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Research Article

To Formulate And Evaluate Cream From *Gymnosporia Senegalensis*

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ABSTRACT

This study aims to evaluate the pharmacognostic parameters of different parts of Gymnosporia senegalensis (Lam.) Loes. These parameters play a vital role in the traditional medicine system for administering the drug and their therapeutic effects on various ailments. Standardization parameters include sequential extract preparation, physicochemical studies (ash value, moisture content, pH, fluorescence analysis), and phytochemical screening of the three parts of G.Senegalensis.The present study revealed the presence of various primary and secondary metabolites (terpenoids, flavonoids, tannins, and saponin) in high and moderate amounts in the extracts of different parts of the plant. The stem and bark also showed a reasonable presence of macro and microelements (As,Cr, Cd, Pb, Zn, Mn, and Cu). The complete analysis provides valuable information for the quality assurance of G. senegalensis as a crude drug for preparing formulations of herbal medication.

INTRODUCTION

The aim of the present research was to formulate the herbal Cream for the purpose of Moistening, Nourishing, lightening & Treatment of various diseases of the skin by using crude drug of Gymnosporia Senegalensis. Herbal cosmetics are defined as the beauty products which possess desirable physiological activity such as healing, smoothing appearance, enhancing and conditioning properties because of herbal ingredient. Now-a-days the usefulness of herbs in the cosmeceutical production has been extensively increased in personal care system and there is a great demand for the herbal cosmetics. Cosmetics are the substances intended to be applied to the human body for cleansing, beautifying, promoting attractiveness, and altering the appearance without affecting the body's structure or functions. But the usage of synthetic products becomes very harmful from long time for the youth as well as our environment. Various synthetic compounds, chemicals, dye and their derivative proved to cause various skin diseases having numerous side effects. Thus we are using herbal cosmetics as much as possible. The basic idea of skin care cosmetic lies deep in the Rig-Veda, Yajurveda,

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Ayurveda, Unani and Homeopathic system of medicine. These are the products in which herbs are used in crude or extract form. These herbs should have varieties of properties like antioxidant, anti- inflammatory, antiseptic, emollient, anti - seborrhatic, antikerolytic activity and antibacterial etc. Cream is a polyherbal formulation that consists of Hekal Powder. That herbs have been selected on the basis of a traditional system and scientific justification with modern uses. A cream that can give effective protection to skin and free from any toxicity or toxic residue or any irritation when regularly used and should also be cosmetically acceptable.

Physiology of normal skin

The skin is composed of three layers,

a) Epidermis (50–100 μm)
b) Dermis (1–2 mm)
c) Hypodermis (1–2 mm)

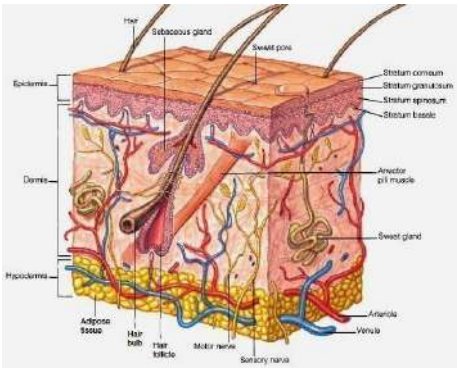


Fig. 1: The anatomical layers of the cutaneous tissue.

The barrier to percutaneous absorption lies within the stratum corneum, the most superficial layer of the epidermis. The function of the stratum corneum is to reduce water loss, provide protection against abrasive action and microorganisms, and generally act as a permeability barrier to the environment. The stratum corneum is a 10–20 μm thick, multilayer stratum of flat, polyhedral-shaped, 2 to3 μm thick, non-nucleated cells named corneocytes. Corneocytes are composed primarily of insoluble bundled keratins surrounded by a cell envelope stabilized by cross-linked proteins and covalently bound lipids. Corneodesmosomes are membrane junctions interconnecting corneocytes and contributing to stratum corneum cohesion. The intercellular space between corneocytes is composed of lipids primarily generated from the exocytosis of lamellar bodies during the terminal differentiation of the keratinocytes. These lipids are required for a competent skin barrier function. The epidermis is composed of 10–20 layers of cells. This pluristratified epithelium also contains melanocytes involved in skin pigmentation, and Langerhans' cells, involved in antigen presentation and immune responses. The epidermis, as for any epithelium, obtains its nutrients from the dermal vascular network.Current knowledge of the function of the stratum corneum has come from studies of the epidermal responses to perturbation of the skin barrier such as:

i. Extraction of skin lipids with apolar solvents
ii. Physical stripping of the stratum corneum using adhesive tape
iii. Chemically-induced irritation.

I. SKIN

The skin is the largest organ of the human body and serves as a protective barrier between the internal organs and the external environment. It has several important functions and consists of multiple layers, each with its own unique characteristics.

