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Formulation and Evaluation of Herbal Cold Cream

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Abstract: ***The study aims to formulate and evaluate an herbal cold cream using plant-based ingredients to provide a natural, safe, and effective skincare solution. The cream incorporates Azadirachta indica (Neem), Hibiscus rosa-sinensis (Hibiscus), Clerodendrum phlomidis (Gorakh Limli) oil, and Prunus amygdalus (Almond) oil. These botanicals were selected for their antimicrobial, anti-inflammatory, antioxidant, and moisturizing properties. The cream was prepared using the water-in-oil emulsification method and evaluated for parameters such as pH, viscosity, spreadability, microbial load, and stability under different environmental conditions. Results demonstrated that the herbal cold cream was stable, skin-compatible (pH 5.0–6.5), non-irritating, and effective in moisturizing and improving skin texture. This formulation offers a cost-effective, eco-friendly alternative to conventional creams, particularly beneficial for dry and sensitive skin types.***

I. INTRODUCTION

A. Introduction

Cold cream is a rich, emollient cosmetic product traditionally used for cleansing and moisturizing the skin. Known for its soothing and cooling sensation upon application, cold cream is made from a blend of water, oils (such as mineral or almond oil), beeswax, and often a mild fragrance. It was originally developed to remove makeup and impurities while leaving the skin soft and hydrated. Suitable especially for dry and sensitive skin types, cold cream remains a popular skincare staple for its gentle and nourishing properties

Formulations used in cosmetics are intended to enh ashvine human beauty. Since the beginning of time, creams have been valued as essential topical preparations in cosmetic products because of how simple it is to apply and remove them from the skin. Pharmaceutical creams are used for a number of aesthetic purposes, including cleansing, beautifying, modifying look, moisturising, etc. They also protect the skin from bacterial and fungal infections and can be used to treat skin injuries including burns, cuts, and wounds. The general population and society can safely employ these semi-solid preparations. The products used to enhance and beautify human appearances are known as herbal cosmetics. The current study‟s objective was to design and assess herbal cold creams that contained plant extracts made utilising the water in oil method for the goal of moisturising and nourishing the skin brassia seed, hibiscus, ditoria ternatea and adansonia use to make the cold cream. As the water in the emulsion slowly evaporates, the cooling and calming effects of the herbal extract with cold cream are produced. Cold creams are more moisturising because they create an oily barrier to stop the loss of water from the stratum corneum, the outermost layer of the skin. They are water-in-oil emulsion and intended for application on skin or accessible mucous membrane to provide localized and sometimes systemic effect at the site of application. Adansonia digitata L. one of the important plant of the world and abundant in African countries. It is Rare in India. The present review article highlight the geographical distribution of this plant in India, Etymology of genus and species, synonyms, botanical description, chemical constituents and medicinal used Fats in its saturated and unsaturated form play an important role in our daily diet. Its overconsumption in either form can be lethal to Our body. Cosmetics are the products which are generally used to beautify the skin and also to purify the skin.

inflammatory, antiseptic and anti-bacterial, etc. herbal products having no side effects compared with synthetic formulations The cosmetics are the word derived from Greek word – „kosmesticos‟ which means to adorn. From that time the materials which are used to promoting appearances or to beautify the skin are called as cosmetic. From ancient time till now people are still using polyherbal or herbal cosmetics for beautification of skin. Cold cream is the water in oil emulsion. Cold cream gives the prolonged contact time in the site of application as compared to the other semisolid dosage form or formulation. Then give elegancy to the skin and it is not that much greasy. Due to the oil phase, it gives an emollience to the skin. The function of the cold cream is for restoring moisture to dry skin, it allows to eliminate the waste materials from the pores and also cools the body. It is easily watered washable and easy to wash away. They are non-irritating when applied on the skin. The water phase provides the skin with additional protection. At body temperature, it becomes liquefiable. It enters the skin through the pores of the skin‟s epidermis.

Galnes, a Greek physician who created the cold cream formulation in the second century, is credited with developing it. He made a mixture of water, beeswax, and rose petals. These were the main moisturiser components he used to create the cold cream. Galen‟s cream was the common name for this skin lotion. Cold creams can be used to remove temporarytattoo marks and then removed with a cotton ball in addition to moisturising the skin. Uses of cold creams are can be to remove temporary tattoo marks and then removed with a cotton ball in addition to moisturising the skin. Uses of cold creams are also related to the creation of children‟s face paint.

"Herbal cosmetics" the demand for herbal medicines is increasing rapidly due to their lack of side effects. The herbal cosmetic is that it is purely made by herbs and shrubs. The herbs extracted from nature do not show adverse effects on human skin. Now a day's cosmetics are used to improve their appearance. Cosmetics are preparing and using to improve their beauty.

For various types of skin ailments formulations like skin protective, sunscreen, anti-acne, anti- wrinkle, either natural or synthetic. The development process for cosmetic formulation needs maintenance of quality standards. The herbs used in cosmetic preparations have varieties of properties like antioxidant, anti-. Cold cream is an emulsion which when applied on the skin, a cooling effect is produced due to slow evaporation of water present in emulsion. They are generally prepared by emulsification of oils and water. In older days cold cream was prepared from animal fat and vegetable o

Fig no.1.1 Herbal Cosmetics

B. Benefits of Herbal Cosmetics

- Being natural, least harmful effect on the skin or other body parts.
- Relatively more safe.
- More placebo effect to the consumers due to its use in traditions and culture.
- Flexibility in formulation.
- Population proves effects from ancient time.
- Easy availability.
- Economical.
- It helps to cleans and beautify the body without side effects.
- It normalizes the body functions.
- It has extreme nutritional value with high content of vitamins and minerals.
- It enhances the energy level of body.
- It stimulates the body's immune system without disturbing the natural balance of body.
- Variety of Phyto-constituents can be incorporated

C. Advantages of herbal cold cream

- Ease of application.
- Convenient to all the population.
- In case of intra and inter-patient variations, avoid fluctuation of drug levels.
- No special risk or technician required for application of product.
- Achievement of efficacy with lower total daily dosage of drug.
- High patient compliance.

D. Disadvantages of herbal cold cream

- Larger particle sized drugs cannot be easily absorbed through the skin pores.
- Chances of skin irritation of contact dermatitis due to any drug interactions.
- Poor absorption may result due to the poor permeability of some drugs through the skin.
- Chances of allergic reaction.
- It can be used mainly for drug which required very small plasma concentration for action.
- Denaturation of the drugs takes place due to the presence of an enzyme in epidermis.

E. Ideal Properties of Herbal Cold Cream

- It should not normally be diluted
- The pH of the cold cream must be optimum from 4.6–6.0 3. Its consistency should be optimum so that it can be easily put out from the container and apply easily.
- Should give a cooling effect on the skin after external application.
- It must provide a thin waxy protective layer on the skin to protect the water evaporation from the skin surface.
- Should give a faster emollient effect, so that very dry skin can swell up and become soft within a short time
- Less greasy than ointment and easily spread on the skin.
- It should be physically and chemically stable throughout its shelf-life.
- The excipients should be compatible with each other. It should be sterile.

F. Application of Herbal Cold Cream to skin

- Despite their intended design as facial moisturizers, cold are actually very versatile and can be used in a number of different ways.
- its most popular uses is as a makeup remover.
- The thick oils are able to gently melt makeup and dirt away, allowing it to be removed with minimal damage, rubbing or scrubbing.
- It effective as a primer for cosmetic foundations as it smooths the skin and allows makeup to be applied more evenly across the face.
- it removes makeup without water, Kelly says it even is a great product to take camping or on road trips where you may be away from your bathroom sink or shower! Lastly, cold creams can also be effective as a lip balm, body lotion, or even a shaving cream.
- Using a cold cream on your lips helps lock in vital moisture and provide hydration throughout the day to the sensitive skin on the lips.
- applying a moisturizing cold cream to your body delivers the same intense hydration that the cream is designed to provide to your face but to your arms, legs, back, and hand.

