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Research Article

Preparation & Evaluation of Polyherbal Cream

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ABSTRACT

This study focuses on the formulation and comprehensive evaluation of a polyherbal cream incorporating natural plant-based ingredient neem leaves, aloe vera gel and turmeric rhizome. These botanicals are widely documented for their potent anti-inflammatory, antibacterial, antioxidant, properties, making them ideal candidates for use in topical therapeutic preparations. The formulation process began with the collection and authentication of plant materials, followed by drying under controlled conditions to preserve active constituents. The dried materials were then finely powdered and subjected to ethanol-based extraction to obtain phytochemically rich extracts containing bioactive. These extracts were then incorporated into a suitable cream base using standard emulsification techniques, ensuring uniform distribution of the active ingredients throughout the formulation. Following the preparation of the polyherbal cream, it underwent rigorous evaluation for key physicochemical parameters, including appearance, consistency, PH, Spreadability, viscosity, and permeability. The ph of the formulation was found to be within the skin friendly range, ensuring compatibility and reducing the risk of irritation. The cream exhibited favorable Spreadability and consistency, suggesting ease of application and good user acceptability. The results collectively highlight the therapeutic potential of herbal-based formulations as a natural and effective alternative to synthetic topical agents. Due to their biocompatibility, lower risk of side effects, and broad-spectrum activity, such polyherbal creams can be considered for further development and commercialization in dermatological and cosmeceutical applications. Future work may focus on stability testing, clinical trials, and large-scale production to validate efficacy and ensure quality control.

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INTRODUCTION

Natural medicine, derived from a wide array of plant components such as leaves, roots, bark, seeds, and flowers, has traditional healthcare systems for centuries. The term "drug" itself originates from the French word *drogue*, meaning "dried herb," reflecting the deep-rooted connection between plants and therapeutic practices. Historically, civilizations across the world from ancient Egypt and China to Greece and India—have relied on botanicals for healing purposes, and many of today's modern pharmaceuticals have evolved from these traditional remedies. Each part of a medicinal plant possesses unique bioactive compounds, including alkaloids, flavonoids, terpenoids, phenolics, glycosides, and tannins, which exhibit a broad spectrum of pharmacological activities. To harness these therapeutic agents effectively, specific extraction techniques such as solvent extraction, maceration, decoction, percolation, and distillation are employed depending on the plant material and desired constituents. Advances in phytochemistry and analytical technologies have further enabled researchers to isolate, identify, and standardize these active compounds, enhancing the consistency and efficacy of herbal products. As awareness about the side effects of synthetic drugs grows, there is a global resurgence in the preference for plant-based medicines, driven by their biocompatibility, holistic benefits, and sustainability. The increasing consumer demand has not only elevated the economic value of medicinal plants in the global market but has also encouraged governments and pharmaceutical industries to invest in research, conservation, and cultivation of valuable botanical species.Medicinal plants continue to be integral to both preventive and curative healthcare, effectively treating ailments such as skin diseases, digestive disorders, respiratory infections, inflammatory conditions, and even chronic illnesses like diabetes and hypertension. Their incorporation into both traditional and modern integrative medicine underscores their versatility and adaptability across cultures and health systems. Scientific investigations and clinical trials are ongoing to validate the safety, efficacy, and mechanisms of action of traditional herbal formulations. The integration of traditional knowledge with modern pharmacological research is bridging the gap between ancient wisdom and contemporary medicine. The formulation and production of polyherbal creams require careful selection of compatible plant species, standardized extraction processes, and stability testing to ensure safety, consistency, and bioavailability of the active compounds. These herbal cosmeceuticals offer a natural and sustainable alternative to synthetic skincare products, addressing concerns such as chemical sensitivity, long-term side effects, and environmental impact. In recent years, herbal cosmeceuticals, particularly polyherbal creams, have emerged as a significant extension of natural medicine, blending traditional botanical knowledge with modern dermatological science. Polyherbal formulations combine multiple plant extracts, each contributing distinct therapeutic properties, to produce synergistic effects that enhance skin health and treat various dermatological conditions. These creams are widely used for their anti-inflammatory, antioxidant, antimicrobial, anti-aging, and wound-healing properties.

Cream:

Cream is a rich, thick dairy product made by flying over a high fat layer. This naturally rises to the top of fresh milk before homogenizing. Known for its mild consistency and slightly sweet taste, it improves the variety of dishes, from hearty dishes to sweet desserts and drinks. There are many

different types of creams, each with a different fat content. This includes heavy cream (or heavy impact cream), light cream, and half and half cream. Heavy cream with about 36-40% fat is ideal for whip and thickening, but light varieties are often used in coffee and light sauces. In addition to traditional milk-based creams, plant-based ingredients such as coconut, almonds, oats and soy also come with lactose-free and vegan options. Sahne is also an important ingredient in skin care because of its moisturizing and soothing properties.