Structure and Layers:

a. Epidermis:

The epidermis is the outermost layer of the skin and acts as a protective barrier. It is composed of several sublayers, including the stratum corneum, stratum granulosum, stratum spinosum, and stratum Basale. The epidermis contains melanocytes, which produce the pigment melanin responsible for skin coloration.

b. Dermis:

The dermis lies beneath the epidermis and provides support and nourishment to the skin. It

contains blood vessels, hair follicles, sweat glands, sebaceous glands, nerve endings, and collagen and elastin fibres that contribute to the skin's strength, elasticity, and flexibility.

c. Hypodermis (Subcutaneous Tissue):

The hypodermis is the deepest layer of the skin and consists mainly of adipose (fat) tissue. It helps insulate the body, store energy, and provide cushioning.

Functions of the Skin:

a. Protection:

The skin acts as a physical barrier, protecting the body from harmful substances, microorganisms, UV radiation, and mechanical injuries.

b. Sensation:

The skin contains numerous nerve endings that detect sensations such as touch, temperature, pain, and pressure.

c. Thermoregulation:

Through sweat production and dilation or constriction of blood vessels, the skin helps regulate body temperature.

d. Synthesis of Vitamin D:

The skin plays a crucial role in the synthesis of vitamin D when exposed to sunlight.

e. Immune Defense:

Specialized cells in the skin, such as Langerhans cells and immune system components, help defend against pathogens and initiate immune responses.

f. Excretion:

Sweat glands in the skin excrete waste products and help maintain fluid balance. Skin Conditions and Disorders

Skin Conditions and Disorders:

a. Acne:

A common skin condition characterized by the formation of pimples, blackheads, and whiteheads.

b. Eczema:

A chronic inflammatory condition that causes dry, itchy, and inflamed skin.

c. Psoriasis:

A chronic autoimmune condition that leads to the rapid build-up of skin cells, resulting in thick, scaly patches.

d. Dermatitis:

Inflammation of the skin caused by irritants or allergens.

e. Skin Cancer:

Various forms of skin cancer, including melanoma, basal cell carcinoma, and squamous cell carcinoma, can develop due to excessive sun exposure or genetic factors.

Skin Care:

1. Regular cleansing, moisturizing, and protection from excessive sun exposure are essential for maintaining healthy skin.
2. Adequate hydration, a balanced diet, and a healthy lifestyle contribute to skin health.
3. The skin is a complex and vital organ with numerous functions. Understanding its structure, functions, and common disorders is crucial for maintaining skin health and seeking appropriate care when needed.

II) MICROBIAL SKIN INFECTION:

Microbial skin infections, also known as skin infections caused by microorganisms, are common conditions that affect the skin. They are typically caused by bacteria, viruses, fungi, or parasites. Here is some information about different types of microbial skin infections:

a. Bacterial Skin Infections:

Bacteria can cause various skin infections, including: 4

i. Impetigo:

Commonly affects children and is characterized by red sores that burst and develop honey-colored crusts.

ii. Cellulitis:

A bacterial infection that affects the deeper layers of the skin, causing redness, swelling, and pain.

iii. Folliculitis:

Infection of the hair follicles, resulting in small, inflamed bumps or pustules.

iv. Boils (Furuncles):

Infections that occur in hair follicles or oil glands, leading to painful, pusfilled lumps.

v. Carbuncles:

Clusters of interconnected boils, often accompanied by fever and fatigue.

b. Viral Skin Infections:

Viruses can cause different types of skin infections, including:

i. Herpes Simplex:

Caused by the herpes simplex virus, it results in painful blisters or cold sores, commonly around the mouth or genitals.

ii. Varicella-Zoster:

Causes chickenpox during the initial infection and later reactivates as shingles, resulting in a painful rash.

iii. Molluscum Contagiosum:

Characterized by small, pink or flesh-colored bumps with a central indentation caused by the poxvirus.

iv. Warts:

Caused by the human papillomavirus (HPV), resulting in rough, raised growths on the skin.

c. Fungal Skin Infections:

Fungi can cause various skin infections, including:

i. Athlete's Foot (Tinea Pedis):

Affects the feet, causing itching, redness, and cracked skin, often between the toes.

ii. Ringworm (Tinea Corporis):

Presents as a ring-shaped, itchy rash with raised edges and a clear centre on the body or scalp.

iii. Jock Itch (Tinea Cruris):

Affects the groin area, resulting in a red, itchy rash.

iv. Candidiasis:

Caused by the Candida fungus, it can lead to diaper rash, oral thrush, or vaginal yeast infections. 5

d. Parasitic Skin Infections:

Parasites can cause skin infections, such as:

i. **Scabies:**

Caused by tiny mites, it leads to intense itching and a rash that often appears as thin, wavy lines.

ii. Pediculosis (Lice Infestation):

Infestation with lice, resulting in itching and the presence of lice or their eggs (nits) on the hair or body.