G. Anotomy & Physiology Of Human Skin

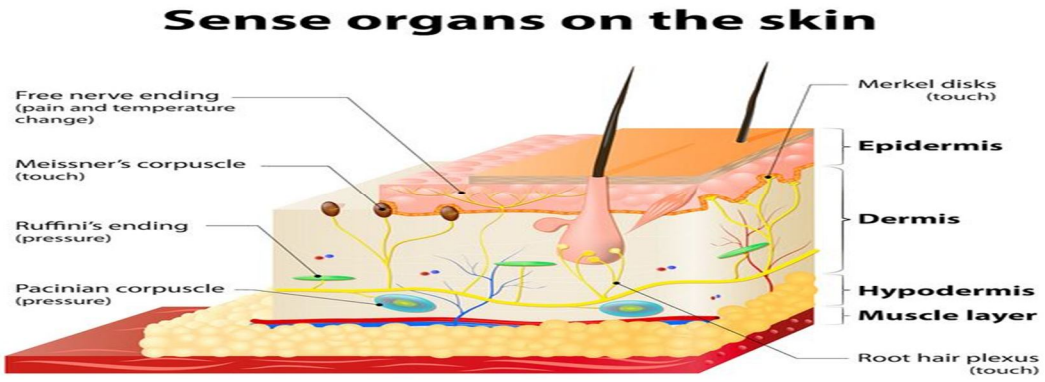

Fig no 1.7.1 Sense Organs On The Skin

1) Introduction

Our skin, which is part of the integumentary system, is the largest organ in the human body. However, it is often overlooked and underappreciated for the role it plays in overall health. Many people only consider the role skin plays in our appearance and how we are perceived by the society. Facial expressions are an important form of non-verbal communication and can have a strong social influence. While our skin is an important part of our outer appearance, it provides a greater contribution to human life and wellbeing than just aesthetics.

This article will overview the anatomy and physiology of skin, skin's response to injury, normal tissue healing, the phases of acute wound healing, and the altered healing in chronic wounds.Wound healing is complex and involves the coordination of many intricate processes. There are many factors that can impact wound healing, both positively and negatively.

2) The Role of the Skin

Skin provides numerous functions vital to life and is important for overall health. The skin's health and appearance can be an indicator of general health, and skin integrity failure often accompanies the failure of other organ systems within the body.

3) Eight Key Functions of the Skin

a) Protection: Skin acts as a physical barrier to the external environment and provides protection for internal organs against external threats.

b) Immune function: Our skin contains a protective acidic barrier called the acid mantle. This acidic layer has a pH between 4.2 and 6.0, which creates a hostile environment for harmful invading organisms while maintaining a favourable environment for beneficial microbes. The acid nature of skin is a key requisite for healthy skin. Skin pH can affect the synthesis and maintenance of a competent skin barrier, play a role in skin pigmentation, and ion homeostasis. The skin's acid mantle Skin pH tends to be lower in people with darker skin because melanin by-products are acidic. Skin pH also tends to increase slightly as we age, which can contribute to an increased risk of infection and alter our healing ability. Specific immune cells and proteins contained in the dermis activate the immune response and attack invading microbes. These cells include: Langerhans cells, memory T cells, and lymphoid cells. The surface of our skin houses millions of bacteria, fungi and viruses that compose the skin microbiome and serves as a physical barrier to prevent the invasion of pathogens. As in our gut, the skin microbiome plays essential roles in the protection against invading pathogens, the education of the immune system,and contributing back to the pH of the acid mantle

c) Thermoregulation: Humans, and all mammals, can maintain a stable core body temperature via thermoregulatory responses. By increasing blood flow to the skin through vessel dilation, body temperates are lowered by evaporative cooling of moist/sweaty surfaces to release body heat.However, if water lost to evaporative cooling is not replaced, body fluid homeostasis will be challenged.

d) Prevention of fluid loss: In addition to the physical barrier provided by skin, it also contains lipids, proteins, amino acids, and salts that work to maintain internal body homeostasis by attracting and holding onto water. Due to this mechanism, under normal circumstances, the outer layer of our skin is about 30% water.

e) Synthesis of vitamin D: Vitamin D is recognised as a pro-hormone, also known as calciferol. There are two major forms of vitamin D: D2 which is human-made and fortified into foods (such as milk, cheese, yogurt, cereals, and juices) and D3 which is synthesised by the skin and from eating animal-based foods (fatty fish, fish liver oil, and egg yolk).[9] While vitamin D can be ingested through food or supplements, the skin and exposure to sunlight is the body's primary source of vitamin D.Vitamin D is essential for calcium and phosphate absorption, bone formation, renal function, and our immune function.

f) Protection from ultraviolet radiation :Ultraviolet radiation (UVR) can cause DNA photodamage, sunburn, and both local and systemic immunosuppressive properties. Melanin and carotene give skin its colour and serve to reflect UVR as a protective mechanism to radiation damage. Melanin also has antioxidant and radical scavenging properties. Melanin is produced by melanocytes in response to increased sunlight, which is why populations that evolved in areas with more sun exposure tend to have darker skin.

g) Interaction with the environment: Our skin gathers sensory information through free nerve endings, hairs, receptors to touch, temperature, and pain. In addition, through physiological processes like sweating or blushing, information is shared about our internal state to the outside world.

h) Healing: Tissue restoration in response to injury.

4) Skin Anatomy and Physiology

It is important to understand the layers of our skin so that we can understand how healing occurs differently based on depth. The skin has two principal layers, the epidermis and the dermis. The hypodermis is considered an extension of the skin by some sources, but not by others.

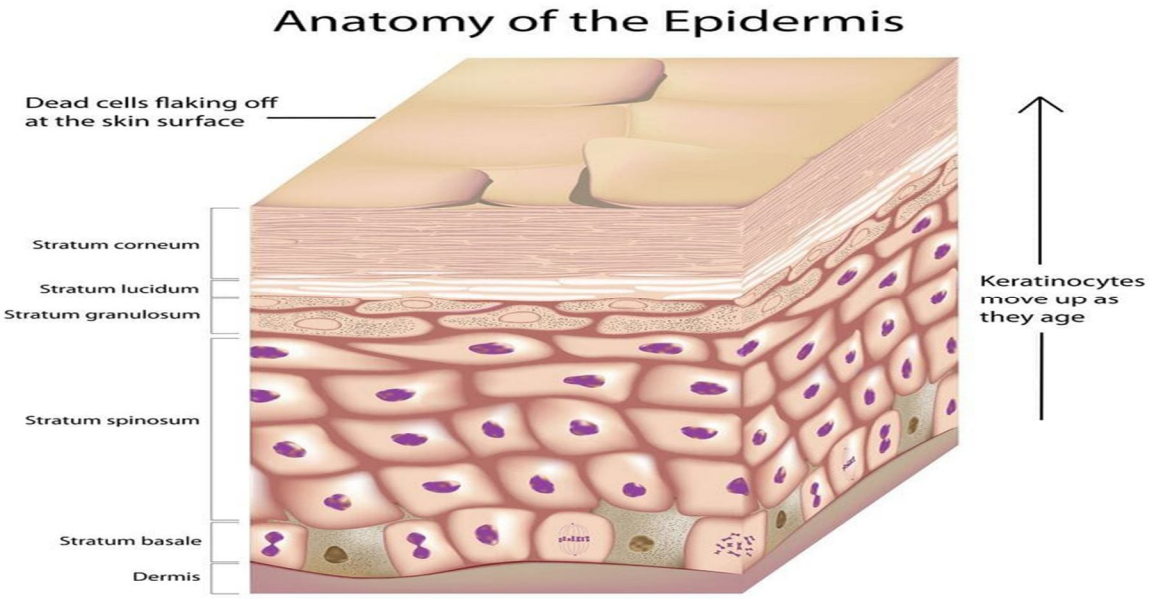

FIG NO 1.7.4.1 THE EPIDERMIS

a) The Epidermis

- .Composed of five layers
- .It is avascular
- .Its thickness varies based on location. For example, it is thickest on the heels and thinnest on the eyelids. Areas that have increased use from friction or weight bearing can build up thicker layers of skin (e.g., where a pencil rubs your writing finger or shoe rubs against your foot).
- .It has no nerves, but free nerve endings from the dermis do extend into the mid layers of the epidermis.

