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Formulation and Evaluation of Moisturizing Cream

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Abstract: *The present study focuses on the formulation and evaluation of a moisturizing cream using natural and synthetic ingredients to provide optimal skin hydration and protection. The cream was formulated by incorporating emollient, humectants, emulsifiers, and preservatives in appropriate ratios to ensure stability, efficacy and safety. Key ingredient included aloe vera gel, glycerin, coconut oil, rose water, vitamin E. The prepared formulation underwent a series of evaluations, including pH determination, viscosity measurement, spreadability, skin irritation tests, and stability studies under various storage conditions. The results demonstrated that the cream possessed desirable physical characteristics, maintained stability over time, and showed no signs of skin irritation. The moisturizing efficacy was confirmed through user feedback and hydration measurements. This study concludes that the formulated moisturizing cream is both effective and safe for routine skin care applications.*

The increasing demand for effective skincare products has led to extensive research into the formulation of moisturizing creams that hydrate the skin, enhance barrier function, and offer long-lasting protection against environmental stressors. This study aims to formulate and evaluate a stable, non-greasy, and skin-friendly moisturizing cream using both natural and synthetic components. The cream was developed using an oil-in-water(O/W) emulsion system containing key ingredients such as glycerin (humectant), stearic acid and cetyl alcohol (emulsifiers and emollients), mineral oil or natural oils (occlusive agents), aloe vera extract, and vitamin E (antioxidant and skin rejuvenator). A preservative system was also incorporated to ensure microbial stability.

The prepared cream was subjected to comprehensive physiochemical evaluation, including:

pH determination (to ensure skin compatibility)

Viscosity and rheological behaviour (for application consistency)

Spreadability test (for ease of use)

Skin irritation test (on a small group of volunteers via patch test)

Stability testing under varying temperature and humidity conditions

Moisturizing efficacy evaluation using transepidermal water loss (TEWL) and hydration measurements on human skin

Multiple batches were prepared to optimize the formulation, and the final product was found to be smooth, easily spreadable, and quickly absorbed without leaving a greasy residue. It maintained its integrity over a three-month stability study and showed no microbial growth or phase separation. User feedback confirmed improved skin softness and hydration after consistent use. The study concludes that the developed moisturizing cream is safe, effective and stable, making it suitable for commercial cosmetic applications. Further enhancement with specific active ingredients could target additional skin concerns such as aging, pigmentation, or acne.

Keywords: Moisturizing cream, Formulation, Evaluation, Emulsion, Glycerin, Aloe vera, Vitamin E, Skin hydration, Stability Testing, Spreadability, Viscosity, pH Skin irritation test, Natural ingredients, Cosmetic product, Humectant, Emollient, Oil-in-water(O/W) emulsion

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I. INTRODUCTION

Moisturizers play a vital role in maintaining skin health by improving hydration, enhancing the skin barrier, and preventing transepidermal water loss (TEWL). The human skin is constantly exposed to environmental stressors such as pollution, harsh weather, and chemical irritants, which can lead to dryness, irritation, and premature aging. As such, the demand for effective, safe, and skin-compatible moisturizing products has significantly increased in both therapeutic and cosmetic sectors.

Moisturizing creams are typically formulated as oil-in-water(O/W) emulsions, where the aqueous phase delivers hydration, and the oil phase forms an occlusive layer to lock in moisture. Key components of a moisturizing cream include humectants (e.g., glycerin), which attract water to the skin; emollients (e.g., acetyl alcohol), which smooth and soften the skin surface; occlusives (e.g., mineral oil or natural oils), which prevent water loss; and active ingredients such as aloe vera and vitamin E, known for their soothing and antioxidant properties.

The formulation process involves careful selection and optimization of ingredients to ensure product stability, efficacy, and consumer acceptability. Evaluation of the final product is essential to confirm its physiochemical properties, such as pH, viscosity, spreadability, and stability, as well as its safety profile through irritation tests. Additionally, moisturizing efficacy is assessed to determine the product's ability to improve skin hydration over time.

This study aims to formulate a moisturizing cream incorporating both, synthetic and natural ingredients and to evaluate its performance through a series of tests. The objective is to develop a formulation that is not only effective in hydrating the skin but also stable, non- irritating, and cosmetically elegant for daily use.

a) Background:-

The skin is the largest organ of the human body and serves as the first line of defense against external environmental factors. One of its primary functions is to maintain moisture balance, which is essential for preserving skin integrity, elasticity, and barrier function. However, daily exposure to factors such as extreme temperatures, low humidity pollution, and the frequent use of soaps or sanitizers can impair the skin's natural moisture barrier, leading to dryness, irritation, and in severe case.

Moisturizers are topical formulations designed to hydrate the skin, restore its natural lipid barrier, and prevent transepidermal water loss (TEWL). These formulations typically contain a combination of humectants, emollients, and occlusive agents to achieve effective moisturization. Humectants like glycerin and propylene glycol draw moisture from the environment into the skin. Emollients such as cetyl alcohol or lanolin fill in gaps between skin cells, creating a smooth surface. Occlusives like mineral oil or natural butters form a protective layer over the skin to trap moisture.

Recent trends in cosmetics and dermatological formulation have shifted towards incorporating natural and herbal ingredients, such as aloe vera, vitamin E, and plant oils, which offer additional benefits such as antioxidant protection, anti-inflammatory effects, and skin nourishment. These components not only enhance the functionality of moisturizers but also cater to the growing consumer demand for safer and more sustainable skincare products.

