and alternative treatments as a therapy within the previous year. **(Barnes *et al.*, 2008)** The impact of Aloe vera on cancer has not been extensively studied but the Consistent use of anthranoid-containing gastrointestinal solutions has been linked to colorectal carcinoma as shown in fig1.2. However, no causal connection has been established. Aloe vera juice can help the body recover from radiation and chemotherapy, which can harm healthy, resistant cells needed for recovery. **(Borra *et al.*, 2011)** Aloe vera has been observed to have anti-diabetic properties that lower blood sugar, raise insulin levels, and improve pancreatic islets (number, volume, area, and diameter). Additionally, this medicinal plant has been shown to protect against oxidative stress-induced diabetic nephropathy and behaviours associated with anxiety and depression**. (Sánchez *et al.*, 2020)**

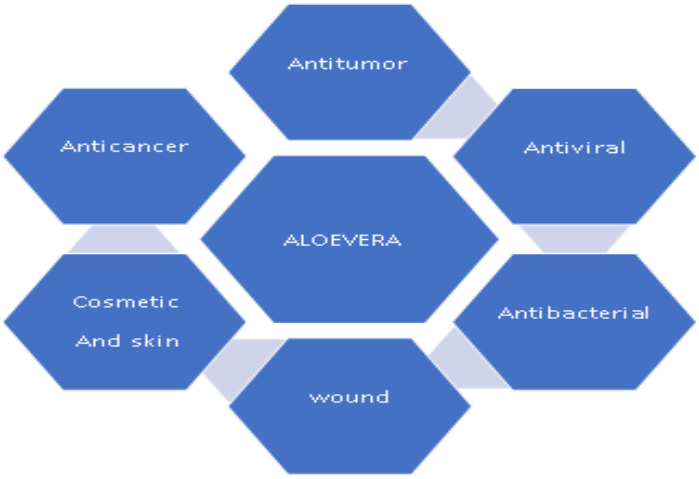

Figure 1.2: Various therapeutic effects of aloe vera.

2. Review of literature

From historic times, Aloe vera (Aloe barbadensis miller) has been known for its medicinal and cosmetic properties, especially used in skincare products. Aloe vera gel, which has polysaccharides content and contains many vitamins, enzymes, amino acids is the most

common ingredient in cold cream and moisturizing skin creams for its moisture effect healing effects on skin. Numourous investigations also targeted the preparation of cold creams based on Aloe vera. These creams are usually developed to be moisturizing, antiinflammatory, and skin healing. However, in emulsions that combine Aloe vera with the moisturizing agents [glycerin, beeswax and oils], skin barrier function improves where these emulsions provide an effective means to keep skin hydrated by reducing transepidermal water loss **(Huang *et al.*, 2015).** Moreover, Aloe vera has also been used with combinations of other botanicals like chamomile and cucumber to increase its anti-inflammatory and antioxidant effects in cold creams **(Oluwatoyin *et al.*, 2020).** Aloe vera biocide activity in cold cream compositions is mostly due to the acemannan, anthraquinones, saponins and other bioactive compounds present in the composition **(Escallón *et al.*, 2023).** These compounds have a spectrum of therapeutical activity. Aloe vera has shown turnaround in wound healing, improves collagen synthesis and speed up skin repair during acute phase of damage (minor burns, cuts, abrasions etc.) **(Surjushe *et al.*, 2008).** It is also effective against inflammation, and can be applied for treatment of eczema and psoriasis. This property has also been shown to effectively fight against other pathogens which makes Aloe vera potential to be used in skincare products because of its antimicrobial activity (**El-Bazzal *et al.*, 2020).** Furthermore, its antioxidant content may also protect the skin against aging and environmental stressors by neutralizing free radicals that can contribute to premature aging of skin. Furthermore, new studies indicate that Aloe vera has a potential for skin regeneration function, management of skin elasticity and reduction of pigmentation disturbance **(Sari *et al.*, 2021).** These results strongly support the therapeutic potential of Aloe vera cold creams which could have numerous commercial applications in cosmetics and pharmacy

3. Rationale, Aim & Objectives of work

3.1 Rationale of work

The rationale for studying the formulation of aloe vera cold cream is to understasnd or study that how it can be used for moisturizing the skin and to understand its safety and effectiveness aloe vera cold cream.

3.2 Aim of study

To formulate the Aloe vera cold cream.

3.3 Objectives of study

- Explore the anti-ageing properties contains Vitamin C and E, helps to eradicate skin blemishes and diminish age lines.
- Explore the antioxidant properties of Aloe vera by carrying out experiment to assess the increase the shelf life and dietary benefit of product.
- Examine the sun burn effects of Aloe vera by reviewing its cooling effect on the skin to smoothen skin and relief pain.

4. MATERIAL AND METHODS

4.1 Materials used

The enlist of various ingredients used in the formulation of Aloe vera cream is given below in table 4.1 and table 4.2 shows the instrument used in the process.

Table 4.1: Ingredients used for formulate aloe vera cream.

