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# "FORMULATION AND EVALUTION OF ANTI-INFLAMMATORY HERBAL FACE CREAM"

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***Abstract*: - Aloe vera gel, almond oil, neem oil, and sandalwood powder are medicinal plants that have been used for centuries in a variety of herbal remedies, including homoeopathic, Siddha, and Ayurvedic. Aloe vera gel, a mucilaginous substance found in the centre of aloe vera leaves, is used to make cosmetics and some medications. There is no anthraquinone in aloe vera gel. They are in charge of aloes' potent laxative properties. Anthraquinone, however, might be present in whole leaf extract. There are 75 potentially active ingredients in aloe vera, including vitamins, minerals, enzymes, sugars, saponins, and amino acids. Glutamic acid, proline, aspartic acid, and other amino acids are found in amla. Minerals and protein. Minerals including magnesium, potassium, and silica are found in aloe vera gel, almond oil, neem oil, and sandalwood powder, which are also high in fibre. Silica is necessary to maintain the health of your tendons, muscles, and bones. Additionally, it moisturises our skin and enhances our complexion and vision.**

***Keywords*—** Aloe vera gel (Aloe, True aloe, Burn aloe), Almond oil (Sweet almond, Bitter almond), Neem oil (Indian lilac), Sandalwood powder. ( white sandalwood, East Indian sandalwood).

## 1.INTRODUCTION: -

The largest organ in the human body is the skin, which includes the epidermis, dermis, subcutaneous tissues, blood vessels, lymphatic vessels, nerves, and muscles. By stopping the breakdown of lipids in the epidermis, liquids can support the operation of the skin's barrier. Skin issues might result from pigmentation, allergic reactions, hidden germs, fungal development on the skin, or bacteria that change the texture of the skin.

## INFLAMMATION

Inflammation is the basic process by which the tissues of the body respond to damage. The biological importance of chronic inflammation is not well understood, despite our extensive knowledge of the signaling mechanisms linking it to energy buildup (adiposity). (3) The body releases different PIM and acute phase proteins (APPs) in response to pathogen-associated molecular patterns (PAMPs) and damage-associated molecular patterns (DAMPs) in the innate branch of immunity. Acute inflammation (e.g., pathogen invasion,

tissue damage from injury or surgery, etc.) is the first sign of this phase of inflammation beginning. The submaps "DAMPs and PAMPs recognition" and "Regulation of APPs" give an overview of the particular molecular level events. Certain chemo attractants and APPs cause the production of a range of PIMs, including chemokines.

**PATHOPHYSIOLOGY OF INFLAMMATION**

The pathogenic role of inflammation in metabolism has already been highlighted, followed by descriptions of its physiological and adaptive functions. Among the acute-phase proteins with elevated blood levels that gave the first sign of an innate system activation in type 2 diabetic patients were serum amyloid A, sialic acid, C-reactive protein (CRP), haptoglobin, fibrinogen, plasminogen activator inhibitor, TNF-α, IL-1β, IL-6, and IL-1Ra. IL-1 regulates these inflammatory proteins, and its antagonistic effects reduce leukocytosis, IL-6, and CRP levels.

**MECHANISM OF INFLAMMATION**

Inflammatory lung diseases, such as psoriasis, atherosclerosis, inflammatory bowel disease, and chronic obstructive pulmonary disease, as well as some chronic conditions, such as rheumatoid arthritis, osteoarthritis, and insect bites, can cause toxic anaphylactic reactions that can be fatal. Inflammation is a defense mechanism used by white blood cells and other substances in the body to fend off infections and outside threats like bacteria and viruses. Conditions known as autoimmune disorders occur when the body's normally protective immune system causes unnecessary inflammation, damaging its own tissues in the absence of external molecules to fight off. When tissue is damaged, inflammatory mediators are released. The inflammatory responses are brought on by circulating cells, plasma proteins, vascular cells, and the extracellular matrix of the surrounding connective tissue. The cells in circulation include neutrophils, eosinophils, basophils, lymphocytes, monocytes, and platelets. The circulating proteins include components of complement, kininogen, and clotting factor, which are mostly produced by the liver. Vascular wall cells include endothelial cells, which come into direct contact with blood vessels. The extracellular matrix, which can proliferate to fill the wound, is produced by mast cell macrophages, lymphocytes, fibroblasts, and other connective tissue cells. The extracellular matrix (ECM) of cells is composed of fibrous structural proteins like collagen and elastin, gel-forming proteoglycans, and sticky glycoproteins like fibronectin.