About Human Skin:

Skin, as the body's largest and most multifunctional organ, acts as a primary barrier and supports overall health. It consists of three primary layers, each with specialized roles:

- **Epidermis:** The outermost layer provides a protective, waterproof barrier, shielding the body from pathogens, chemicals, and UV light. This layer contains melanocytes, which produce melanin, contributing to skin color and offering UV protection. Constantly renewing, the epidermis replaces old cells with new ones approximately every 28 days.

- **Dermis:** Situated beneath the epidermis, this layer contains a dense meshwork of collagen and elastin, granting skin its strength and flexibility. The dermis houses blood vessels, hair follicles, sweat and oil glands, and nerve endings, playing a role in temperature regulation, waste removal, and sensory perception. This layer also supports skin repair and healing.

- **Hypodermis (Subcutaneous Layer):** The innermost layer, primarily made of fat cells and connective tissue, provides insulation, energy storage, and shock absorption. It secures the skin to underlying muscles and bones, giving it flexibility and allowing movement.

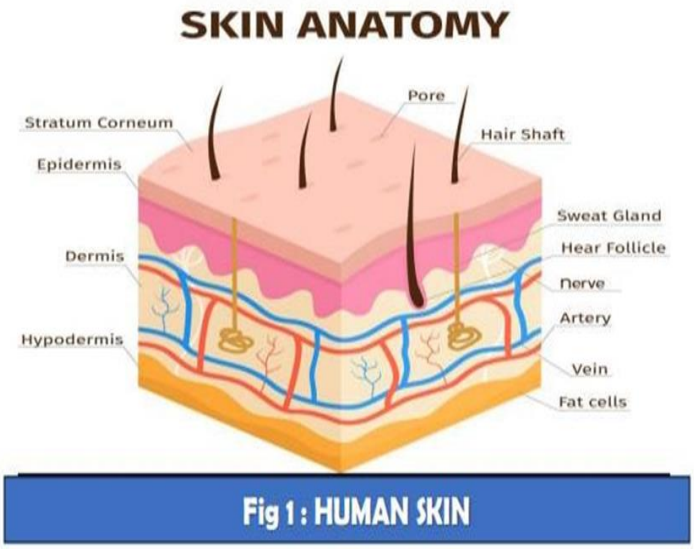


Fig 1 : HUMAN SKIN

Advantages Of Polyherbal Cream

Natural Ingredient

1. **Synergistic Effects**: Combining multiple herbs can enhance therapeutic efficacy, as the active compounds may work together to

produce stronger anti-inflammatory, antibacterial, and healing effects.

2. **Broad Spectrum of Action:** A polyherbal formulation targets various aspects of a condition simultaneously (e.g., infection control, inflammation reduction, tissue regeneration), improving overall effectiveness.

3. **Natural and Safer Alternative:** Compared to synthetic drugs, polyherbal creams typically have fewer side effects and are generally well-tolerated by the skin.

4. **Reduced Resistance Risk:** Using multiple plant-based actives makes it harder for microbes to develop resistance, unlike single-agent synthetic antibiotics.

5. **Holistic Healing:** Herbal combinations often promote skin repair, improve blood circulation, and support immune responses, encouraging faster and more complete healing.

6. **Moisturizing and Soothing Properties:** Ingredients like aloe vera offer hydration and skin-calming effects, making the cream suitable even for sensitive or irritated skin.

7. **Cost-Effective:** Polyherbal creams are often affordable to produce, especially in regions where medicinal plants are locally available.

8. **Cultural Acceptance:** Herbal products are more culturally accepted in many communities, especially where traditional medicine is widely practiced.

Materials & Methodology for The Development of Polyherbal Cream

MATERIALS

Herbal Extracts: Tridax Procumbence Leaves, Turmeric Extract, Neem Leaves Extract, Aloe Vera gel.

Base Oils: Rose Oil

Butters: Shea butter or cocoa butter.

Beeswax: To thicken the cream and provide a protective**.**

Preservative: Natural preservatives like vitamin E oil or grapefruit seed extract.