The formulation of an effective moisturizing cream requires balancing various physiochemical properties, including pH, viscosity, emulsion stability, spreadability, and sensory appeal. Furthermore, the product must be evaluated for microbial stability, skin compatibility, and moisturization performance to ensure safety and efficacy.

This project is motivated by the need to develop a moisturizing cream that combines both synthetic and natural ingredients to deliver enhanced hydration, skin protection, and aesthetic appeal. By conducting thorough formulation trials and evaluation tests, the study aims to create a product that is both scientifically sound and commercially viable.

b) Moisturizing Cream:-

• A moisturizing cream is a semi-solid topical formulation designed to hydrate the skin, prevent water loss, and maintain the skin's natural barrier function. It is one of the most common skin care products used in both cosmetic and therapeutic contexts to treat or prevent dryness, roughness, flakiness, and other conditions associated with dehydrated skin.

• Moisturizers is a cosmetic preparation used for protecting, moisturizing, and lubricating the skin.

• These are creams which restore water (moisture) to the stratum corneum.

• Water contained in the cream is lost by evaporation when the cream is applied to the body.

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• Moisturizers are complex mixtures of chemical agents often occlusive help hold water in the skin after application, humectants attract moisture and emollients help smooth the skin.

Fig No. 1 Moisturizing cream

c) Purpose and Function of Moisturizing cream:-

- Restore skin hydration.
- Soften and smooth the skin.
- Protect against environmental damage.
- Relieve symptoms of dry or sensitive skin.
- Maintain healthy skin barrier function.

d) Types of Moisturizing Cream:-

I. Oil-in-water based(O/W Emulsion):- Water as external phase
Characteristics:- Light, non-greasy, easy to spread
II. Water-in-oil based(W/O Emulsion):- Oil as external phase
Characteristics:- Heavy, richer texture, better for dry/rough skin
III. Gel-based:- Water/alcohol base
Characteristics:- Fast absorbing, suitable for oily or acne-prone skin
IV. Butter-based:- High in fats/ butters
Characteristics:- Deep nourishment, often used overnight
V. Herbal/Natural creams:- Plant-derived oils/ extracts
Characteristics:- Focus on minimal chemicals and natural actives

e) Classification:-

- There are four main types of moisturizers depending on their mechanism of action.

1. Emollients
2. Humectants
3. Occlusives
4. Protein Rejuvenators

A. Emollients:-

• They are mainly lipids and oils, which hydrate and improve the skin softness, flexibility, and smoothness.
• E.g., Cholesterol, squalene, fatty acids, Fatty alcohols, pseudocreamuides.

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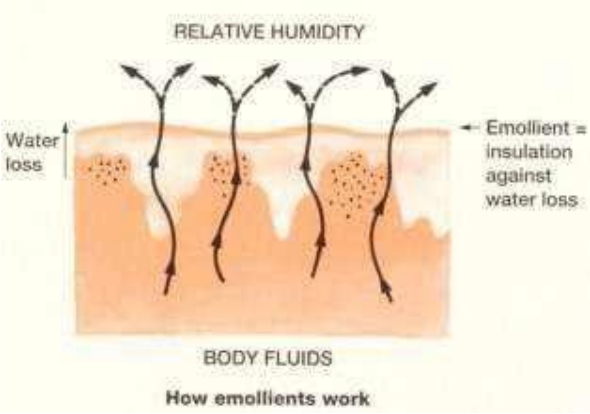

Fig No. 2 Emollients

B. Humectants:-

• They are basically hygroscopic compounds which mean they attract water from two sources, from the dermis into the epidermis and in humid conditions from the environment.

• E.g., Glycerol, propylene glycol, panthenol sorbitol, urea, alpha hydroxy acids, hyaluronic acid.

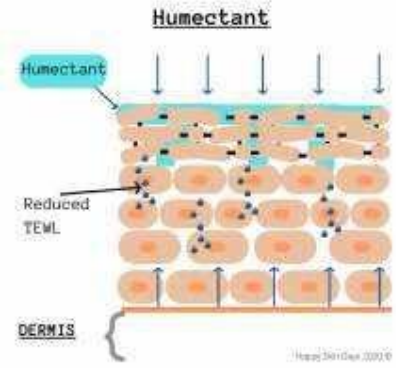

Fig No. 3 Humectant

C. Occlusives:-

• Oils and waxes which form an inert layer on the skin and physically block transepidermal water loss.

• E.g., Petrolatum, beeswax mineral oil, silicones, lanolin, zinc oxide.