Sr. No	Ingredients	Properties
1	*Aloevera* gel	Anti-ageing, Anti-Inflammatory, moisturizer, Reduce acne and pimples
2	Bees Wax	It provides thickness to the cream
3	Distilled water	As a solvent
4	Borax	Works as an emulsifier to form soap
5	Liquid paraffin	Use as a lubricant or alkaline agent
6	Rose oil	For fragrance
7	Methylp-hydroxy benzoate	As a preservative or to make consistency

- **Aloe vera gel:** It is an herbal plant species belonging to family Liliaceae. Aloe vera includes amino acids such as leucine and isoleucine, saponin glycosides that provide purification, vitamins A, B, E, C, choline, B12, and folic acid, along with having antioxidant properties. The gel may possess analgesic and anti-inflammatory effect that help with burns and other skin injuries.
- **White bees wax:** Beeswax is an edible quality wax which appears white when newly produced. The colour eventually turns to yellow due to the presence of propolis and pollen colorants. Bees wax is insoluble in water whereas gets soluble in organic solvents and get heated at temperature of 30-35℃.
- **Distilled water:** It is a purified water prepared through the process of distillation which is used as a solvent**.**
- **Borax:** Borax, sometimes referred to as sodium borate, is a chemical compound with the formula Na2B4O7.10H2O. For example, borax is used in various cosmetic goods and

detergents. In the field of biochemistry, borax is often utilized for the manufacture of buffer solutions.

- **Liquid paraffin:** Liquid paraffin is a highly refined mineral oil used in cosmetics and medicine. Liquid paraffin used for cosmetics or medication purposes should not be mistaken with fuel-grade paraffin, or kerosene. It is also used as an alkaline agent**.**
- **Rose oil:** Rose water originates from distilling rose petals with steam. Rose water is a fragrant natural alternative to chemical-based perfumery. Rose water has been applied for thousands of years, even throughout the Middle Ages. Historically, it has been utilized in beauty, food, and beverage items.
- **Methyl p-hydroxy benzoate:** Methylparaben has been utilized as a preservative in the food, cosmetic, and pharmaceutical markets for more than 50 years. The chemical formula for methylparaben is C8H8O3. In 1984, the Cosmetic Ingredient Review (CIR) presided that methylparaben, propylparaben, and butylparaben were safe for use in cosmetic goods at concentrations of up to 25%.

Table 4.2: Instrument used in the formulation.

Sr. No.	Instruments/Glassware's
1	Beaker
2	Glass rod
3	Thermometer
4	Heating mental
5	Measuring cylinder
6	Weighing Machine
7	Mortar pestle

4.2 Methods of preparation

Aloe barbadensis was collected from the herbal garden of Dreamz College of Pharmacy, Khilra in Sunder Nagar. A leaf of Aloe vera is cut off from the plant in rainy season having 26℃ temp. in the month of September, 2024. The composition consisted of beeswax, liquid paraffin, borax, methylparaben, distilled water, rose oil, and Aloe vera gel were used. The cream was created by mixing excipients and aloe extract using the extemporaneous process as shown in fig4.1.

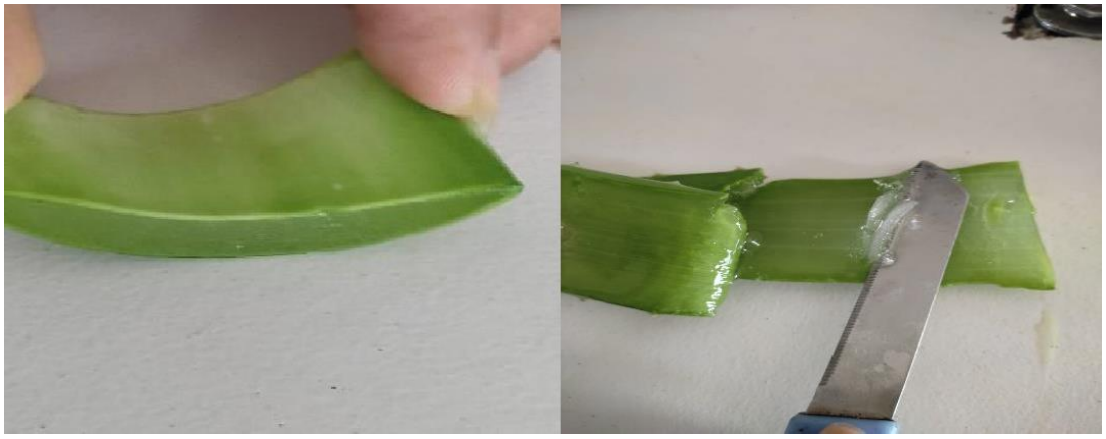

Figure no. 4.1: Extraction of aloe vera.

Table 4.3: Master formula for formulation of aloe vera cold cream.