Equipment Needed:

1. Sox let extractor
2. Forceps
3. Clamp stand, heating mantle
4. Three round-bottomed flasks
5. Reflux condenser
6. Heating mantle and Chiller
7. TLC plate
8. Distillation apparatus
9. Iodine chamber
10. Test tube

Chemicals:

1. Ethanol
2. Liquid Paraffin
3. Silica gel
4. Distilled water.

Herbal Ingredients Used in Formulation of Cream

Tridax Procumbence Leaves:

Fig: 2 Tridax Procumbens Plant

- **Family:** Asterceae
- **Synonyms:** Ptiloatephium Kunth, Mandonia wedd, Bartolia adans, Batolina adans.
- **Chemical constituent:** alkaloid, s steroids, flavonoids, carotenoids, fatty acids, phytosterol, tannin, and minerals.
- **Medicinal Uses:** anti-inflammatory, antimicrobial, anticoagulant, and antifungal.
- **Biological Source:** Tridax procumbens is the plant itself.

Scientific Classification

- **Kingdom** – Plantae
- **Division** – Magnoliophyta
- **Sub-class** – Asteridae
- **Genus** – Tridax
- **Sub-kingdom** – Tracheobionta
- **Species** – Procumbens
- **Order** – Asteraceae
- **Class** – Magnoliopsida

Turmeric

Fig 3: Turmeric

- **Family:** Zingiberaceae.
- **Chemical constituent:** Curcumin, Demethoxycurcumin, Zingiberene, Turmerone Curcumol, Curdione, Iron, etc.
- **Medicinal Uses:** anti-inflammatory, antimicrobial, anticoagulant, and antifungal.

Benefits Of Turmeric In Health

- Skin health is improved.
- Treatment of ACNE.
- Potential relief from psoriasis.
- For Clearing of the skin.
- Antibacterial agent.

Neem Leaves:

Fig 4: Neem leaves

- **Family:** Meliaceae
- **Synonyms:** Azadirachta Indica, Margosa, Roseship, Melia Azadirachta
- **Chemical constituent:** Azadirachitin, Salannin, Meliantriol, Nimbasterol, Quercetin, Glyceride, Oleic Acid and Stearic Acid
- **Medicinal Uses:** Treat acne, treat fungal infection.
- **Biological Source:** Azadirachta Indica Tree.

Benefits Of Neem for Human Skin:

Most people have some minor skin problems, but when you wash your body with neem it will look clean and shiny. Scrub your body in front of the bathroom with Neem Paste, let it dry for a while and then rinse with water to act as an excellent antibacterial cleanser.

Alternatively, you can soak some neem leaves overnight in water and bathe in this water in the morning.

Procedure of Extraction:

- **Extraction of Tridax Procumbens:**

1. **Selection and Preparation of Plant Materials:**

- The selected medicinal plants (Tridax Procumbens) are shade-dried to prevent the degradation of active compounds.
- The dried plant materials are then coarsely powdered using a grinder.

2. **Selection of Solvent:**

- A suitable solvent is chosen based on the nature of phytoconstituents to be extracted. Common solvents include ethanol.

3. **Maceration Process:**

- The powdered plant material is placed in a clean glass or stainless-steel container.
- The solvent is added in a specific ratio (typically 1:5 or 1:10 w/v – one part plant material to five or ten parts solvent).
- The container is tightly closed to prevent evaporation and contamination.
- The mixture is allowed to stand for 3 to 7 days at room temperature.
- The mixture is stirred or shaken daily to enhance solvent penetration and extraction efficiency.

4. **Filtration:**

- After the maceration period, the mixture is filtered using muslin cloth or Whatman filter paper to remove the plant residues.
- The clear extract is collected and may be used directly or concentrated further.

5. **Concentration (if needed):**

- The filtrate may be concentrated using a rotary evaporator or gentle heating on a water bath to remove excess solvent, resulting in a thick or semi-solid extract.

6. **Storage of Extract:**

- The final extract is stored in amber-colored bottles to protect it from light and degradation.
- It is kept in a cool, dry place or under refrigeration until further use in cream formulation

- **Preparation of Turmeric extract:** Take 1 g turmeric powder in 10 ml distilled water And

shaken in 250 ml volumetric flask heated in water bath at 80°C to 100°C for 5 to 10 minutes. Then filtered and turmeric extract is obtained.

- **Preparation of Neem extract:** Dry the neem leaves at room temperature and grind them into a powder. Soak the powder in ethanol. The ratio of powder to ethanol can vary, but for example you can use 300 grams of powder to 1liter of ethanol. Let the powder Macerate in the ethanol. Filter the mixture through a filter paper. Use a rotary Evaporator to concentrate the extract. Dry the concentrated extract in a vacuum oven at a low temperature.