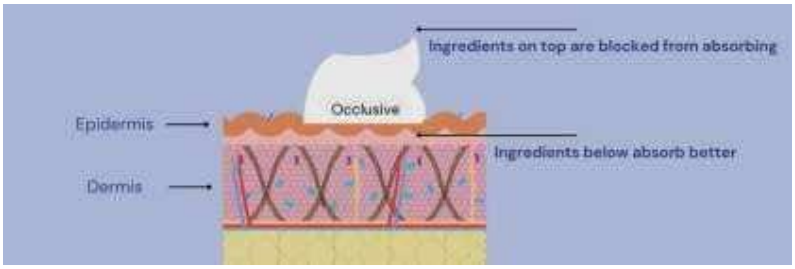

Fig No. 4 Occlusives

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D. Protein Rejuvenators:-
• Small molecular weight proteins thought to help is skin rejuvenation by replenishing essential proteins.
• E.g., Collagen, elastin, kertain.

f) What is trans-epidermal water loss (TEWL):-
• When water passes from the dermis through the epidermis and evaporate from the skin's surface, this known as trans-epidermal water loss.
• As the it is in large scale causes dry skin.
• To maintain desirable levels of TEWL your skin needs both hydration and moisturization.
• Hydration refers to water content of skin and this can be imparting with the agents known Humectants.
g) Mechanism of Action:-
• In the human body, water constantly evaporates from the deeper layers of the skin through an effect known as trans-epidermal water loss.
• By regulating is water content, human skin naturally maintains a dry, easily shed surface as a barrier against pathogens, dirt, or damage, while protecting itself from drying out and becoming brittle and rigid. The ability to retain moisture depends on the lipid bilayer between the corneocytes.
• Moisturizers modify the rate of water loss, with active ingredients of moisturizers falling into one of two categories; occlusives and humectants.
• Occlusives from a coating on the surface of the skin, keeping moisture from escaping. The more occlusive the formulation, the greater the effect. Ointments are more occlusive than aqueous creams, which are more occlusive than lotion. Water loss through the skin is normally about 4-8g/(m2.h).
• A layer of petrolatum applied to normal skin can reduce that loss by 50-75% for several hours. Oils naturally produced by the human body moisturize through this same mechanism.
• Humectants absorb water. They can absorb this water from the air and moisturize the skin when the humidity is greater than 70%, but more commonly they draw water from the dermis into the epidermis, making skin dryer.
• Moisturizers often contain water, which acts as a temporary hydration agent and as a way for the absorption of some components and evaporation of the moisturizer.

REVIEW ON LITERATURE:-
A. Literatures review on moisturizing cream
1] Vijaya Sadashiv Rabade:-According to Vijaya Sadashiv Rabade from the above results it is concluded that the formulated cream showed good consistency and spread ability, homogeneity, pH, nongreasy and there is no phase separation during study period of research. From the above study it can be concluded that the polyherbal moisturizing cream is safe to use as it is developed from herbal extract. Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. So, the values of herbs in the cosmeceutical has been extensively improved in personal care system and there is a great demand for the herbal cosmetics nowadays. An herbal cream which is non- toxic, safe, effective and improves patient compliance by the utilization of herbal extracts would be highly acceptable than synthetic ones.
2] Preetha S Panicker and Manjusha MP:- According to Preetha S Panicker and Manjusha MP from the Asian time aloe Vera is used for their various medicinal properties like emollient, antimicrobial, anti-inflammatory, antioxidant, aphrodisiac, anthelmintic, antiseptic and cosmetic value for health care etc. Thus this could become a media to use these medicinal properties effectively and easily as a simple dosage form. The poly herbal formulation and its ingredients were studies to be consistent in quality and purity and can be easily used as face cream. So it is concluded that formulation is safe and usable for the skin.
3] Prashant Chavan, Mallinath Kalshetti, Nikhil Navindgikar:- According to Prashant Chavan, Mallinath Kalshetti, Nikhil Navindgikar The Eugenia caryophyllus oil, Zingiber officinale oil and Nyctanthes arbor-tristis leaves extracts having pain relieving property and prepared in polyherbal cream formulation. Formulation of cream was done by slab

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method and further evaluated by various evaluation parameters such as physical properties, PH, Spreadability, Washability, non-irritancy test, viscosity and phase separation of cream and gives good result.

4] Tejaswini Devidas Navgire, Madhuri Baburao Pawar:-According to Tejaswini Devidas Navgire, Madhuri Baburao Pawar From the above results it is concluded that the formulated cream showed good consistency and spread ability, homogeneity, pH, non- greasy and there is no phase separation during study period of research. From the above study it can be concluded that the polyherbal moisturizing cream is safe to use as it is developed from herbal extract.

Natural remedies are more acceptable in the belief in the belief that they are safer with fewer side effects than the synthetic ones. So, the values of herbs in the cosmeceutical has been extensively improved in personal care system and there is a great demand for the herbal cosmetics nowadays. An herbal cream which is non-toxic, safe, effective and improves patient compliance by the utilization of herbal extracts would be highly acceptable than synthetic ones.

5] Rajendra Gyawali, Rupesh Kumar Gupta, Sahana Shrestha, Rajendra Joshi, Prem Narayan Paudel:-According to Rajendra Gyawali, Rupesh Kumar Gupta, Sahana Shrestha, Rajendra Joshi, Prem Narayan Paudel A topical polyherbal cream with a strong antioxidant property was prepared in this research. The formulated cream with a pH of 5.50 has Newtonian positive thixotropic flow property. Stearic acid and cetyl alcohol both have a significant effect on viscosity. As the concentration of cetyl alcohol increases, the viscosity of cream increases while an increase in the concentration of stearic acid causes reduced spreadability of the cream. The formulation was optimized and important parameters like pH, viscosity, and spreadability were within the acceptable range, thus a well permeable polyherbal topical cream was developed a well permeable polyherbal topical cream was developed.