III. Overview of Microbial Skin Infections

In micros like Fungi and bacteria usually make their homes in moist areas of the body where skin surfaces meet: between the toes, in the genital area, and under the breasts. Common skin infections are caused by yeasts (such as Candida or Malassezia furfur) or dermatophytes, such as Epidermophyton, Microsporum, and Trichophyton. Many such microbes live only in the topmost layer of the epidermis (stratum corneum) and do not penetrate deeper. Obese people are more likely to get these infections because they have excessive skinfolds, especially if the skin with in a skinfold becomes irritated and broken down (intertrigo). People with diabetes tend to be more susceptible to skin infections as well. Strangely, fungal infections on one part of the body can cause rashes on other parts of the body that are not infected. For example, a fungal infection on the foot may cause an itchy, bumpy rash on the fingers. These eruptions (dermatophytids, or identity or id reactions) are allergic reactions to the fungus.



Fig. 2: Fungal skin infection



Fig. 3: Bacterial skin infection

Symptoms

- Skin changes, including red and possibly cracking or peeling skin.
- Itching.

Ca**uses of microbial skin infection:**

- Imbalance of bacteria is due to following reasons:
- Due to use of antibiotics
- Hormone imbalance
- Poor eating habbits

Diagnosis

Doctors may suspect a fungal infection when they see a red, irritated, or scaly rash in one of the commonly affected areas. They can usually confirm the diagnosis of a skin infection by scraping off a small amount of skin and having it examined under a microscope or placed in a culture medium where the specific fungus can grow and be identified.

Treatment

- Antifungal drugs
- Antibacterial drugs
- Measures to prevent moisture
- Microbial infections are typically treated with antimicrobial drugs, usually with antimicrobial drugs that are applied directly to the affected area (called topical drugs). Topical drugs may include creams, gels, lotions, solutions, or shampoos. Antimicrobial drugs may also be taken by mouth.
- In addition to drugs, people may use measures to keep the affected areas dry, such as applying powders or wearing open-toed shoes.

Cream

Definition-

"Cream is semisolid preparation of a medication for topical use (on the skin) that contains a water base. Essentially, it is a preparation of oil (often lanolin or petrolatum) in water. "An ointment is preparation for topical use". Creams are a type of topical drug delivery system. They are semi-solid emulsions, meaning they are a mixture of water and oil that has a smooth, creamy consistency. Creams are widely used in medicine and dermatology because they are easy to apply and deliver medication effectively to the skin.

1. Composition

Creams are typically composed of three main components:

Water:

The base of most creams.

Oil:

Provides moisture and a protective barrier.

Emulsifying Agent:

Helps to keep the water and oil mixed together.

3. Classification of Creams

There are several different types of creams, classified based on the way the water and oil are mixed:

Oil-in-Water (O/W) Creams:

- Water is the continuous phase, with oil droplets dispersed throughout. Commonly used for hydrating and moisturizing the skin.
- Easy to spread, non-greasy, and wash off easily.

Water-in-Oil (W/O) Creams:

- Oil is the continuous phase, with water droplets dispersed throughout.
- Provide an occlusive effect, forming a protective barrier on the skin that reduces water loss. Greasier and more suitable for dry or damaged skin.

Multiple Emulsion (W/O/W or O/W/O) Creams:

- Contain two sets of emulsions, combining properties of both O/W and W/O creams.
- Used to deliver medications with different solubilities or for enhanced drug stability and prolonged release.

Emulsion-Microemulsion Creams:

- Utilize microemulsion systems, which are stable mixtures of oil, water, surfactants, and co- surfactants.
- Improve drug solubility and skin penetration for effective drug delivery.

Applications of Creams

Creams have a wide range of applications, including:

Dermatology:

Treating skin conditions like eczema, psoriasis, acne, and dermatitis.

Wound Healing:

Promoting wound healing and preventing infection.

Cosmetics:

Moisturizing, anti-aging, and skin rejuvenation. Sunscreens: Protecting against UV radiation and sunburn. Antimicrobial Creams: Preventing and treating infections.

Advantages of Cream

- able to calm inflammation
- Promote skin tone
- Keep wrinkles and acne away
- Increase cell metabolism and blood circulation
- Easily water washable. Easy to wipe away.
- Suitable for sensitive, dry, and fair skin.
- Suitable for acute lesions

Disadvantages of Cream

- Stability is not as good as ointment
- They are less hygroscopic than other semi-solid preparation, so risk ofcontamination is high than other.
- Less viscous than other semi-solid preparation.

Gymnosporia Senegalensis as an Antimicrobial Agent

Gymnosporia Senegalensis is a common spice with a long history of use in traditional medicine or various health benefits. One of its key properties is its ability to fight microbes.