Procedure:

Step 1: Prepare the Herbal Extracts

Measure the following extracts and set them aside:

- Tridax procumbens extract – 5.4 ml
- Turmeric extract – 1.5 ml
- Neem extract – 1.2 ml

Step 2: Prepare the Oil and Aqueous Phases Oil Phase:

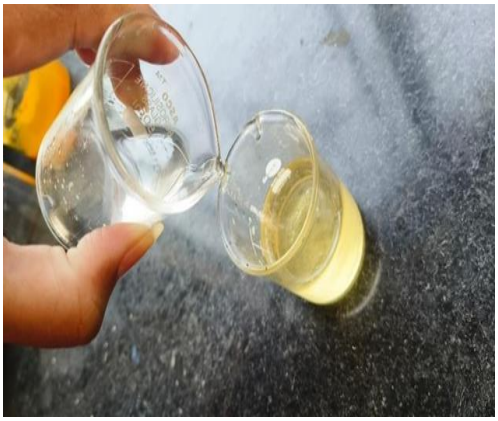
- Weigh 6 g of white beeswax and add it to 12 ml of liquid paraffin in a beaker.
- Heat the mixture on a hot plate at 60°C until the beeswax is completely melted.

Aqueous Phase:

- In a separate beaker, dissolve 0.4 g of borax and 0.04 ml of methylparaben in 4 ml of rose water.
- Heat this solution to 60°C.

Step 3: Emulsification – Combine Aqueous and Oil Phases

- Gradually add the aqueous phase (borax and rose water mixture) drop by drop into the oil phase (beeswax and paraffin) while stirring continuously.
- Maintain a consistent temperature and stirring speed to achieve a smooth emulsion.



Step 4: Incorporate Herbal Extracts and Additives

- Slowly add the prepared herbal extracts (Tridax procumbens, turmeric, and neem) into the above solution.
- Stir thoroughly to ensure even distribution.
- Add the following:

- 10–20 drops of essential oils (e.g., lavender or tea tree oil)
- A few drops of vitamin E oil
- Continue mixing until the cream is smooth and well-blended.

Step 5: Pour and Cool the Mixture

- Prepare containers by sterilizing jars or tins.
- Carefully pour the warm cream mixture into the containers, avoiding contact with the inside surfaces to maintain sterility.
- Allow the mixture to cool at room temperature until it solidifies. This may take several hours.
- Once completely cooled:
- Seal the containers tightly.
- Label each container with the preparation date and a list of ingredients.

Step 6: Storage and Shelf-Life Storage:

- Keep the cream in a **cool, dry place**, away from direct sunlight (e.g., a bathroom cabinet or kitchen cupboard).

Shelf Life:

- The cream can last between 6 to 12 months, depending on the ingredients and storage conditions.

- The addition of vitamin E oil helps prevent oxidation and extend shelf life.

Signs of Spoilage:

- If the cream changes in color, texture, or smell, it may have spoiled and should be discarded.

Final Polyherbal Cream Formulation

Formulation

Table no 01: Formulation

Sr. No	Ingredients	Quantity
1	Tridax Procumbens	5.4 ml
2	Turmeric	1.2 ml
3	Neem	1.5 ml
4	Bees wax	6 g
5	Methyl paraben	0.04 ml
6	Liquid paraffin	12 ml
7	Borax	0.4 g
8	Rose water	4 ml

Stepwise Common Instructions for the application of Polyherbal Cream:

1. Prepare Your Skin

- **Cleanse:** Begin with a freshly cleansed face, using a gentle cleanser suitable for your skin type to effectively clear away any dirt, oil, or makeup.

- **Dry:** Gently pat your skin dry with a soft towel, keeping it slightly damp to enhance product absorption.

2. Optional: Apply Toner or Serum

- If you use toner or serum, apply these before your cream to boost absorption. Let them fully absorb before proceeding.

3. Apply Your Cream

- **Amount:** Use about a pea-sized amount for the entire face and neck. Adjust as necessary, but avoid applying too much to prevent pore congestion.
- **Application:** Dab small dots of the cream onto the forehead, cheeks, nose, and chin.
- **Massage:** Smooth the cream into your skin using gentle, upward circular motions. Around the eyes, use your ring finger for a soft touch and lightly pat the cream.
- **Extend to Neck and Chest:** Don't forget to spread the cream to your neck and chest areas for added hydration.

4. Absorption

- Allow a few minutes for the cream to fully absorb before applying other products like makeup or sunscreen.

5. Use Frequency

- **Daytime:** Choose a lightweight cream for morning use, ideally one with SPF to shield your skin from UV exposure.
- **Nighttime:** In the evening, apply a more nourishing cream to support your skin's overnight repair process.