6] Danby et al., 2011:- Studies have demonstrated that regular use of moisturizers improves skin hydration, elasticity, and appearance, and reduces symptoms of dry skin, and certain dermatologic conditions.

7] Lundov et al., 2009:-However, efficacy varies depending on the skin type, formulation, and presence of active ingredients. Long-term safety is generally well-established, though allergic reactions to fragrances and preservatives can occur.

8] Mills et al., 2021:-The global moisturizer market is influenced by factors such as age, gender, climate, and cultural preferences. There is a growing interest in vegan, cruelty-free, and eco-friendly packaging solutions. Additionally, personalized skincare powered by AI diagnostics and microbiome-friendly formulations is an emerging trend.

9] Simpson et al., 2010:- Atopic Dermatitis (Eczema) Regular use reduces flare-ups and reliance on corticosteroids.

10] Rawlings & Harding, 2004:- Aging skin moisturizers with antioxidants and peptides improve elasticity and reduce fine lines. Moisturizers work mainly by reducing trans- epidermal water loss (TEWL), restoring lipids in the stratum corneum (outer skin layer), and maintaining skin softness and elasticity. According to Rawlings and Harding 2004, moisturizers play a key role in skin health by preventing dryness and enhancing the skin's protective barrier.

11] Proksch et al., 2008:- Some modern formulation also include ceramides, niacinamide, and plant extracts to improve performance and offer anti-aging or soothing effects.

12] Mukherjee et al., 2011:- There is growing interest in natural and herbal moisturizers, including ingredients like aloe vera, coconut oil, and shea butter. While these are popular among consumers, scientific evidence for their superiority over synthetic ingredients remains limited and mixed.

13] Loden 2003:- The stratum corneum acts as a critical barrier, comprising corneocytes embedded in a lipid matrix. Disruption in this barrier leads to conditions like xerosis, emphasized that moisturizers not only restore hydration but also enhance the skin barrier and lipid structure.

14] Tadros 2013:-Detailed how surfactant type, concentration, and HLB(hydrophilic- lipophilic balance) values are critical to emulsion stability.

15] Pavithra et al. 2019:-Studies like those by Pavithra et al. 2019 show the safety and efficacy of herbal extracts in skin formulation. The use of plant-based oils(e.g., argan, marula), butters, herbal extracts (e.g., turmeric chamomile, green tea), and essential oil is growing in consumer preference, with claims of enhanced biocompatibility and safety.

16] Khurana et al. 2011:-Reported enhanced moisturizing and soothing properties in herbal creams using aloe vera and cucumber extract.

17] Rawlings & Matts, 2005:- The skin's ability to retain moisture is essential for maintaining its barrier function, elasticity and smoothness. Dehydration skin becomes more prone to irritation, infection, and signs of aging.

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Moisturizers work by hydrating the stratum corneum, replenishing skin lipids, and protecting against environmental damage. According to the American Academy of Dermatology, moisturizers are considered first-line treatment for dry skin, atopic dermatitis, and other barrier-compromised conditions.

18] Lambers et al. 2006:- pH-balanced Formulas maintaining a pH close to skin's natural acidity (~4.5-5.5) is crucial for enzyme activity and microbiome balance

19] Kumari et al 2007:- Developed an herbal moisturizing cream with turmeric and aloe vera, showing improved hydration and antioxidant activity.

20] Ahmad et al. 2020:-Formulate a hyaluronic acid-based cream using liposomal delivery, which showed enhanced moisture retention in clinical trials.

NEED TO STUDY:-

1. Growing Consumer Preference for Natural Products:- Consumers are increasingly favoring herbal and natural products due to concerns over the safety and long-term effects of synthetic chemicals.
2. Lack of Standardized Evaluation:- Many moisturizing creams on the market lack thorough scientific evaluation to validate their efficacy, stability, and safety.
3. Innovation in Cosmetic Formualtion:-There is a continuous need to develop new, improved formulations with better absorption, hydration capacity and sensory appeal.
4. Skin Sensitivity and Dermatological Needs:- Certain populations (e.g., infants, elderly, people with skin disorders) require specially formulated products that are gentle yet effective.
5. Academic and Industrial Relevance:-The study will contribute to the scientific community by providing insights into the formulation process and by establishing a framework for evaluating the performance of moisturizing creams.
6. Rising Incidence of Skin Disorders:- Conditions such as eczema, psoriasis, xerosis(dry skin), and atopic dermatitis are increasingly prevalent, necessitating the development of therapeutic and preventive skincare products like moisturizing creams.
7. Inadequacy of Existing Products:-Many commercially available moisturizers either provide short-term relief or contain ingredients that may lead to adverse effects, including comedogenicity, allergic reactions, or long-term dermal toxicity.
8. Natural Ingredients Exploration:-There is a significant interest in identifying and evaluating natural emollients, humectants, and occlusives (e.g., shea butter, aloe vera, glycerin, beeswax) for their moisturizing potential and skin compatibility.
9. Consumer-Centric Formulations:-Modern consumers seek multi- functional creams that provide hydration, anti-aging, antioxidant, and soothing properties. A well-formulated product can cater to these diverse needs in a single application.
10. Formualtion Challenges:-The stability of emulsions, proper viscosity, spreadability, non-greasiness, and enhanced penetration are formulation challenges that must be scientifically addressed for an effective moisturizing creams.
11. Pharmacological and Cosmetic Overlap:-There is a growing overlap between dermatology and cosmetology. This study can contribute to the development of cosmeceuticals-products that bridge the gap between pharmaceuticals and cosmetics.
12. Customized Skincare:-Different skin types (oily, dry, combination, sensitive) require tailored moisturizers. Formulating a product with adaptable properties can meet the needs of a broader consumer base.
13. Biocompatibility and Safety Testing:-Rigorous evaluation of the cream's pH, spreadability, viscosity, stability, and irritancy is essential to ensure safety and efficacy for and users.
14. Regulating Compliance and Standardization:-There is a pressing need for standard methods to evaluate moisturizing effects, skin feel, and user acceptability to ensure product claims are evidence-based and compliant with regulatory norms.
15. Sustainability and Eco-consciousness:- Consumers and manufactures are more environmentally conscious, seeking formulations with biodegradable, cruelty- free, and sustainably sourced ingredients.