Spectrum of Activity

Gymnosporia Senegalensis exhibits a broad spectrum of antimicrobial activity, effective against various bacteria and fungi:

A. Antibacterial Activity:

Gymnosporia Senegalensis can inhibit the growth of a wide range of bacteria, including both Gram-positive and Gram-negative strains. Examples include Escherichia coli (E. coli), Salmonella typhi (causes typhoid fever), Staphylococcus aureus (common cause of skin infections), and Pseudomonas Aeruginosa .

B. Antifungal Activity:

Gymnosporia Senegalensis also demonstrates antifungal properties. It has been shown to be effective against various fungal strains, including Candida species (associated with yeast infections), Aspergillus species (can cause respiratory infections), and dermatophytes (cause fungal skin infections like athlete's foot).

Review of literature

a. Premkumar, T. Muthukumaran, V. Ganesan, Shanmugam R., Priyanka D. L et.al, (oct 2014-march 2015).

This research paper consist of: A novel cream formulation consisting of combination of miconazole nitrate, mupirocil and hydrocortisone was prepared. The formulation was subjected to in- vitro diffusion studies. Microbiological studies and in- vivo skin irritation studies were performed to find out the safety of material used in the formulation. The developed cream consisting of combination of miconazole nitrate, mupirocil, and

hydrocortisone was found to be safe and effective for the treatementof skin infection.

b. Amulyaratna behera & Sumit kumar sahoo et.al, (Jun 2012).

This research paper consist of: GB- loded PLGA NPs were prepared by solvent evaporation technique using methanol/dichloromethane(2:1) & characterize by transmission electron microscopy(TEM), and differential scanning calorimetry(DSC). effect of strring speed(250,1000,1500,2500 rpm) and drug : polymer (1:1,1:2,1:3 and 2:1) on particle size, size distribution, zeta potential, drug loading, encapsulation efficiency and drug release was also studied. Stable NPS were successfully prepared without any incompatibility, as indicated by TEM and DSC studies, respectively. As polymer and drugconcentrations and stirring speed increased, particle size, drug loading and encapsulation efficiency also increased. Increase in polymer concentration sustained drug release but reverse was obtained as drug concentration increased.

c. Ashwini. S.Dhase, Somishwar.S. Khadbadi and Shweta.S. Sahoo et.al,(2014).

This research paper consist of: The purpose of the present research work was to formulate and evaluate vanishing herbal cream.Herbal creams offer several advantages over the other creams. The majority of existing creams which has prepared from drug of syntheticorigin, such as acyclovir, triamcinolone, calcipotriene, mometasone, extracts gives fairness to face, but it has several side effects such as itching or several allergic reactions. Herbal cream do not have any of these side effects, without side effects it gives the fairness look to skin.

d.Jain D and Janmeda P et.al,(2022)

have conducted studies demonstrating that the pharmacognostic study of the leaf, stem, and bark of G. senegalensis has been carried out for the first time. Our results have standardized the physicochemical andphytochemical parameters of this medicinal plant. The present study revealed the presence of primary and secondary metabolites in the extracts of different parts of the plant. The stem and barkalso showed a moderate presence of macro and microelements. This study justified the nutritional and ethnomedicinal benefits of G. senegalensis to human health and authenticated itas an herbal drug. A standard monograph will be prepared from our results that will be highly significant for the manufacturing of formulations of phytomedicine.

e.Pimpale D, Cholke P et.al, (2022)

has been concluded that Gymnosporia Senegalensis has been used in Africa, India and some other Asian and African countries as traditional medicine for the treatment of numerous ailments, including respiratory diseases, inflammation and microbial affections. It also shows anti-mycobacterial activity against the H37Rv strain of mycobacterium Tuberculosis. Detailed in vivo studies are needed. Some active compounds such as Ephedrine, Norephedrine, Hexosan, Anthocyanins, Ferula acid, Kaempferol have been isolated, but there is still many more to do.There are still many constituentsof Gymnosporia Senegalensis with potential pharmacological activities that have not yet beenstudied. It is very likely that this species contains many beneficial pharmacological properties dueto its wide spectrum of uses in African and Asian traditional medicine. Therefore,in vivo and clinical studies on their pharmacological effects may provide valuable evidence and insight into their potential utility for the future clinical managementof many human diseases

f. Jain D, Janmeda P et.al,(2023)

have conducted studies demonstrating that the crude drug misidentification and adulteration can cause consumers and pharmaceutical industries various health and legal problems. The first stage towards quality control of the medicinal plants is

to ensure the accuracy and authenticity of the selected species for the designed use. It can be evaluated with various techniques, such as macro and microscopic identification, histochemical analysis, and SEM, especially for microscopic botanical aspects. Therefore results generated from this study would be helpful in the identification and standardization of the plant material towards quality assurance and also for the preparation of a monograph on the G. senegalensis plant.