6. Storage Tips

- Store your cream in a cool, dry location, and ensure the lid is tightly closed to preserve freshness.
- Evaluating a cream product (cosmetic, medicinal, or other types) involves several general tests to assess its quality, effectiveness, safety, and sensory properties. These cf tests typically vary based on the purpose of the cream, but here's a comprehensive overview of common evaluation parameters.
- **Determination of pH:** The pH of the cream can be measured on a standard digital pH meter at room temperature by taking adequate amount of formulation diluted with a suitable solvent in a suitable beaker.
- **Physical appearance:** The physical appearance of the cream can be observed by its colour roughness & graded.
- **Viscosity:** Viscosity of formulated creams can be determined by using Brookfield Viscometer.
- **Homogeneity:** The formulation was tested for the homogeneity by visual appearance and by touch**.**
- **Removal:** The ease of removal of the creams applied was examined by washing the applied part with tap water.
- **Dye test:** The scarlet dye is mixed with the cream. Place a drop of cream in a slide and cover with a cover slip and examine it under a microscope. If the disperse globule appears red and the ground colourless then it is o/w type and the reverse condition appears in w/o type of creams.
- **Microbial Contamination:** Test for the presence of harmful microorganisms like bacteria, fungi, or yeast using microbiological culture techniques.
- **Sterility Testing:** If the cream is expected to be sterile (e.g., for medicinal use), sterility testing can be done to ensure the absence of all viable microorganisms.

- **Spreadability:** Measure how easily the cream spreads on the skin, often done with a glass slide method or using a texture analyzer.
- **Absorption:** Assess how well and quickly the cream absorbs into the skin. This can involve visual observation or specialized instruments like a corneometer.
- **Moisturization Testing:** For moisturizing creams, conduct a hydration test using equipment like a corneometer or TEWL (Transepidermal Water Loss) meter.
- **Adhesion and Residue:** Evaluate whether the cream leaves a greasy, sticky, or smooth feeling after application.
- **Dermatological Tests:** For safety on the skin, perform patch tests on volunteers or animal models (if applicable) to check for irritancy, sensitization, or allergic reactions.
- **Toxicity Testing:** For medicinal creams, cytotoxicity, mutagenicity, or carcinogenicity tests may be required depending on the ingredients.
- **Heavy Metal and Contaminants Testing:** Analyze for the presence of heavy metals like lead, mercury, and arsenic, which are restricted in cosmetics.
- **Dispensability:** Assess how easily the cream can be dispensed from its packaging (tube, pump, jar, etc.).
- **Labeling and Shelf Life:** Ensure that packaging has accurate information regarding ingredients, usage, and expiration date. Accelerated aging tests can help estimate shelf life.

Evaluation Tests:

Table No 02: Physical Evaluation Result

Sr. No	Characteristics	Result
1	Color	Yellowish green
2	Odour	Pleasant
3	State	Semi solid
4	Consistency	Smooth

Table No 03: Evaluation Tests Result

Sr. No	Parameters	Result
1	Ph	6.4
2	Spread ability	5.3g.cm/s
3	Washability	Easily washable
4	Irritancy test	Non irritant
5	Homogeneity	Satisfied
6	After feel	Emollient

Table No 04: Results For Optimized Formulation

Sr. No	Parameters	Results
1	Colour	Yellowish green
2	Odour	Pleasant smell
3	State	Semi solid
4	Consistency	Smooth
5	Ph	6.4
6	Spreadability	5.1g.cm/s

7	Washability	Easily washable
8	Irritancy test	Non irritant
9	Homogeneity	Satisfied
10	After feel	Emollient

RESULT:

The present study focused on the formulation and evaluation of a polyherbal cream. Various evaluation parameters were assessed, including physical appearance, pH, Spreadability, washability, non-irritancy, and viscosity. The formulated cream demonstrated good Spreadability, and its pH and viscosity were within acceptable ranges, making it suitable for topical application. The cream was easily washable with plain water and exhibited a non-greasy texture, ensuring user comfort. During the stability observation period, no phase separation or physical instability was noted. Additionally, the formulation was found to be non-irritant and did not cause any adverse effects on the skin, confirming its safety and compatibility for topical use.

CONCLUSION:

Polyherbal creams are effective in supporting the natural process such as Skin health is improved, Treatment of acne, Potential relief from psoriasis, For Clearing of the skin, Antibacterial agent activating multiple physiological pathways. extensive research, formulation development, and testing have been conducted to assess the efficacy and safety of various herbs in skin care. The findings highlight that polyherbal creams provide notable benefits, such as inherent anti-inflammatory, antimicrobial, and regenerative effects, positioning them as a promising alternative to synthetic options for skin care.

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