Five layers of the epidermis

- Stratum corneum
  - Composed of 15 to 30 layers of keratinocytes called squames or corneocytes. These are dead keratinocytes. They contain a high concentration of keratin which provides a waterproof barrier for the skin, hair, and nails.
  - This layer is continually being shed from the body. Shed cells are replaced via the process of skin cell migration from the stratum basale. This process takes an average of 30 days, but this varies based on age and certain health conditions.

- Stratum lucidum
  - Contains two to three layers of keratinocytes and is not living. It can be penetrated or shaved off without awareness.
  - It is only found in areas of thick skin, like the palms of the hand and the soles of the feet. Present in calluses.

- Stratum granulosum
  - This layer contains the greatest concentration of free nerve endings that extend from the dermis. Free nerve endings are unencapsulated dendrites originating from a sensory neuron. They are the most common nerve endings in skin and provide sensory information about painful stimuli, hot and cold, and light touch. However, they are less sensitive to abrupt changes in stimulation.
  - This is the most superficial layer of the epidermis which contains living cells.

- Stratum spinosum
  - Contains Langerhans cells and lymphocytes which play an important role in the immune system.

- Stratum basale
  - The only layer that undergoes continuous mitosis to produce new cells.
  - Keratinocytes are constantly being produced in the stratum basale and they move up through the layers until they reach the outermost layer.[1] Keratinocytes are the most dominant cell type in the skin. They play a critical role in wound healing as they are structural cells and they perform important immune functions.
  - Melanocytes are also produced in the stratum basale. They produce melanin, which contributes to the colour of skin. Humans have approximately the same amount of melanocytes. Therefore, skin colour is based on the amount of melanin that these melanocytes produce in response to their environment.
  - This layer also contains Merkel cells which can perform both nervous and endocrine actions. They can synthesise and store locally produced hormones and neurotransmitters. They function as mechanoreceptors[1] for light and selective tactile perception, but not for hard touch and vibration; they are also involved in the transfer of nociceptive signals.

b) The Dermis

- Located deep to the epidermis
- Contains blood vessels and nerves which supply the epidermis via capillary loops and free nerve endings
- Composed of two layers

Two layers of the dermis

FIG NO.1.7.4.2 .1 Dermis Papillary Layer

- Papillary Layer
  - Interdigitates with the epidermis
  - The ridges of this layer give rise to our unique fingerprints.
  - Contains fibroblasts which are responsible for the production of collagen, elastin, and proteins. These qualities give skin strength and flexibility.
  - Contains mast cells which produce heparin and histamine, important factors in clot formation and the inflammatory response.
  - Contains macrophages which play an important role in the immune response, wound repair, cancer defence, salt balance, and hair regeneration. They are known for destroying foreign invaders through phagocytosis (the process by which a phagocyte, a type of white blood cell, engulfs and digests foreign cells and removes dead cells
  - Contains leukocytes which are crucial to the inflammatory response following an injury to the skin. Leukocytes are essential for clearing infection and normal wound healing.

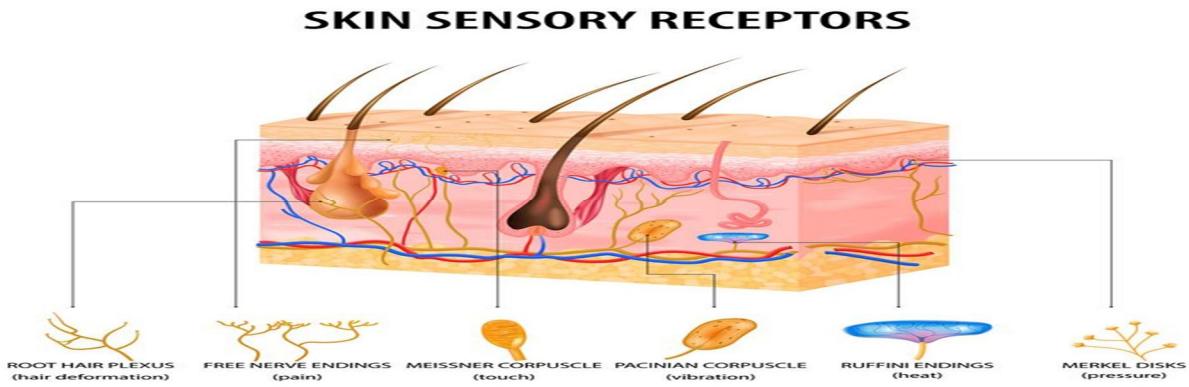

FIG NO 1.7.4.2..2 Dermis Of Reticular Layer

- Reticular layer
  - Located between the papillary layer and the subcutaneous layer or hypodermis.
  - It is made up of collagen, blood vessels, nerve endings, T-cells, hair follicles and glands.
  - The hair follicles contain stem cells that produce keratinocytes that will become hair. They play an important role in wound healing by contributing epithelial cells for wound closure.
  - The T-lymphocytes are responsible for destroying pathogens and malignant cells.
  - Nerves located within the dermis detect sensations such as itching, touch, pressure, vibration, pain, and temperature.
  - Injuries which reach into the dermis can result in pain due to nerve exposure and or damage. There will be an absence of pain if the nerves are completely destroyed and or severed by an injury.

c) The Hypodermis

- Located below the dermis and contains subcutaneous tissue.
- It is made up of loose connective tissue, adipose tissue. It is well vascularised and well innervated.
  It helps to attach the skin to the muscles and bones through superficial fascia, and provides insulation and cushioning through fat storage.

II. LITERATURE REVIEW

1) Fowler, J. (2003). Skin Care: Beyond the Basics. Lippincott Williams & Wilkins.

Cold cream is a topical emulsion widely used for skin moisturizing, cleansing, and cosmetic purposes. Traditionally, it is an emulsion of water in oil (W/O), typically consisting of water, oils, waxes, and sometimes fragrances or therapeutic additives. Its formulation dates back to ancient Greece, where Galen of Pergamon is credited with its earliest known version using beeswax, olive oil, and rose water (Fowler, 2003).

2) Draelos, Z. D. (2012). Cosmetic Dermatology: Products and Procedures. John Wiley & Sons.

Modern cold creams have evolved significantly in both composition and purpose. Research has shown that cold cream serves as a potent emollient, offering hydration and creating a barrier that prevents transepidermal water loss (Draelos, 2012). Moreover, the occlusive properties of cold cream are particularly beneficial for individuals with dry or sensitive skin.

3) Elsner, P., & Maibach, H. I. (2000). Cosmetics: Science and Technology. CRC Press

A study by Lodén (2003) emphasized the role of emollients like cold cream in improving the skin barrier function, highlighting its effectiveness in conditions like atopic dermatitis. Furthermore, cold creams are frequently used as cleansing agents due to their ability to dissolve makeup and sebum without stripping natural oils from the skin (Elsner & Maibach, 2000).