Sr. No.	Name of ingredient	Quantity taken
1	Borax	0.16gm
2	Bees wax	3.2gm
3	Liquid paraffin	10ml
4	Methyl-p-hydroxybenzoate	0.02gm
5	Distilled water	6ml
6	Rose oil	2drops
7	Aloevera gel	5gm

4.2.1 Procedure for the formulation of aloe vera cold cream

- Take all the glassware's and wash them properly with water then dry it in hot air oven.
- Weigh that the bees wax 3.2gm and melted with mineral oil by heating on a water bath at the temperature of 70℃ i.e. mixture A (oily phase).
- Water is heated in another container at the same temperature and added with borax i.e. mixture B (aqueous phase).
- Mixture B is slowly added to the mixture A with stirring to form a creamy emulsion.
- In the last step, the preparation is brought down to 40℃ added with a suitable perfume.

4.2.2 Evaluation parameters of aloe vera cold cream

- **Determination of physical appearance**

A physical examination of cold cream was carried out against a dark background. An average of three readings is taken and recorded successfully. The result is shown as

- **Sensitivity test**

The prepared cold cream composition was applied to the hand's skin and exposed to direct sunlight for 4 to 5 minutes.as a result there is no irritation and have a sense of cooling.

- **Spread ability test**

The spread ability was measured in terms of the number of seconds it took for two slides to separate from the cream that was positioned in between them when subjected to a specific load. Better the spread ability, the shorter the time required to separate the two slides. A slide with the appropriate dimensions was selected, and the cream formulation was placed on it. The formulation was subsequently layered with another slide. After that, a weight or other specific load was applied to the upper slide, pressing the cream in the space between the two slides evenly to create a thin layer. Later the weight was removed off, and the additional formulation that had stuck to the slides was scraped off. The upper slide was allowed to slip off freely by the force of weight tied to it. The time taken by the upper slide to slip off was noted.

- **pH**

The pH of aloe cold cream was measured using a pH meter. The probe uses a glass electrode to conduct a modest voltage. The voltmeter measures electronic impedance in glass electrodes and shows pH units instead of volts. To take a measurement, submerge the tip of the instrument in the semisolid until the meter registers the reading.

- **Viscosity**

Cream's viscosity was measured at 25 °C using an Ostwald viscometer and spindle number 63 spinning at 2.5 RPM. The findings indicated that the viscosity of all three formulations was suitable.

5. RESULT AND DISCUSSION

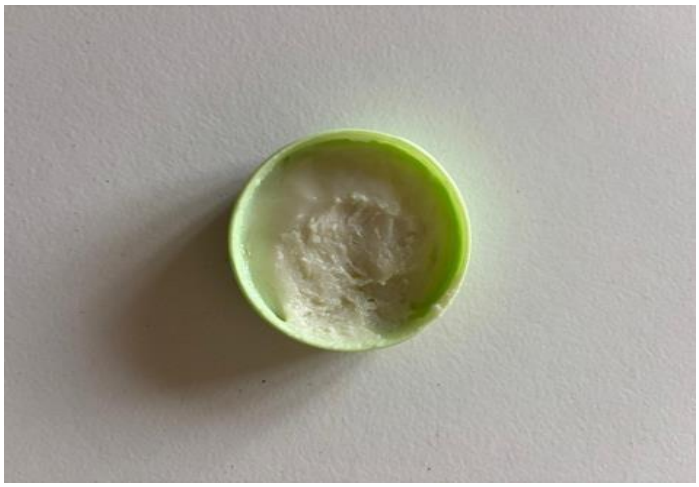

Figure No. 5.1: Formulated aloe vera cold cream.

Table no. 5.1: Physical observation.

Sr. no.	Parameters	Formula 1
1.	Colour	Slightly green
2.	Odour	Pleasant
3.	Texture	Smooth
4.	State	Semisolid

Table no. 5.2: Wash ability observation.

Sr no.	Formulation	Washability
1.	F1	Easily washable

Table no. 5.3: Sensitivity observation.

Sr. no.	Formulation	Irritation effect
1.	F1	no

Table no. 5.4: PH observation.

Sr. no.	Formulation	pH
1.	F1	6.2

6. SUMMARY AND CONCLUSION

The Aloe vera plant is a unique natural resource with numerous health and beauty benefits. Its cream is well-known for its soothing and moisturizing characteristics, making it a popular ingredient in skincare products. Furthermore, when consumed in juice, Aloe vera shows promise in terms of digestive health. While the advantages of Aloe vera are widely known, it is critical to use it with caution and to check with a doctor if you have any specific health issues. Overall, the aloe vera plant is an excellent complement to home cures and wellness routines. Aloe vera cold cream is a moisturizing solution that combines the soothing effects of Aloe vera with the rich emollients found in conventional cold creams. This cream is designed to hydrate and protect the skin, making it especially useful in dry or cold conditions. It helps to retain moisture, alleviate inflammation, and form a protective barrier against external irritants. Its mild, non-greasy texture makes it appropriate for all skin types, offering nourishment without blocking pores. Aloe vera cold cream is ideal for regular usage and can leave your skin feeling soft, smooth, and revitalized.

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