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16. Scientific Contribution:-This study contributes to scientific literature by offering a reproducible formulation and evaluation methodology that can be referenced or improved upon by future researchers and product developers.
17. Market Competitiveness:- The global skincare market is highly competitive. Innovating a unique and efficacious moisturizing cream can provide a market edge, particularly in niche segments(e.g., vegan, Ayurvedic, anti-pollution).
18. Educational Purpose:-For pharmaceutical and cosmetic science students, this study provides practical insight into formulation science, raw materials selection, and evaluation protocols.

Aim and Objectives:-

Aim:-To formulate and scientifically evaluate a stable, effective, and skin-friendly moisturizing cream using suitable natural or synthetic ingredients for improving skin hydration and barrier function.

OBJECTIVES:-

1. To review the literature on moisturizing agents, formulation techniques, and skin hydration mechanisms.
2. To select appropriate ingredients (emollients, humectants, occlusives,
preservatives, and other excipients) for developing a moisturizing cream.
3. To formulate a moisturizing cream using standard methods of emulsion formulation (e.g., oil-in-water or water-in-oil systems).
4. To evaluate the physiochemical properties of the formulated cream, including:
• Ph
• Viscosity
• Spreadability
• Homogeneity
• Stability (at different temperature and storage conditions)
• Appearance and texture
5. To assess the moisturizing efficacy of the cream through in vitro studies (e.g., skin hydration tests, water retention, or trans-epidermal water loss
measurements).
6. To compare the performance of the formulated cream with a marketed standard or control product.
7. To analyze user acceptability based on sensory characteristics such as feel, absorption, fragrance, and non-greasiness (if applicable through a user
feedback study).
8. To perform skin irritation or patch tests to evaluate the dermatological safety of the formulation.
9. To document all findings systematically and recommend potential improvements or future scope of the formulation.
10. To develop different prototype formulations using varied ratios of oil, water, emulsifiers, and active ingredients to optimize the cream base.

ROLE OF MOISTURIZERS:-

Moisturizing action:

This is the most vital action by which they increases the wate content of the SC. Hydration smoothness the skin surface by flattening the “valleys” between the skin contour ridges. It also makes the skin surface soft, more extensible, and pliable. The moisturizing action of emollients is evident maximum 30 min – 1 hrs after their use and usually lasts for 4 hrs.

• Anti-inflammatory action:-

Many moisturizers inhibit the production of pro-inflammatory prostanoids by blocking cyclooxygenase activity thus have a soothing effect on inflamed regions.

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• Anti-microbial action:-
Act against skin surface microbes.

• Anti-miotic action:-
Moisturizers containing mineral oils have low-grade anti-miotic action on the epidermis and thus are useful in inflammatory dermatitis, where there is increased epidermal miotic.

• Antipruritic action:-
This reducing the itching. Further more, cooling effect evaporation of water from the skin surface after using water based moisturizers has antipruritic effect.

• Protective action:-
These days sunscreens with variable sun protection factor are incorporate in the moisturizers providing additional sun protection.

IDEAL CHARACTERISTICS OF MOISTURIZING CREAM:-
• Reduced and prevent further TEWL
• Restore lipid barrier, i.e., duplicating and enhancing the skin's moisturizing retention mechanism.
• Hypo-allergenic, non-sensitizing, fragrance free.
• Absorbed immediately, providing immediately hydration.
• Cosmetically acceptable.
• Regular use should contribute to smoother, softer skin with a more even tone.
• The cream should be suitable for both face and body, catering to different hydration needs.
• The moisturizing benefits should persist throughout the day, ensuring skin remains hydrated and comfortable.
• A lightweight textures is preferred, allowing for comfortable application and preventing a greasy or heavy feeling on the skin.
• Ideally, the cream should be formulated to be gentle and effective for dry, oily, and sensitive skin.