4) Mukherjee, P. K., Maity, N., Nema, N. K., & Sarkar, B. K. (2011). Bioactive compounds from natural resources against skin aging. Phytomedicine, 19(1), 64–73.

Recent trends have seen the incorporation of herbal and natural ingredients into cold cream formulations. For instance, aloe vera, chamomile, and green tea extracts are added for their antioxidant and anti-inflammatory benefits (Mukherjee et al., 2011). These developments not only enhance the therapeutic value but also appeal to consumer preferences for natural products.

5) *Katsambas, A. D., & Dessinioti, C. (2010). Acne and Rosacea. Springer.*

Despite its benefits, cold cream may not be suitable for all skin types, particularly those prone to acne, due to the potential comedogenicity of some traditional oil-based ingredients (Katsambas & Dessinioti, 2010). Hence, newer formulations are being developed with non-comedogenic oils and light emulsifiers to improve tolerability.

6) *Singh, S., & Duggal, S. (2010). Herbal cosmetics: Trends in skin care formulation. Pharmacognosy Reviews, 4(7), 82–89*

Traditional Use of Herbal Cold Creams:Herbal cold creams have long been used in traditional medicine systems such as Ayurveda for their emollient, moisturizing, and skin-protective properties. These creams typically include natural oils, waxes, and herbal extracts with skin-nourishing properties. According to Singh et al. (2010), herbal cosmetics have fewer side effects and are preferred over synthetic ones for long-term use.

7) *Key Ingredients and Their Benefits*

a) Kumar, A., & Sharma, S. (2014). Beeswax: A natural ingredient for skin care formulations. International Journal of Pharmaceutical Sciences Review and Research, 26(2), 76–79.

b) Pundir, R. K., Jain, P., & Sharma, C. (2010). Evaluation of moisturizing and skin barrier function of some herbal cold cream. Journal of Pharmacognosy and Phytochemistry, 2(4), 110–114.

C) Surjushe, A., Vasani, R., & Saple, D. G. (2008). Aloe vera: A short review. Indian Journal of Dermatology, 53(4), 163.

While the exact formulation of Gorakh Limli Cold Cream is not widely documented in scientific literature, similar creams often contain ingredients such as:Beeswax: Acts as a thickening agent and skin protectant (Kumar & Sharma, 2014).

Herbal oils (e.g., almond, coconut, or mustard oil): Provide moisture and improve skin texture (Pundir et al., 2010).

Aloe vera or other herbal extracts: Soothing and healing effects on dry or irritated skin (Surjushe et al., 2008).

8) *Research and Markets. (2022). Global Herbal Cosmetics Market Report. Retrieved from* http://www.researchandmarkets.com/

Market Trends and Consumer Preference:The demand for herbal cosmetic products, including cold creams, has risen significantly. According to a report by Research and Markets (2022), the global herbal cosmetics market has been expanding due to consumer awareness regarding natural ingredients and the side effects of synthetic products.

9) *Rani, D. S., & Khullar, R. (2012). Evaluation of anti-aging potential of Hibiscus rosa-sinensis L. flower extract. Journal of Pharmacognosy and Phytochemistry, 1(3), 49–53.*

Hibiscus (Hibiscus rosa-sinensis):Hibiscus is rich in alpha hydroxy acids (AHAs), antioxidants, and vitamin C, making it a beneficial addition to anti-aging and moisturizing creams. Its AHAs promote exfoliation, while antioxidants combat oxidative stress on the skin (Rani et al., 2012). Hibiscus extract also helps improve skin elasticity and tone.

10) *Vermaak, I., Viljoen, A., & Hamman, J. H. (2011). Natural oils for skin-barrier repair: Cosmetic applications. Pharmaceutical Biology, 49(8), 774–789*

Almond Oil (Prunus amygdalus):Almond oil is a light, non-comedogenic oil known for its emollient properties. It is rich in fatty acids, especially oleic and linoleic acids, which help to restore the skin's moisture barrier. It has been used traditionally to reduce skin dryness, improve skin tone, and treat inflammatory skin conditions (Vermaak et al., 2011).

11) *Dash, S., Murthy, P. N., Nath, L., & Chowdhury, P. (2008). Kinetics modeling on drug release from controlled drug delivery systems. Acta Poloniae Pharmaceutica, 67(3), 217–223.*

Cold Cream Base:Traditional cold creams are water-in-oil (W/O) emulsions that provide intensive moisturization. The inclusion of natural ingredients like neem, hibiscus, and almond oil in cold cream formulations not only enhances moisturizing capacity but also adds functional properties such as antimicrobial protection, skin rejuvenation, and anti-aging benefits (Dash et al., 2008).

12) *Kumar, S., Yadav, A., & Tripathi, P. (2014). Formulation and evaluation of polyherbal cold cream. Journal of Pharmacognosy and Phytochemistry, 3(4), 155–158*

Preliminary studies and herbal cosmetic formulations have reported positive outcomes from such combinations in terms of skin texture improvement, reduced acne, and enhanced skin smoothness (Kumar et al., 2014).

III. AIM AND OBJECTIVE

A. Aim

Formulation And Evaluation Of Herbal Cold Cream

B. Objective

- To develop a skin-friendly cold cream using herbal extracts and oils.
- To evaluate the moisturizing and healing properties of the herbal formulation.
- To ensure the cream is free from harmful chemicals and suitable for all skin types.

- To study the stability and shelf-life of the herbal cold cream under various conditions.
- To create an affordable and effective alternative to commercially available cold creams using sustainable and eco-friendly ingredients.
- To prepare the cream by using the emulsification technique.
- To made safety, efficacy and quality of Herbal cold cream.
- They are non-irritant applied on the skin.
- To explore the many aspects of the rich traditional Indian herbal medicine.
- To give knowledge gained during the course in evaluating the usefulness of herbal formulas.
- To formulate and evaluate a herbal cold cream for shining skin by using natural herbalproduct
- To make a cold cream ideal for all skin types.
- To give the useful benefits of cold cream on human use as cosmetic product.

IV. PLAN OF WORK

1. Introduction
2. Literature Review
3. Aim and Objectives
4. Materials and Methods
5. Results and Discussion
6. Conclusion
7. References

V. MATERIALES AND METHOD

A. Materials

1. Oil Phase:Almond Oil – Emollient, rich in Vitamin E
Gorakh Limli Oil (Clerodendrum phlomidis) – Anti-inflammatory, soothing
Beeswax – Emulsifier and thickener
Stearic Acid – Stabilizer and thickening agent
2. Aqueous Phase:Distilled Water
Hibiscus Extract (Hibiscus rosa- sinensis) – Rich in AHAs, anti-aging
Neem Extract (Azadirachta indica) – Antibacterial, skin purifier
Glycerin – Humectant
3. Preservative: Phenoxyethanol or other suitable broad-spectrum preservative
4. Optional Additives:Vitamin E oil (tocopherol) – Antioxidant
Fragrance (mild, natural)

B. Method

1. Preparation of Extracts: Hibiscus & Neem Extracts: Dried plant parts (flowers for hibiscus, leaves for neem) are powdered and extracted using aqueous or hydroalcoholic maceration (1:10 ratio), filtered, and concentrated.
Gorakh Limli Oil is usually cold-pressed or extracted via maceration in a carrier oil.
2. Oil Phase Preparation: Combine almond oil, Gorakh Limli oil, beeswax, and stearic acid.
Heat to 70°C using a water bath until all solids are melted.
3. Aqueous Phase Preparation: Heat distilled water to 70°C.
Add glycerin, hibiscus, and neem extracts. Stir to homogenize.
4. Emulsification: Slowly add the aqueous phase to the oil phase with continuous stirring.
Use a high-speed homogenizer or hand blender for 5–10 minutes until a uniform cream forms.
5. Cooling and Finishing: Allow to cool to ~40°C.
Add preservative, Vitamin E, and fragrance (if used).