**CAUSES OF THE SKIN**

1. Sunburn
2. Hyper melanogenesis
3. Epigenetic changes brought on by UVR
4. Regulation of microRNAs by UVR
5. Damage and repair of DNA caused by UVR
6. Photocarcinogenesis

**RISK FACTORS**

1. Age
2. Alcohol
3. Cancer-Causing Substances

4. Chronic Inflammation
5. Common Cancer Myths and Misconceptions
6. Diet, Hormones
7. Immunosuppression
8. Infectious Agents
9. Obesity, Radiation
10. Sunlight
11. Tobacco

**MATERIALS**

The face cream was made using the following natural and herbal ingredients: Neem oil has antimicrobial and anti-inflammatory properties.

**Almond oil: -** offers intense hydration and sustenance.

**Aloe vera gel:** - moisturizes and calms skin.

**The powdered sandalwood**: - helps to soothe and brighten the skin.

**Beeswax:** - is a natural thickening and emulsifier.

**Rose water:** - is utilized as a liquid phase and for its toning properties.

**Vitamin E oil**: - serves as an antioxidant and natural preservative.

**Essential oils:** - are optional but can be applied for scent and extra skin benefits.

**1. NEEM OIL: -**

Neem oil is a potent natural component that is frequently found in face creams because of its many skin-benefitting properties. It helps nourish and moisturise the skin while supporting a healthy complexion because it is rich in fatty acids, vitamin E, and antioxidants. Acne, blemish reduction, and breakout prevention are all made possible by its potent antibacterial and antifungal qualities. Neem oil also contains anti-inflammatory properties that help heal minor wounds or scars, soothe irritated skin, and lessen redness. By increasing skin suppleness and diminishing the visibility of wrinkles and fine lines, its natural ingredients also aid in the battle against ageing.

**2. SANDALWOOD: -**

Sandalwood's therapeutic, calming, and fragrant qualities make it a widely prized ingredient in face creams. Its inherent antibacterial and anti-inflammatory properties prevent outbreaks, soothe skin irritation, and lessen

acne. The capacity of sandalwood to lighten the complexion, even the skin tone, and lessen the visibility of dark spots and imperfections is another well- known benefit. Its cooling properties help sunburnt or sensitive skin, and its mild scent makes for a soothing and revitalising experience. Sandalwood also supports a young, glowing complexion and helps to improve skin texture.

### 3. ALMOND OIL: -

Almond oil's high concentration of vitamins A, E, and vital fatty acids makes it a very advantageous component of face creams. Without clogging pores, it provides the skin with deep moisture, preserving its softness and smoothness. Because of its antioxidant and anti- inflammatory qualities, it works well to minimise dark circles under the eyes, reduce puffiness, and soothe irritated skin. Additionally, almond oil promotes skin renewal and enhances the general tone and texture of the skin. It can lessen the visibility of fine wrinkles, defend against environmental damage, and improve the skin's natural radiance with consistent application.

### 4. ALOE VERA GEL: -

Because it is calming, moisturising, and healing, aloe vera gel is a widely prized ingredient in face creams. All skin types, but notably sensitive or acne-prone skin, benefit from its deep moisturising properties without making the skin oily. It is packed with vitamins, enzymes, and antioxidants. Aloe vera soothes irritability, lessens redness, and promotes the recovery of minor burns, wounds, and sunburns. Its antibacterial and anti-inflammatory qualities also aid in acne reduction and outbreak prevention. Aloe vera also increases skin suppleness, encourages skin regeneration, and makes the complexion look younger and more luminous.

| Ingredients | Quantity | Functions |
|---|---|---|
| Aloe vera gel | 40g | Hydrating base, soothes skin |
| Almond oil | 20g | Moisturizer, rich in Vitamin E |
| Neem oil | 3-4 g | Antibacterial, anti-inflammatory |
| Sandalwood Powder | 3g | Calming, brightens complexion |
| Beeswax | 10 g | Emulsifier, adds cream texture |
| Rose water | 20g | Toning, light fragrance |
| Vitamin E oil | 1g | Natural preservative & antioxidant |
| Essential oil(optional) | 2-3 drops | Added benefits and mild scent |

**PROCEDURE FOR HERBAL FACE CREAM PREPARATION**

1. Preparation of Ingredients:

Weigh and prepare all ingredients accurately. Ensure all tools, containers, and surfaces are clean and sterilized to maintain hygiene.

2. Oil Phase (Fat Phase):

In a double boiler, melt beeswax (emulsifying agent) gently. Once melted, add almond oil and neem oil to the beeswax. Stir continuously and maintain the temperature around 70°C.

3. Aqueous Phase (Water Phase):

In a separate container, warm aloe vera gel and rose water to the same temperature (~70°C) to ensure proper emulsification.