g. **Simplice Joel Tatsimo Ndendoung, Jean-De-Dieu Tamokou, Kazufumi Toume, Leopold Havyarimana, Steve Endeguele Ekom, and Katsuko Komatsu et.al, (2022**)

conducted a chemical investigation of the ethyl acetate extract of G. senegalensis leaves, resulting in the isolation of nine compounds, including a new megastigmane derivative. The isolated compounds exhibited varying degrees of antimicrobial activities, with phaeophytin A being the most potent, while compounds 5 and 6 demonstrated the highest antioxidant activities. These findings suggest the potential use of these constituents as essential taxonomic markers for the genus and highlight their potential contribution to the efficacy of G. senegalensis in traditional medicine.

h. **G. da Silva, R. Serrano, and O. Silva et.al,(2011)**

have explored the potential pharmacological activity of M. senegalensis, a subject that has not been previously investigated. Both species, G. senegalensis and M. senegalensis, are likely to harbor numerous beneficial pharmacological properties, given their extensive use in African traditional medicine. To unveil their full potential, further in vivo and clinical investigations are warranted, providing valuable evidence and insights for the future clinical management of various human diseases.

i. **M.E. Makgatho, W. Nxumalo, and L.A. Raphoko et.al,(2018)**

have conducted a study revealing the presence of Maytenoic acid, pristimerin, lupenone, β-amyrin, and β-sitosterol in the stems and roots of G. senegalensis. These chemical entities contribute to the antimicrobial and anti- inflammatory properties of the plant. Notably, these bioactive elements have yet to be identified in the leaves of G. senegalensis. Further research is essential to isolate and characterize the chemical constituents of the plant, with a specific focus on evaluating their anti-mycobacterial and immune-regulatory properties. This avenue of investigation holds promise for expanding our understanding of the therapeutic potential of G. senegalensis and its applications in medicine.

AIM: TO FORMULATE AND EVALUATE CREAM FROM GYMNOSPORIA SENEGALENSIS.

OBJECTIVE

i. The objective of this research work was to formulate the cream which does notcause side effects or adverse reaction.
ii. To study efficacy and safety of prepared antimicrobial cream.

PHYTOCHEMISTRY OF HERBAL DRUG:

Herbal ingredient used: Leaves of Gymnosporia Senegalensis extract



Fig.4: Plant of Gymnosporia Senegalensis .

Synonyms:

Gymnosporia Senegalensis, Red Spike-Thorn, Hekal.

Biological source:

Hekal consists of the fresh and dried leaves of Gymnosporia Senegalensis [Lam.] Loes

Family:

Celastraceae.

kingdom: Viridiplantae

Phylum:

Streptophyta

Class:

Magnoliopsida

Order:

Celastrales

Family:

Celastraceae

Species:

Gymnosporia senegalensis

Macroscopical characters

The organoleptic examination is a specific characterization done by the sensory organs of particular species. It is the first step towards the identification of plant raw materials. Some important characteristics of the crude drugs, i.e., odor, texture, and taste, were extremely sensitive criteria based on an individual's perception. Therefore, feature descriptions sometimes may cause differences of opinion.

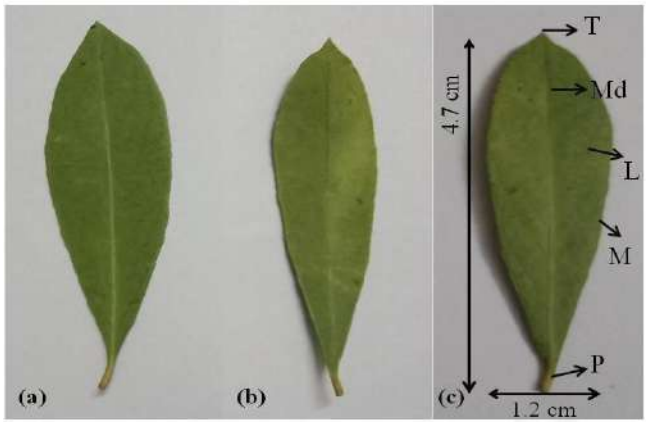


Figure 5. Adaxial and abaxial side of the leaf, (c) Morphological features of G. senegalensis leaf. T- tip, Md- midrib, L- lateral veins, M- margin, P- petiole.

Table No: 1. Organoleptic and morphological characterization of different parts (leaf, stems, flowers, fruits, and bark) of G. senegalensis.