VI. DETAIL OF HERBS

A. Adansonia Digitata

Scientific classification
Kingdom: Plantae
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Malala‟s
Family: Malvaceae
Genus: Adansonia
Species: Digitata

Binomial name : Adansonia digitata.

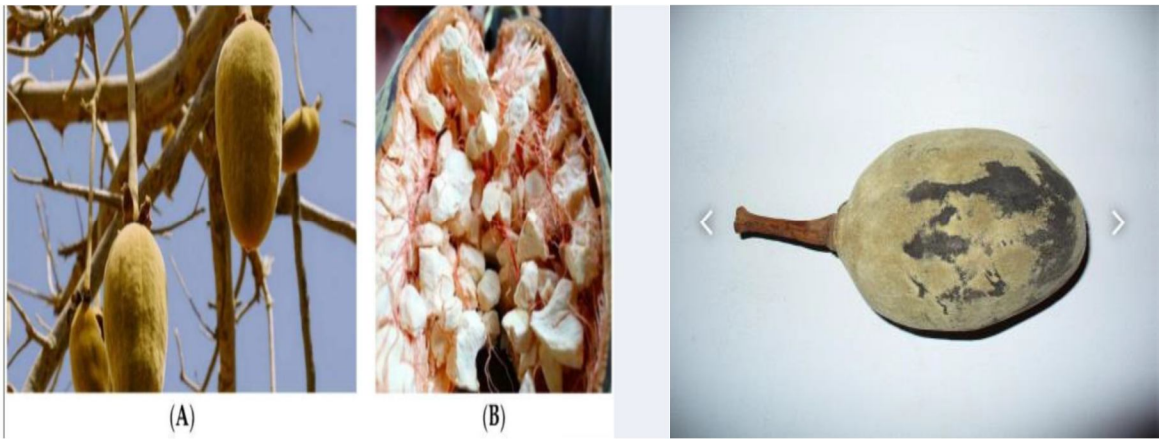

FIG NO 6.1 . ADANSONIA DIGITATA SEED

Family: Malvaceae (formerly Bombacaceae)
Habit: Large deciduous tree, often reaching 25–30 meters in height.
Trunk: Massive, bottle-shaped or cylindrical, capable of storing large amounts of water; can be up to 10 meters in diameter.
Bark: Smooth, greyish, and fibrous.
Leaves: Palmately compound with 5–7 leaflets, dark green, and shed during the dry season.
Flowers:Large, showy, and white
Open at night and are pollinated mainly by bats
Have a strong scent

Fruit: Large, oval or oblong, with a hard woody shell
Contains a dry, powdery pulp rich in nutrients
Seeds are embedded in the pulp

Chemical Constituents of Adansonia digitata
Different parts of the baobab tree (leaves, fruit pulp, seeds, bark) contain a wide range of bioactive compounds:
1. Fruit Pulp:Vitamin C: High concentration, often exceeding that of oranges
Organic acids: Citric, tartaric, malic acids
Carbohydrates and fibers
Minerals: Calcium, potassium, magnesium, iron
Phenolic compounds: Flavonoids, proanthocyanidins
2. Leaves:Proteins and amino acids Vitamin A and C
Flavonoids: Quercetin, kaempferol
Tannins and saponins
3. Seeds: Fatty acids: Palmitic, oleic, linoleic acids
Sterols: Beta-sitosterol
Proteins Tocopherols (Vitamin E)
4. Bark and Roots: Alkaloids, Tannins, Steroidal compounds

Pharmacological Properties:
Antioxidant
Anti-inflammatory
Antimicrobial
Antidiabetic
Antiviral
Hepatoprotective
Synonyms
Adansonia baobabs L.
Adansonia baobab Gaertn.
Adansonia integrifolia Raf.
Adansonia kilima Pettigrew, K.L.Bell, Bhagw., Grinan, Jillani, Jean Mey., Wab
Adansonia scutula Steud. Syno
Adansonia situla (Lour.) Spreng.
Adansonia somalensis Chiov.
Adansonia sphaerocarpa A.Chev.
Adansonia sulcata A.Chev.
Baobabus digitata (L.) Kuntze
Ophelus sitularius Lour

Use
- The Adansonia digitata, also known as the baobab tree, has many medicinal uses, including:
- Anti-inflammatory: The tree‟s parts are used to treat inflammation.
- Anti-diarrhea: The pulp and seeds are used to treat diarrhea and dysentery.
- Antipyretic: The tree‟s parts are used to treat fevers.
- Antimicrobial: The tree‟s parts are used to treat microbial infections.
- Anti-malarial: The tree‟s parts are used to treat malaria.
- Anti-viral: The tree‟s parts are used to treat viral infections.
- Analgesic: The tree‟s parts are used to treat pain.
- Immune stimulant: The tree‟s parts are used to stimulate the immune system.
- Insect repellent: The tree‟s parts are used to repel insects.

- Pesticide: The tree‟s parts are used as a pesticide.
- Skin disease treatment: The seeds and oil are used to treat skin diseases, such as dandruff and muscle wounds.
- Oral hydration: The pulp and seeds are used for oral hydration in the Ivory Coast and eastern Africa.
- Hemoptysis treatment: A fruit decoction is used to treat hemoptysis in Tanzania.

B. Hibiscus Rosa-Sinensis

Hibiscus rosa-sinensis, known colloquially as the Chinese hibiscus, China rose and shoe flower, is an evergreen flowering shrub native to East Asia.It is widely grown as an ornamental plant throughout the tropics and subtropics. The flowers are large, generally red in the original varieties, and firm, but generally lack any scent. Also many colors are available in a single, double or multi-shades including white, yellow, orange, red, pink, salmon, purple, etc. Hibiscus rosa-sinensis, is the national flower of Malaysia. The leaves are alternate, simple, ovate to lanceolate, often with a toothed or lobed margin. The flowers are large, conspicuous, trumpet-shaped, with five or more petals. The fruit is a dry five-lobed capsule, containing several seeds in each lobe, which are released when the capsule dehisces (splits open) at maturity

FIG NO 1.6.2 HIBISCUS ROSA SINENSIS (FLOWER)

Botanical Name	:	*Hibiscus rosasinensis* L.
Kingdom	:	Plantae
Subkingdom	:	Tracheobionta
Super division	:	Spermatophyta
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Subclass	:	Dilleniidae
Order	:	Malvales
Family	:	Malvaceae
Genus	:	Hibiscus
Species	:	rosasinensis

Morphology of Hibiscus : (e.g., Hibiscus rosa-sinensis)

1. Habit:Shrub or small tree, often ornamental.
2. Stem:Erect, woody, branched, cylindrical, and hairy.
3. Leaves:Simple, alternate, ovate with serrated margins. Palmately veined. Petiolate with stipules.
4. Flowers: Large, showy, bisexual, complete. Actinomorphic, pentamerous.

Usually red but may vary in color (white, yellow, pink, etc.).

Inflorescence: Solitary axillary or terminal.

5. Calyx: sepals, gamosepalous (fused), green.

6. Corolla: 5 petals, polypetalous (free), brightly colored.
7. Androecium: Numerous stamens, monadelphous (filaments fused into a staminal tube surrounding the style).
8. Gynoecium: Ovary superior, pentacarpellary, syncarpous, style passing through the staminal tube, stigma 5-lobed.
9. Fruit: Capsule, dehiscent, contains many seeds.
10. Seeds: Kidney-shaped, smooth or hairy.