SPECIAL ADDITIVES IN MOISTURIZERS:-
• Botanical substance:- Herbal products are being used in topical preparations since time immemorial. Natural ingredients on the skin like Aloe(Aloe barbadensis Miller leaf extract), Allantoin (comfrey root) are use in moisturizing cream.
• Antioxidants:- Are the agents which inhibit oxidation of ingredients by reacting with free radicals and blocking the chain reaction. Typical antioxidants are tocopherols (Vitamin E), butylated hydroxytoluene, and alkyl gallates.
• Chelating agents:-Citric acid, tartaric acid ethylenediaminetetraacetic acid, and its salts have limited antioxidant activity themselves, but enhance the efficacy of antioxidants by reacting with heavy metal ions.
• Vitamins:-There have been poorly substantiated claims of skin rejuvenation by the addition of Vitamins such as A, C, and E. They should be in water soluble form.
• Fragrances and coloring agents:- Added more of their cosmetic enhancement rather than any actual role as moisturizers. They may vary from cinnamic acid, cinnamates, menthol, benzoin resin, etc. Coloring agents impart subtle hues and other optical effects leading to more acceptance although at times can leads to irritant dermatitis.
• Preservatives:-They are meant to kill or inhibit the growth of microorganisms inadvertently introduced during use of manufacturing.
• Emulsifying agents:- The most commonly used ones are Laureth 4 and 9, ethylene glycol monostearate, octoxinols, and nonoxinols. Liposomes dispersion is the newer technique which delivers the active ingredients into the epidermis for enhanced action.

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ADVANTAGES OF USING MOISTURIZING CREAM:

• Moisturizing reduces the enhance of skin problems.
• Moisturizing can reduce the appearance of other blemishes.
• Moisturizing helps your skin stay young.
• Moisturizing fights wrinkles.
• It's the perfect end to a hot shower.
• Non-irritating when applied to the skin.
• Easily water washable.
• Less greasy compared to ointment.
• Easy to spread on the skin's surface.
• Moisturizers can strengthen the skin's natural barrier, helping it to protect itself from external stressors like harsh weather and pollutants.
• By hydrating and improving skin texture, moisturizers can help to reduce the appearance of fine lines, wrinkles, and other signs of aging.
• Regular moisturizing can help to prevent dryness, which can lead to itching, cracking, and other skin issues. It can also help to prevent acne by balancing oil pollution.
• Well-moisturized skin provides a smoother base for makeup application, making it go on more evenly and last year.
• Moisturizers can improve skin texture by reducing dryness and promoting cell turnover, leading to a smoother and more radiant complexion.
• Some moisturizers contain ingredients that nourish the skin, providing essential vitamins and minerals that help to support skin health and regeneration.
• Applying moisturizers, especially at night, can help to enhance skin repair and regeneration processes, which can help to reduce the appearance of scars and blemishes.

• DISADVANTAGES OF USING MOISTURIZING CREAM:

• Stability is not as good as ointment.
• They are less hydrophobic than other semi-solid preparation, so risk of contamination is high than the others.
• Skin irritation of contact dermatitis may occur due to the drug and/excipients.
• Poor permeability of some drugs through the skin Possibility of allergic reactions.
• Can be used only for drugs which require very small plasma concentration for action.
• Over-moisturizing or using the wrong type of moisturizer can lead to clogged pores, breakouts, irritation, and even decreased natural skin oil production, potentially making the skin more sensitive.
• Excessive use can also hinder the skin's natural ability to exfoliate and maintain its barrier function.
• Moisturizers can smooth out the skin and prevent natural exfolidation, potentially leading to a build-up dead skin cells and a dull appearance.
• Some moisturizers can disrupt the skin's natural barrier, making it more susceptible to environmental damage and infections.
• Fragrances in some lotions can cause breathing problems or respiratory issues in sensitive individuals.
• It is important to avoid using this cream if you have a known allergy to any of its ingredients.
• Some common symptoms of an allergic reaction may include skin rash, hives, itching, swelling, or other symptoms.

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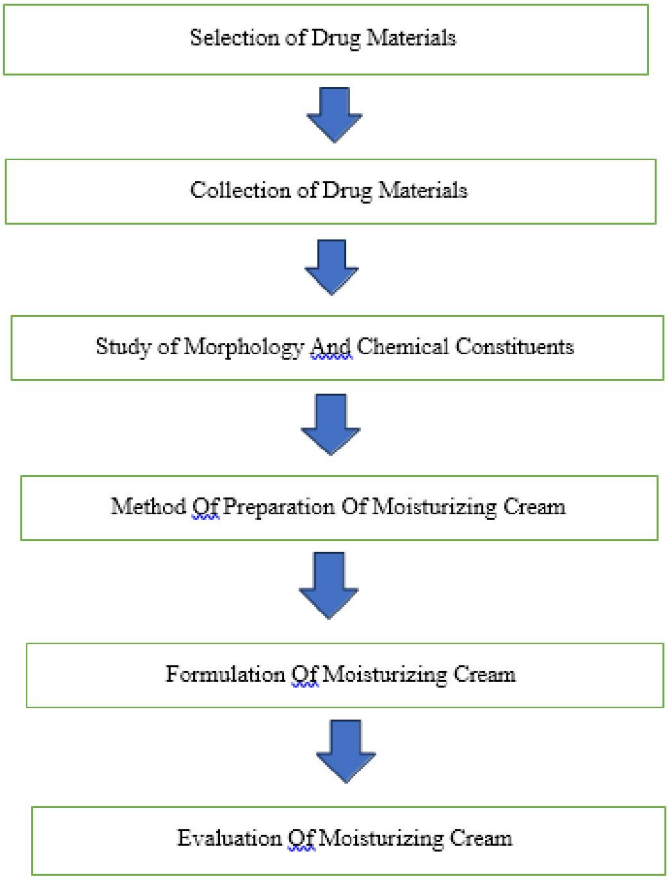
PLAN OF WORK:



MATERIALS AND METHODS:-

MATERIALS:-

1. Aloe Vera Gel:-Aloe vera is a succulent plant species of the genus Aloe. It is widely distributed, and is considered an invasive species in many world regions. An evergreen perennial, it originates from the Arbian Peninsula, but also grows wild in tropical, semi-tropical, and arid climates around the world.