Leaf	
Apex	Acute with sharp spine
Margin	Serrate (to the end)
Venation	Reticulate, anastomosing towards margin
Base	Acute
Petiole	Small
Shape	Lanceolate
Type	Simple
Lamina	Entire and flat
Phyllotaxy	Alternate or sub opposite
Surface Colour and texture	
Adaxial side	Dark green and smooth
Abaxial side	Olive green and rough
Stem	
Branching pattern	Monopodial
Spikes	Present, sharp
Flowers	
Pattern	Terminal clusters

Odor	Sweetly scented
Fruits	
Pattern	2-lobed capsule
Color	Pinkish to reddish-brown
Bark	
Surface	Rough

Chemical Constituents:

a. Alkaloids
b. Alkanes and alkanols
c. Maytansinoids
d. Phenolic compounds
e. Sugars
f. Monoterpenes
g. Triterpenes
h. megastigmane

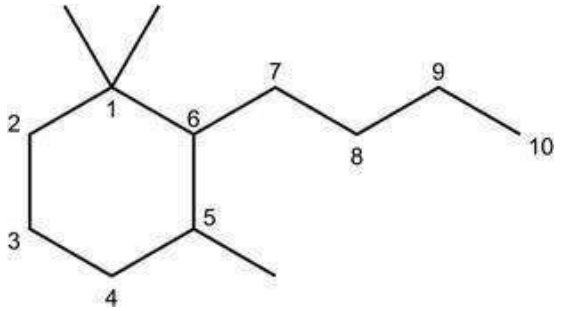


Fig 6. Structure Of Megastigmane

Uses

a. Antibacterial Agent
b. Antifungal Agent
c. Antimicrobial Agent
d. Antioxidant

PLAN OF WORK

Literature survey

↓

Collection of ingredients

↓

Formulation

↓

Evaluation

↓

Final report

EXPERIMENTAL WORK

Collection of plant -

The well grown plant of Gymnosporia Senegalensis was selected for formulation. Then the plant is collected for the formulation of cream which have anti- inflammatory, smoothening, Anti-oxidant, Antimircobial, Antifungal, Antibacterial Properties.

Collection of parts of herbal plant -

Gymnosporia Senegalensis leaves typically harvested when they young and tender, as older leaves can become tough and fibrous. Harvesting is usually done by cutting the leaves from the plant with a sharp knife or scissors. Then they are often washed thoroughly to remove any dirt or debris.

Authentication of plant-

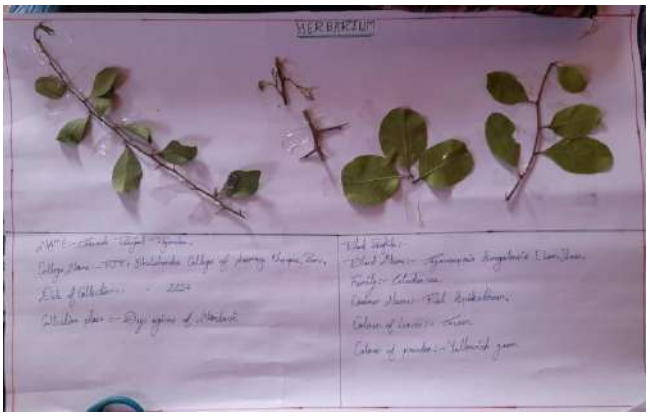


Fig 7. Herbalism

Preparation of dry powder of flower and leaves

a. Harvesting: Harvest fresh, mature taro leaves and flowers from your garden. Choose leaves and flowers that are green, healthy, and free from any damage or disease.
b. Cleaning: Thoroughly wash the leaves under running water to remove any dirt, debris, or pests. Trim off any tough stems or damaged parts of the leaves and flower.
c. Blanching: Blanch the taro leaves and flower in boiling water for 1-2 minutes. This step

helps to soften the leaves and flowers and preserve their color and nutritional content. After blanching, immediately transfer the leaves and flower to a bowl of ice water to stop the cooking process and retain their vibrant green color.

d. Drying: Once blanched, drain the taro leaves , flowers and spread them out in a single layer on a clean kitchen towel or paper towels. Pat them dry to remove excess moisture.
e. Grinding: Once dried, transfer the taro leaves and flower to a food processor or grinder. Grind the dried leaves into a fine powder. You may need to do this in batches depending on the size of your grinder.
f. Sifting: After grinding, sift the taro leaves powder through a fine mesh sieve to remove any large particles and ensure a smooth consistency.

MATERIAL AND EQUIPMENTS

Extracting Gymnosporia Senegalensis with Soxhlet Apparatus

Preparation (Steps 1-2) :

Grind the plant material:

Grind the Gymnosporia Senegalensis bark or leaves into a fine powder using a mortar and pestle, grinder, or similar equipment.

Prepare the thimble:

Place the powdered plant material into a thimble made of filter paper or a similar cellulose material. Fold the top of the thimble to secure the powder.