Chemical Constituents of Hibiscus (mainly Hibiscus rosa-sinensis and Hibiscus sabdariffa)
1. Flavonoids: Quercetin, Kaempferol, Hibiscetin, Gossypetin
(Contribute to antioxidant properties)
2. Anthocyanins: Delphinidin,Cyanidin
These are responsible for the red/purple pigmentation, especially in Hibiscus sabdariffa (roselle).
3. Phenolic Compounds: Chlorogenic acid, Protocatechuic acid, Caffeic acid
4. Organic Acids: Citric acid, Malic acid,Tartaric acid, Hibiscus acid
(Confer sour taste, especially in roselle calyces)
5. Polysaccharides: Mucilage (gives the slimy texture of leaves and flowers)
6. Fatty Acids and Sterols: Linoleic acid, Oleic acid, Beta-sitosterol
7. Volatile Compounds: Terpenes and esters in essential oils (minor components)
8. Vitamins: Vitamin C (Ascorbic acid),Vitamin A
USES

- To induce abortion, ease menstrual cramps and to help in childbirth.
- To treat headaches.
- A preparation from the leaves is used to treat postpartum relapse sickness, to treat boils, sores and inflammations.
- Good for hairs.
- Hibiscus flowers are reported to Possess anti-fertility property by ancient Ayurvedic texts

C. Neem

scientifically known as Azadirachta indica, is a tree in the mahogany family (Meliaceae) with a wide range of uses, including medicinal and pesticidal applications, due to its bioactive compounds like azadirachtin**.**

FIG NO 6.3. Neem Leaves

Biological Source & Family
Scientific Name: Azadirachta indica.
Family: Meliaceae (Mahogany family).
Common Names: Neem, Margosa, Nimtree, Indian Lilac.
Morphology:
Tree Type: Medium-sized, evergreen tree, reaching 15-30 meters in height.
Crown: Large, rounded crown, up to 10-20 meters in diameter.
Leaves: Pinnately compound leaves.
Roots: Deep taproot, mycorrhizal-dependent species.

Chemical Constituents:
Active Compounds: Azadirachtin, nimbin, nimbandiol, nimbolide, quercetin, and other alkaloids, saponins, and flavonoids.
Other Constituents: Ascorbic acid, n-hexacosanol, and amino acids.

Microscopic Features (TS):

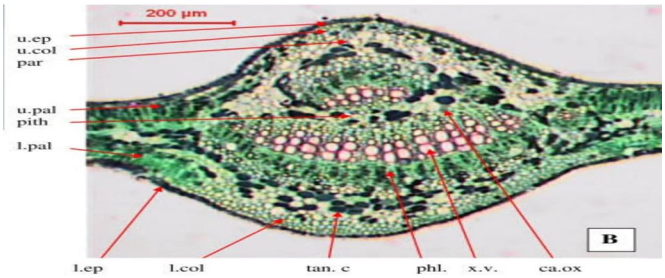

FIG NO 6.3.2 NEEM OF LEAVES T.S

Leaf: Leaf anatomy includes a palisade mesophyll, spongy mesophyll, and epidermal layers with characteristic stomata.
Bark: Bark anatomy shows phloem, cambium, and xylem tissues.
Seed: Seed anatomy reveals endosperm and embryo tissues.

Uses Medicinal
Antimicrobial (antibacterial, antifungal, antiviral).
Anti-inflammatory.
Used in traditional medicine systems like Ayurveda and Unani for various ailments.
Used in shampoos for dandruff, and soaps/creams for skin conditions.
Pesticidal: Neem seed oil is used as a natural insecticide and pesticide.
Azadirachtin is the primary insecticidal compound.
Other Uses: Used for wound healing.
Used as a natural remedy for tooth plaque and gingivitis.
Used to repel insectsiological Source

D. Almond Oil
Is obtained from the dried kernels of seeds of Prunus amygdalus.
Family: Rosaceae

FIG NO 6.4 ALMOND OIL

Morphology of Almond Seed
Shape: Ovoid, flattened
Color: Brown seed coat; inner kernel is pale yellow-white
Surface: Slightly wrinkled
Size: 2-3 cm long
Taste: Sweet or bitter depending on the variety
Odor: Characteristic mild nutty odor
Types of Almonds
1. Sweet Almond – Prunus amygdalus var. dulcis

2. Bitter Almond – Prunus amygdalus var. amara

Chemical Constituents

- Fixed oils (40-60%) – mainly Oleic acid, Linoleic acid, Palmitic acid
- Proteins
- Vitamins – Especially Vitamin E
- Emulsin enzyme (in bitter almonds)
- Amygdalin (only in bitter almonds) – hydrolyzes to produce hydrogen cyanide, glucose, and benzaldehyde

Uses

- Sweet Almond Oil:
- Emollient in cosmetics and pharmaceuticals
- Base oil in massage and aromatherapy
- Mild laxative
- Nutritional supplement
- Bitter Almond Oil (used after detoxification):
- Flavoring agent

VII. EQUIPMENTS

1) Mixing Equipment

High-shear mixer or homogenizer: Ensures a smooth, uniform emulsion.
Stainless steel mixing tanks (jacketed): For heating and cooling the cream during processing.
Agitator/stirrer: Keeps the ingredients well mixed during heating and cooling.

2) Heating & Cooling System

Double jacketed kettle or pan: For melting oils and waxes and then cooling the mixture.
Temperature control system: Essential for precise heating and cooling during emulsification.

3) Weighing & Measuring Equipment

Digital scales: For accurate measurement of raw materials
Measuring cylinders/beakers: For liquid components.

4) Filling & Packaging Equipment

Cream filling machine (semi or fully automatic): For filling cream into jars or tubes.
Capping machine: For sealing containers.
Labeling machine: For applying product labels.

5) Quality Control Tools

Viscometer: To measure the viscosity of the cream.
pH meter: To ensure the cream is skin-friendly.
Microbial testing tools: For safety and shelf-life assurance.

6) Miscellaneous

Stainless steel utensils (spatulas, ladles): For manual handling.

7) Cleanroom environment or laminar airflow cabinet:

8) Gorakh Limli (Clerodendrum phlomidis):

9) Oil Extraction Using Soxhlet Apparatus

10) Heating Mantle

11) Round Bottom Flask

12) Reflux condenser

13) Membrane filtration

VIII. FORMULA

SR.NO	INGREDIENTS	30 GM **F1**	30 GM **F2**	30 GM **F3**
1	ALMOND OIL	5	5	5
2	GORAKH LIMLI OIL	3	2	3
3	BORAX	1	3	2
4	STEARIC ACID	3	4	3
5	DISTILLED WATER	12	10	11
6	GLYCERIN	1.5	2	2
7	HIBISCUS EXTRACT	2	1.5	1.5
8	NEEM EXTRACT	2	1.5	1.5
9	PRESERVATIVE	Q S	QS	QS
10	VITAMIN E	0.5	0.5	0.5
11	FRAGRANCE	Q S	QS	QS
RESULT		FAIL	PASS	FAIL

IX. PROCEDURE

1. Sample Preparation:
Weigh about 20–50 grams of dried hibiscus calyces.
Grind the calyces into a coarse powder using a grinder or mortar and pestle.
2. Solvent Preparation:
Prepare the solvent: commonly used are water, ethanol, or a mixture (e.g., 70% ethanol).
Use a solvent-to-solid ratio of about 10:1 (e.g., 500 mL solvent for 50 g of hibiscus).
3. Reflux Extraction Setup:
Place the powdered hibiscus and solvent into a round-bottom flask.
Attach the reflux condenser to the flask.
Start the water flow in the condenser before heating.
4. Refluxing:
Heat the mixture gently (e.g., 70–80°C for ethanol) and maintain for about 1–3 hours.
The condenser will prevent solvent loss while allowing continuous boiling.
5. Cooling and Filtration: Allow the system to cool. Filter the extract through filter paper to remove plant residues.
6. Concentration (Optional): Concentrate the filtrate using a rotary evaporator if a more concentrated extract is needed.
Alternatively, gently evaporate using a water bath. Store the extract in a clean, dark bottle at 4°C to preserve its activity.