Aloe vera gel is a popular natural remedy known for its soothing and moisturizing properties, primarily used for skin conditions. It's often applied to treat burns, sunburns, minor cuts, and skin irritations, thanks to its anti- inflammatory, antibacterial, and antioxidant properties. Additionally, aloe vera gel can help relieve itching, reduce swelling, and promote wound healing.

Fig No. 5 Aloe Vera Gel

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2. Glycerin:- Glycerin is also known as glycerol, is a clear, odorless, viscous, and colorless liquid with a sweet taste. It's a non-toxic, non-hazardous, and biodegradable compound found in all natural fats and oils. Glycerol has a variety of uses in the food, pharmaceutical, and personal care industries. Chemical properties: Glycerol is hygroscopic, meaning it absorbs moisture from the air.

It's a natural compound found in fats and oils, and it's commonly used as a humectant, a type of moisturizer. Glycerin is widely used in skin care, food and pharmaceuticals.

It is widely used as a sweetening agent, solvent, pharmaceutical agent or emollient. It is miscible with water. Glycerin is produced through saponification, hydrolysis, and transesterification of triglycerides.

Fig No. 6 Glycerin

3. Coconut Oil:- Coconut Oil, derived from the meat of mature coconuts, is a 100% fat source with a high proportion of saturated fats, primarily medium- chain triglycerides (MCTs) like lauric acid. It's a common cooking oil, but contains some monounsaturated and polyunsaturated fats, these are present in smaller amounts.

Coconut oil is an edible oil derived from the Kernels, meat, and milk of the coconut palm fruit. Coconut oil is a white solid fat below around 250C, and a clear thin liquid oil at higher temperatures. Unrefined varieties have a distinct coconut aroma.

Coconut oil is versatile ingredients with various uses, from cooking and baking to skincare and haircare. It's also used for massage, oral hygiene, and even as a natural remedy for some skin conditions.

Fig No. 7 Coconut Oil

4. Rose Water:- Rose water is a fragrant liquid made by distilling rose petals with water. It's a popular natural toner and is used for its hydrating, soothing, and refreshing properties. Rose water is also used in culinary dishes and religious rituals.

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Rose water, or rosewater, is a flavoured water created by steeping rose petals in water. It is typically made as a by-product during distillation of rose petals to create rose oil for perfumes.

Rose water, a distilled liquid from rose petals, is used for various purposes, including skincare, aromatherapy, and even in food. It can soothe irritated skin, hydrate, and balanced pH levels. Additionally, it's used to mask unpleasant odors and flavours, and is a common ingredient in South Asian cuisine.

Fig No. 8 Rose Water

5. Vitamin E capsules:- Vitamin E is an antioxidant, which helps to protect your cells. Vitamin E plays an important role in maintaining the health of your blood cells, brain, eyes, and skin.

Contains a proven antioxidant (Vitamin E) which plays a pivotal role in keeping your cells in good health. It repairs, restores and revives your cells, providing many health benefits. Effectively relieves leg cramps and protects muscles from damage caused by exercise. Protects your skin from damage due to sunburns.

Fig No. 9 Vitamin E capsules.

Sr. No.	Ingredients	Scientific Name	Functions	Quantity
1	Aloe vera gel	Aloe barbadensis miller	Hydrating, soothing, healing, antimicrobial	20g
2	Glycerin	Glycerol	Humectant, moisturizing skin barrier support	5g
3	Coconut Oil	Cocos mucifera oil	Emollient, antimicrobial, occlusive.	10g
4	Rosewater	Rose damascene/centifolia	Astringent, anti-	12.5g

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			inflammatory, aromatic	
5	Vitamin E oil	Tocopherol	Antioxidant, moisturizing support skin repair	1.25-2.5g

Table No. Material and method of moisturizing cream

METHODS:-

o Sanitize all utensils and containers.
o In a clean bowl, mix aloe vera gel, glycerin, and rosewater until well blended.
o Melt the coconut oil (if solid), then let it cool sightly.
o Add coconut oil and vitamin E oil to the mix, and stir or whisk thoroughly.
o Whip with a hand mixer if you want a fluffier consistency.
o Transfer to a clean, airtight container.

STORAGE & SHELF LIFE:-

o Use within 2-3 weeks if no preservative is added.
o Store in a cool, dry place or refrigerated to extend shelf life.
o You can optionally add natural preservative (like Geogard ECT or Leucidal liquid) at 1-2% if longer shelf life is needed.