Soxhlet Apparatus Setup (Step 3) :



Fig 8. Soxhlet Apparatus Setup

Assemble and fill the apparatus:

Fill the round-bottom flask with your chosen solvent (e.g., methanol, ethanol, acetone). Assemble the Soxhlet apparatus, ensuring the siphon tube is properly aligned. Position the thimble containing the plant material in the main chamber of the Soxhlet apparatus.

Extraction Process (Steps 4-5) :

Heat and extract:

- Turn on the heating mantle/hot plate to a temperature suitable for your chosen solvent (ensure it's below the boiling point).
- The extraction will proceed as described previously.
- Monitor the process by observing the color of the solvent in the siphon chamber.

Stop heating and cool down:

- Once the desired extraction time is reached (typically 4-8 hours), or the solvent in the siphon chamber appears clear, turn off the heating.
- Allow the Soxhlet apparatus to cool down completely.

Solvent Removal and Extract Concentration (Steps 6-7) :



Fig 9. Solvent Removal and Extract of Gymnosporia Senegalensis

Filter and concentrate:

Filter the extracted solvent through filter paper to remove any plant material particles. Concentrate the extract using a rotary evaporator or by carefully evaporating the solvent using a heating mantle/hot plate at a low temperature (ensure proper ventilation when using a heating mantle/hot plate).

Dry and store the extract:



Fig 10. Dried extract of Gymnosporia Senegalensis

- Once the solvent is removed, the remaining residue will be the concentrated extract of Gymnosporia Senegalensis.
- Transfer the extract to a pre-weighed container and place it in an oven at a low temperature (around 40-50°C) to remove any residual solvent.
- Once completely dry, weigh the extract to determine the yield.
- Store the extract in a sealed container in a cool, dark place for further use.

Phytoconstituents Screening Test of flavonoids

a. **Lead Acetate Test :**

Formation of pink color indicates the presence of Flavanoids. Lead acetate test-10 mg of bark extract was taken and few drops of 10% lead acetate solution was added. Appearance of yellow colour precipitate indicates the presence of flavonoids.

b. **Ethyl Accetate Test :**

Test for Flavonoids: To 0.5 g crude extract 10 mL of ethyl acetate was added and heated with a steam bath for 3 min. The mixture was filtered and 4 mL of the filtrate was shaken with 1 mL of dilute ammonia solution and, the formation of a yellow coloration was checked as a positive test for the presence flavonoids.

Excipient Profile:

In this formulation following ingredients are used and their uses as follow:

Table no.2: Uses of ingredients.

Sr. No	Ingredient	use
1	Hekal Powder	Antimicrobial Agent
2	Petroleum Jelly	Soothing Agent
3	Hard Paraffin	Lubricant
4	Cetyl alcohol	Emollient
5	Glyceryl monostearate	Emulsifier
6	Methyl Paraben	Preservative
7	Propyl Paraben	Preservative
8	Peppermint Water	Fragrance
9	Activated Charcoal	Adsorbent

1. **Petroleum Jelly:**

In this formulation it is used as soothing agent.

a. It is semisolid mixture of hydrocarbon (with carbon number higher than 25).
b. It's melting point is typically in between 400c-700c.
c. It is flammable only when heated to liquid.
d. It is colourless or has pale yellow colour, translucent, and devoid of taste and smell when pure.
e. It is insoluble in water and soluble in organic solvent.

2. Hard Paraffin:

In this formulation it is used as lubricant.

a. It is the mixture of solid saturated hydrocarbons that are derived from petroleum.
b. Hard paraffin is colourless or white wax like material that is physically composed of mixture of microcrystals.
c. The melting temperature of hard paraffin is between 470c-650c.
d. When solid it is used to enhance the rheological property of cream base.

3. Cetyl Alcohol:

In this formulation it is used as an emollient.

a. It is also known as hexadecan-1-on and palmityl alcohol.
b. It is fatty alcohol with formula CH3(CH2)15OH.
c. At room temperature it takes the form of waxy white solid or flakes.
d. The name cetyl derives from the whale oil from which it was first isolated.
e. It's melting point is 49.30c.

4. Glyceryl Monosterate:

In this formulation it is used as emulsifier.

a. It's melting point is 570-650c.
b. It is insoluble in water. It is commonly known as GMS, is monoglyceride commonly used as emulsifier in foods.
c. It takes form of white, odoure less and sweet tasting flaky powder that is hygroscopic.
b. Chemically it is glycerol ester of stearic acid.

5. Methyl Paraben:

In this formulation it is used as preseravative.

a. It is preservative with chemical formula CH3(C6H4(OH)COO).
b. It is methyl ester of p-hydroxybenzoic acid.

6. Propyl Paraben:

It is used in the formulation as preservative.

a. It is ester of p-hydroxybenzoic acid, occurs as natural substance.
b. It is found in many plant and some insects, although it is manufactured synthetically for use in cosmetics and pharmaceuticals and foods.
c. It is member of class of paraben.
d. It is preservative typically found in many water based cosmetics, such as cream lotions.