A. Neem

1.Collection and Cleaning: Collect fresh neem leaves.
Rinse thoroughly under clean water to remove dust or dirt.
2. Crushing: Grind the leaves using a mortar and pestle or blender with a small amount of water until you get a green paste.
3. Extraction: Add a little more water to the paste (about 1:3 ratio of paste to water).
Mix well and let it sit for 15–30 minutes.
4. Filtration: Use a muslin cloth or fine strainer to filter the mixture into a clean bowl.
Squeeze out all the liquid.
5. Storage: Store the neem extract in a clean container.

B. Gorakh Limil

Collection & Cleaning :Collect mature Gorakh Limli seeds.
Clean them thoroughly to remove dust, dirt, and any foreign particles.
Dry them in the shade for 3–5 days to remove surface moisture.

2. Grinding (Optional for Solvent Extraction) :Grind the dried seeds into a coarse powder using a grinder or mortar and pestle. This increases the surface area for better extraction.
3. Extraction Methods : Solvent Extraction
Mix ground seeds with a food-grade solvent (like hexane or ethanol) in a closed container.
Let it sit for 24–48 hours, shaking it occasionally. Filter the mixture to separate the solid residue.
Evaporate the solvent using a rotary evaporator or by gentle heating in a water bath.
Store the resulting oil in a sealed, dark container.
4. Storage: Keep the oil in a cool, dark place.
Shelf life can be up to 6 months if stored properly

C. Cold Cream

1. Prepare Oil Phase: Combine almond oil, beeswax, emulsifying wax, and stearic acid in a beaker.
Heat this mixture to 70–75°C in a water bath until everything melts and forms a uniform solution.
2. Prepare Aqueous Phase: In a separate beaker, mix distilled water and glycerin, and heat to 70–75°C.Add hibiscus, neem, and Gorakh Limli extracts to the warm water and stir well.
3. Emulsification: Slowly add the aqueous phase to the oil phase while continuously stirring with a hand blender or stirrer.
Mix until a smooth, creamy texture forms. Allow the mixture to cool down to below 40°C.
4. Add Final Ingredients: Add preservative and fragrance (if using) and mix thoroughly.
5. Packaging: Pour the finished cream into clean, sterilized containers

FIG NO 9.1CHEMICAL FOR COLD CREAM


FIG NO 9.2 NEEM EXTRACT (FIRTER)

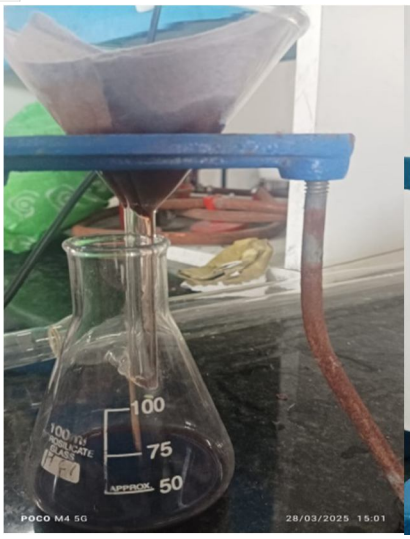

FIG NO 9.3.HIBISCUS ROSA

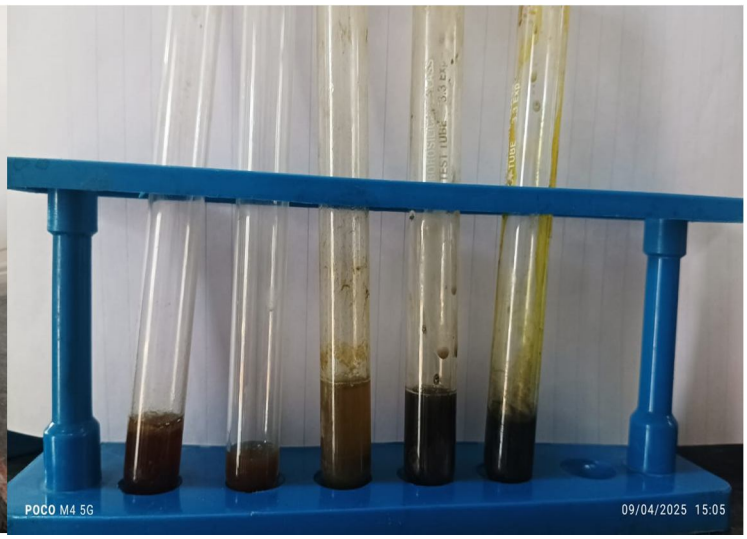

FIG NO 9.4 CHEMICAL TEST FOR NEEM SINENSIS EXTRACT(FIRTER)

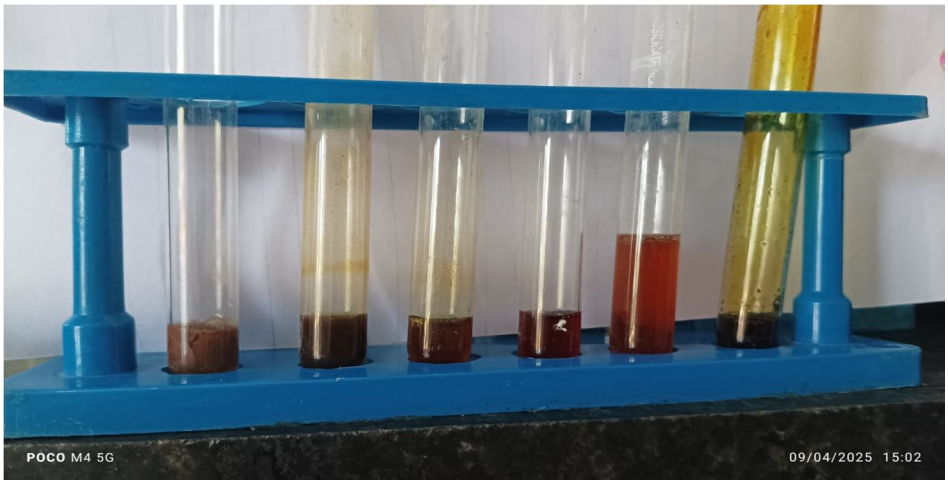

FIG NO 9.5 CHEMICAL TEST FOR HIBISCUS ROSA SINENSIS

FIG NO 9.6. ADANSONIA DIGITATA SEED

FIG NO 9.7 SOXHLET EXTRACTION ……...ADANSONIA DIGITATA SEED EXTRACT

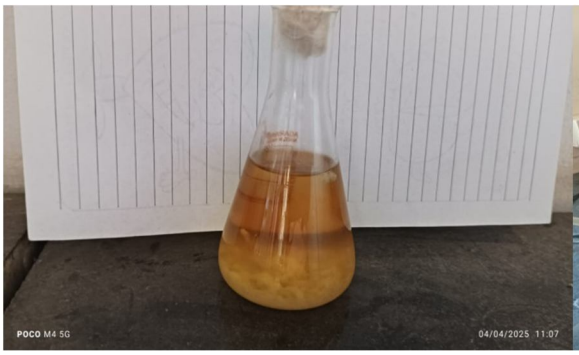

FIG NO 9.8 ADANSONIA DIGITATA SEED OIL

FIG NO 9.9 ADANSONIA DIGITATA OIL(MEMBRANE FILTRATION)

FIG NO 9.10 FORMULATION FOR COLD CREAM

X. EVALUATION TEST

Evaluation Testing of Halber Product in Cold Cream Formulation
Formulation Testing Parameters

A. Organoleptic Evaluation

Appearance
Color
Odor **:** pleasant
Texture **:** smooth
Smoothness on skin application

B. PH Testing

FIG NO.10.2. DIGITAL PH METAL

pH should be in the range of 5.0–6.5 for skin compatibility
Measured using pH meter

C. Viscosity

Measured using Brookfield Viscometer :

The viscosity was found to be adequate for a semi-solid topical formulation, ensuring good consistency and ease of spread on the skin.