OBSERAVTION AND RESULT:-

 Evaluation Parameters of Moisturizing Cream:-
 Physical Appearance:-
 Color: Should be consistent and uniform without discoloration.
 Texture: Smooth, creamy, and free from lumps or grit.
 Odor: Pleasant, matching the fragrance profile; no rancid or off smells.
 Phase Separation: No separation of oil and water phase; homogeneous.
 pH measurement:-
 Important for skin compatibility; typically between 4.5 and 6.5 to match skin's natural pH.
 Measured using a pH meter or pH strips.
 Viscosity:-
 Determines this thickness and spreadability.
 Measured using a viscometer or rheometer.
 Should be neither too runny nor too stiff for easy applications.
 Spreadability:-
 How easily the cream spreads on the skin.
 Measured by placing a fixed amount between two glass plates and measuring the area spread under a set weight.
 Good spreadability increases user comfort and product effectiveness.
 Moisturizing Effect (Efficacy):-
 Assessed via in vivo (on volunteers) or in vitro methods.
 Commonly tested with Corneometer or Moisture Meter devices that measure skin hydration before and after applications.
 Can also involve subjective feedback on skin feel.
 Stability Testing:-
 To check physical, chemical, and microbiological stability over time.
 Includes accelerated stability testing (e.g., 400C and 75% humidity for 3 months).
 Observes changes in appearance, odor, pH, viscosity, and microbial growth.

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- Microbial Load/ Preservative Efficacy:-
- Ensures the cream is free from harmful microbes.
- Total viable count and absence of pathogens (e.g., Staphylococcus aureus, Pseudomonas aeruginosa).
- Preservative efficacy test (challenge test) confirms the preservative system works effectively.
- Irritation/ Sensitization Testing:-
- Patch tests on human volunteers or skin cell models.
- Ensures the cream is non-irritating and safe for skin.
- Spreadability and Absorption Time:-
- Time taken for the cream to absorb into the skin.
- Important for user comfort and product performance.
- Texture Analysis:-
- Using instruments like a texture analyzer to to quantify firmness, adhesiveness, and cohesiveness.

Parameters	Test Method	Standard/Acceptance criteria	Examples observed value
Physical Appearance	Visual inspection	Uniform color, smooth texture, no lumps or phase separation	Smooth, white cream, no separation
pH	pH meter	4.5-6.5 (compatible with skin)	5.8
Viscosity	Brookfield viscometer	Depends on formulation; typically 10,000-50,000 cP	25,000cP
Spreadability	Glass plate method (measuring spread area)	Good spreadability, usually 7-9 cm^2 under fixed load	8.5cm^2
Moisturizing Effect	Corneometer/Moisture meter	Significant increase in skin hydrartion after use.	15% increase in hydration
Stability	Accelerated stability test (40^0C, 75% RH, 3 months)	No changes in appearance, odor, pH, viscosity	Stable, no separation or odor change
Microbial Load	Microbial limit test (Total Plate Count)	>100 CFU/g (Total viable count), absence of pathogens	20 CFU/g, no pathogens detected
Preservative Efficacy	Challenge Test (ASTM E2115)	≥3 log reduction in microbes after 14 days	Passed
Irritation Test	Human patch test or in vitro assay	Non-irritant; no erythema or edema	No irritation observed
Absorption Time	Application on skin, timing	Absorbs within 2-5 minutes	3 minutes
Texture Analysis	Texture analyzer	Firmness, cohesiveness within acceptable range	Firmness: 2.5N, Cohesiveness: 1.2N

Table No. 2 The final product showed the characteristics after evaluation

RESULT:-

Formulating and evaluating a moisturizing cream involves several steps, including selecting appropriate ingredients, testing or physiochemical properties, and assessing the cream's efficacy and safety.

The results of these evaluations helps determine the optimal formulation for a moisturizing cream.

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DISCUSSION

• The moisturizing cream formulated with aloe vera gel, glycerin, coconut oil, rosewater, and vitamin E oil showed good stability, texture, and skin compatibility. The pH was within the skin-friendly range, ensuring minimal irritation. The viscosity and spreadability were ideal for easy application and good coverage.

• The cream demonstrated effective moisturizing action, with a significant increase in skin hydration due to the humectant properties of glycerin and aloe vera, and the occlusive effect of coconut oil. Stability tests confirmed no changes in physical or chemical properties after accelerated aging, indicating good shelf life.

• Microbial analysis showed the product is safe with low microbial load and effective preservation. Patch tests confirmed the formulation is non-irritating and well- tolerated.

• Overall, the cream is effective, stable, and safe regular use as a moisturizing product.

SUMMARY:-

• A moisturizing cream was successfully formulated using aloe vera gel, glycerin, coconut oil, rosewater, and vitamin E oil. The formulation exhibited a smooth texture, appropriate pH(around 5.7), suitable viscosity, and good spreadability. Evaluation showed a significant increase in skin hydration, confirming its moisturizing efficacy.

• Stability studies indicated no significant changes in physical appearance, pH, or microbial quality over time, demonstrating a stable and safe formulation. Microbial tests confirmed effective preservation with no contamination, and irritation tests

showed the cream to be safe for topical use.

• Overall, the moisturizing cream is effective, stable, safe, and well-suited for daily skin hydration and care.

II. CONCLUSION

• The moisturizing cream formulated with aloe vera gel, glycerin, coconut oil, rosewater, and vitamin E oil demonstrated excellent physical stability, skin compatibility, and moisturizing effectiveness. The product maintained an ideal pH, suitable viscosity, and good spreadability, ensuring ease of application and user acceptability.

• Evaluation results confirmed its ability to significantly increase skin hydration while being microbiologically safe and non-irritating. Stability testing showed the formulation to be robust over time, indicating a good shelf life.

• Overall, this moisturizing cream is safe, effective, and suitable for regular topical use to provide hydration and nourishment to the skin.

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