7. Peppermint water:

In this formulation it is used as fragrance.

a. It is active ingredient of pepperimint water is peppermint oil, which comes from leaves of peppermint plant.
b. It is also known as Menthax piperita L.
c. It is traditional herbal medicine to relieve discomfort in gut such as indigestion, flatulence and stomach cramps.
b. It is clear and colourless.

8. Activated Charcoal:

It is used as adsorbent in this formulation.

a. It is used as adsorbent in cream.
b. It has antifungal property because it successfully rid the body poisons.
c. It draws bacteria, poison, chemicals, dirt and other microparicles to surface of skin, helping in achieving flawless complexation and fight acne.
b. It is not metabolized, adsorbed by body, but it can used to treat some poisonous bites and disinfect some wounds.

Formulation Method

The formulation components used were listed in Table 2. Oil in water emulsion of 20 and 60% of drugs were formulated. The emulsifier (glycerol

monostearate) and other oil soluble components (petroleum jelly, Cetyl alcohol) were dissolved in the oil phase (Part A) and heated up to 80° C. Extract and water soluble components (Methyl paraban, Propyl paraban) were dissolved in (Part B) and heated up to 80° C. After heating, the aqueous phase was added in portions to the oil phase with constant stirring until cream is formed, And cream was formulated Having superb color i.e. Of White. Perfume was added when the temperature dropped to 450 C ± 500 C.

Table no. 3: Composition of Cream.

Sr. No.	Ingredient	F1	F2	F3
1	Hekal Powder	9ml	6ml	6ml
2	Petroleum Gelly	15gm	12.9gm	12.9gm
3	Hard Paraffin	9gm	6gm	6gm
4	Cetyl Alcohol	4ml	1.5ml	1.5ml
5	Glyceryl Monostearate	4gm	1.5gm	1.5gm
6	Methyl Paraben	4gm	1.2gm	1.2gm
7	Propyl Paraben	2.1gm	0.9gm	0.9gm
8	Peppermint Water	q.s	q.s	q.s
9	Activated Charcoal	0.1gm	0.03gm	0.03gm



Fig 11. Ingredients of Antimicrobial Cream

Evaluation of Cream

1. Physical Properties:

The Cream was observed for colour, odour and appearance.

Table 4: Physical Property.

Sr. No	Properties	Observation
1	Colour	Off White
2	Oduor	Characteristic
3	Appearance	Semi-Solid



Fig 12. Physicochemical properties of cream

2. Determination of pH:

The pH value of this cream was determined by using pH paper value of this Gymnosporia Senegalensis cream was found to be 6.5.



Fig 13. pH Test

3.Patch Test :

About 1-3gm of material to be tested was placed on a piece of fabric or funnel and applied to the sensitive part of the skin e.g. skin behind ears. The cosmetic to be tested was applied to an area of 1sq.m. of the skin. Control patches were also applied. The site ofpatch is inspected after 24 hrs.



Fig 14. Patch Test Result : No any inflammation or irritation to the skin.

4. SPREADIBILITY TEST:

Placed l gm formulation on a butter paper and on the formulation put watch glass. After that 5gm weight was placed on watch glass for 2 minute to compress the sample to uniform thickness and its diameter was measured.



Fig 15. Spreadability test

5. **Test for microbial growth in formulated creams:**

The formulated creams were inoculated on the plates of agar media by streak plate method and a control was prepared by omitting the cream. The plates were placed in to the incubator and are incubated at 370 C for 24 hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control.



Fig 16. Antimicrobial Test

EVALUATION TEST (Result)

Table No. 5 : Evaluation Test

Parameters	Observation
Color	Off White
Oduor	Characteristics
State	Semisolid
Consistency	Smooth and Thick
pH	6
Spreadability	5cm
Patch Test	Pass

RESULT AND DISCUSSION

- The formulation of cream shows no redness, edema, inflammation and irritation during Patch Test studies. These formulations are safe to use for skin.
- The spreadability studies showed that formulation have better spreadability.
- The formulated creams were tested for the presence of pathogenic microorganisms by culturing it with agar medium.There were no signsof microbial growth after incubation period of 24 hours at 370 C and having moreantifungal property as compare to standard.

CONCLUSION

The present work focuses on the potential of herbal extracts from cream purposes. The uses of cosmetic have been increased in many folds in personal care system. The use of bioactive ingredients in cream influence biological functions of skins and provide nutrients necessaryfor the healthy skin. The prepared formulations showed good spreadability, no evidence of phase separation and good consistency during the study period. Stability parameters like visual appearance, nature variation during the study period and fragrance of the formulations showed that there was no significant changes during study period. We have conducted a microbial study on this cream. However, in the future, it may be utilized as an antimicrobial formulation .

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