Ensures spreadability and stability :

No signs of phase separation or runniness, indicating physical stability of the emulsion over time.

D. Spreadability

Determines ease of application :

(Slip and drag test)

E. Stability Studies

Temperature (25°C, 40°C, 4°C)

Humidity (75% RH)

Observed for

30 days for separation : No phase separation

60 days for separation :No phase separation

90 days for separation **:**No phase separation

color change : No significant color change

microbial growth : No microbial growth,

F. Microbial Load Testing

Total bacterial and fungal count

Must meet cosmetic safety standards (ISO 17516:2014)

Passed; no harmful microbial contamination detected.

G. Irritation/Skin Sensitivity Testing (In vivo)

Patch test on volunteers (dermatologically tested)

Ethical clearance needed

Fig No.10.4. Irritation Sensitivity Test In Hand

H. Efficacy Testing (Optional)

Moisturization index (Corneometer)

Reduction in dryness, redness over 2-4 weeks

Increased skin hydration.

Reduction in dryness and redness.

Improvement in overall skin texture and brightness.

XI. RESULT

Hydration and Moisture Retention from almond oil and cold cream base Soothing & Healing for acne-prone or inflamed skin due to Neem and Gorakh Limli

Brightening & Anti-aging effects from Hibiscus (natural AHA) Daily moisturizing cream for face and bodyNight cream for dry or combination skin Herbal cold cream for winter dryness

Neem Extract: Antibacterial, antifungal, helps with acne and skin inflammation.

Hibiscus Extract: Rich in AHAs and antioxidants, promotes exfoliation and improves skin tone and texture.

Gorakh Limli Oil (Clerodendrum phlomidis): Traditionally used for its soothing and anti-inflammatory properties, good for sensitive or inflamed skin.

Almond Oil: Moisturizing, vitamin E-rich, helps improve complexion and reduces dryness.

Cold Cream Base: Provides the emollient and hydrating structure; typically a mix of water, oil, and waxes (like beeswax or stearic acid).

XII. CONCLUSION

The formulated cold cream incorporating Neem extract, Hibiscus extract, Gorakh Limli (Clerodendrum phlomidis) oil, and Almond oil demonstrates a synergistic effect in providing both therapeutic and cosmetic benefits. Neem and Gorakh Limli contribute potent antibacterial and anti-inflammatory actions, aiding in skin healing and acne prevention. Hibiscus offers natural AHAs, promoting gentle exfoliation and enhanced skin brightness. Almond oil serves as a rich emollient, improving skin softness and delivering vitamin E, a natural antioxidant. When blended in a traditional cold cream base, this formulation shows promise for hydrating, soothing, and revitalizing the skin, especially suitable for dry to combination skin types.

The combination of Neem extract, Hibiscus extract, Gorakh Limli oil, Almond oil, and a cold cream base results in a highly effective herbal cold cream with multiple skin benefits. This formulation offers moisturizing, antibacterial, anti-inflammatory, exfoliating, and skin-soothing properties, making it ideal for dry, sensitive, or acne-prone skin. With regular use, it can help improve skin texture, reduce inflammation, and provide deep hydration, especially during colder months. Proper formulation and preservation ensure product stability and efficacy

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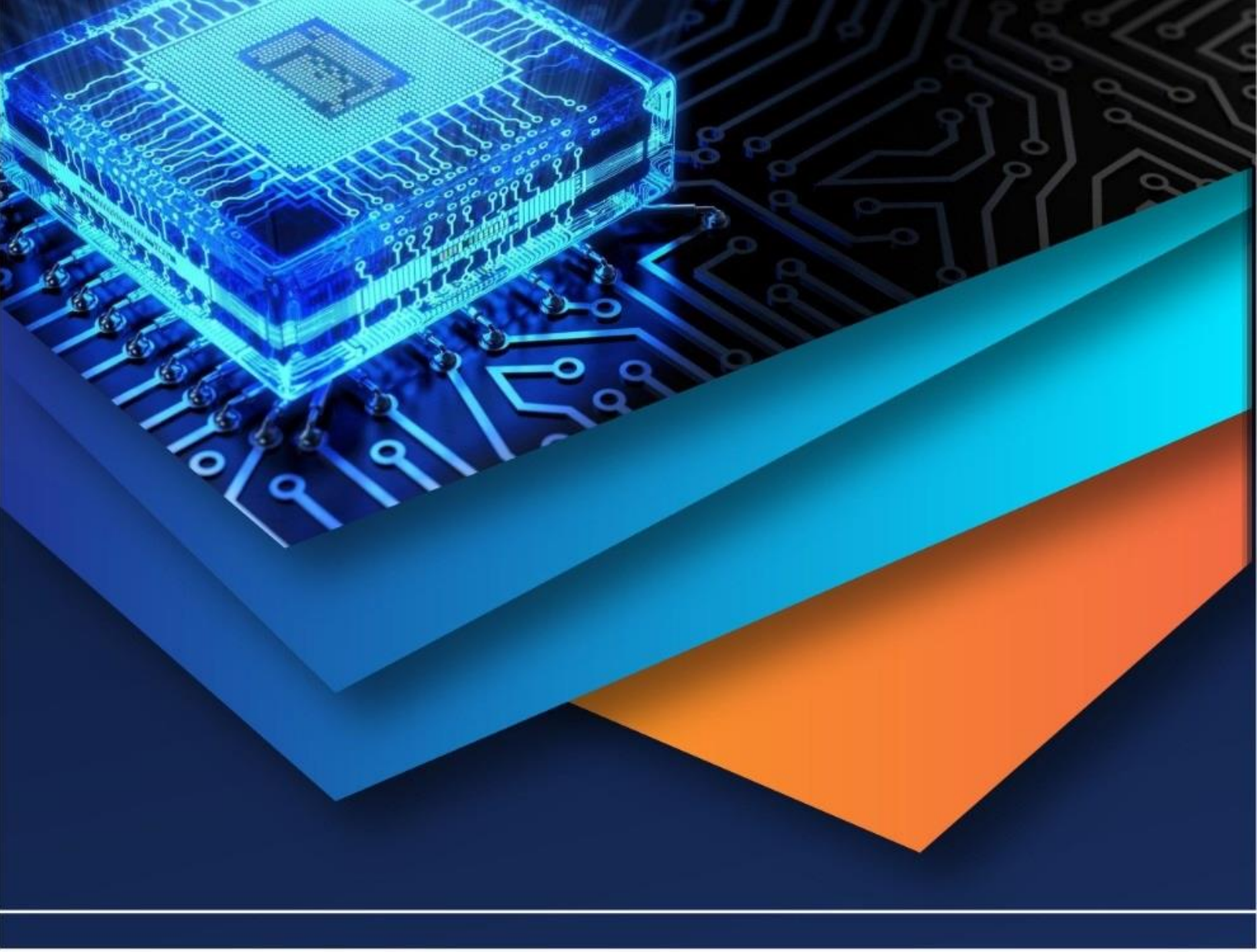

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