4. Emulsification Process:

Slowly add the aqueous phase to the oil phase while continuously stirring using a hand blender or mechanical stirrer. Continue stirring until a smooth, uniform cream is formed.

5. Cooling and Active Additions:

Allow the mixture to cool down to about 40°C.Add sandalwood powder, vitamin E oil, and essential oils (if

used). Mix thoroughly until the cream reaches room temperature.

6. Storage:

Transfer the finished cream into sterile, airtight containers or jars.

**EVALUATION PARAMETERS**

**1. Stability Testing**

| **Test Condition** | **Time Point** | **Appearance** |
|---|---|---|
| **Room Temperature(25°C)** | 0 Days | Homogenous |
| | 7 Days | Smooth, No separation |
| **Accelerated(40°C)** | 0 Days | Homogenous, No separation |
| | 7 Days | Slight oil droplets observed |
| **Refrigerated(4°C)** | 0 Days | Homogenous, No separation |
| | 7 Days | Slight creaming observed |

**2. Spreadability Testing:**

Spread ability= m × l/t

Were,

m= Standard weight which is tied to or placed over the upper slide (30g) l= length of a glass slide (5 cm)

t= time taken in seconds.

Spreadability= m × l/t =100×10/9 = 111.11cm

**3. PH Determination**

Take 10ml of final Herbal face cream in the volumetric flask and make up the volume up to 100ml with distilled water. The pH was measured by using digital pH meter. Range of ph. for herbal face cream between 4.5 and 6.5

**4. Patch Test**

The herbal neem cream is non-irritant and safe for topical application based on human patch testing. Patch testing is undertaken for the investigation and confirmation of substances that produce allergic contact dermatitis. It involves applying appropriately diluted allergens to the skin, usually on the back for convenience, for 48 hours.

**5. Skin irritation:**

A skin irritation test is a study conducted to assess the potential of a substance to cause skin irritation or corrosion. These tests are crucial in the development of pharmaceuticals, cosmetics, and other products that come into contact with the skin**.**

**6. Viscosity:**

A viscosity test measures the thickness or flowability of a fluid. It's crucial in various industries, including pharmaceuticals, cosmetics, food, and oil. Viscosity testing is essential for ensuring product quality, stability, and performance.

Purpose: Determine product consistency, ensure quality control, Meet regulatory standards

**Formula for viscosity: -** force × time ÷ area

**RESULTS**:

To evaluate the quality and effectiveness of a face cream. Herbal face creams are made using plant- based ingredients and typically avoid harsh chemicals. Moisturization, Anti-inflammatory-aging, Acne control.

Even skin tone

Evaluation parameters of herbal face cream

A) ORAGANOLEPTIC PARAMETERS: -

| **Sr. No** | **PRODUCTS** | **ORGANOLEPTIC PROPERTIES** | | |
|---|---|---|---|---|
| | | **Color** | **Odor** | **Taste** |
| 1. | Neem | Dark Green | Pungent | Bitter |
| 2. | Aloe vera | Green | Mild | Bitter |
| 3. | Sandalwood | Pale yellow | Sweet, Pleasant | Astringent |
| 4. | Almond | Light Brown | Mild bitter | Sweet |
| 5. | Bees wax | Yellow | Mild, pleasant | Waxy |

B) PHYSIOCHEMICAL PARAMETERS: -

| SR. NO | EVALUATION PARAMETERS | STDANDARD | TEST |
|---|---|---|---|
| 1 | PH | 4.5 | 6.5 |
| 2 | Viscosity | 1690 cps | 1520 cps |
| 3 | Skin irritation | No | No |
| 4 | Spredability | Good | Good |
| 5 | Consistency | Good | Good |
| 6 | Washability | Good | Good |

**CONCLUSION**

The formulation studies of the neem herbal cream were within specifications. The physical properties such as colour, odour, texture, and consistency were found to be satisfactory. The neem herbal cream formulation can significantly contribute to improving skin health and preventing common facial skin issues. Furthermore, it can be assured that no harmful ingredients are present in the neem herbal cream formulation. It has been demonstrated that the natural neem extracts used in the formulation may help prevent problems such as acne, inflammation, bacterial infections, and skin irritation. The neem herbal cream is suitable for all age groups due to its minimal side effects. This formulation offers a convenient, effective, and natural option for maintaining healthy skin. The present study is crucial for developing an affordable and efficient neem-based herbal cream, particularly for individuals from low socioeconomic backgrounds. However, as this study was brief, longer-term studies with larger sample sizes are necessary to confirm the findings.

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