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Formulation and Evaluation of Antifungal Ointment from Galinsoga Parviflora

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Abstract

Antifungal ointments have gained significant attention as natural alternative for treating various skin conditions due to their potential therapeutic benefits and minimal side effects . This study aimed to formulate and evaluate a herbal ointment with a focus on its anti – fungal properties. The ointment was formulated using accombination of medicinal herbs known for their anti-fungal effects , with Galinsoga parviflora as the primary active ingredients . The formulation process involved extraction of the bioactive compounds from Galinsoga parviflora and incorporation into a suitable ointment base . The prepared herbal ointment was subjected to comprehensive evaluation to assess its anti –fungal efficacy . In vitro experiments were conducted to determine the ointment's ability to inhibit fungal markers , such as eczema , lichens and ringworm. The results demonstrated a significant reduction in the levels of pro-inflammatory markers , indicating the potential of the herbal ointment to modulate the fungal response . In addition , the herbal ointment was evaluated for its safety profile and skin compatibility. Thus result showed a significant reduction in inflammation induced edema and redness after the application of ointment, validating its potential therapeutic benefits. In conclusion , the formulated herbal ointment utilizing Galinsoga parviflora exhibited promising anti-fungal properties. The comprehensive evaluation confirmed its potential as a natural remedy for fungal skin conditions . Further studies , including clinical trials are warranted to determine the ointments efficacy in human subject and optimize the formulation for commercial production . Research contributes to the

growing body of evidence supporting the development of herbal ointments as effective and safe alternative in dermatological care.

Keywords: Antifungal, Galinsoga Parviflora, Bioactive Compounds, Induced Edema, Eczema, Lichens, Ringworm.

1. Introduction

Herbal remedies also known as botanical medicine, are made from a variety of plants, including seeds, roots , leaves , bark and flowers and are used for a variety of therapeutic purpose (Devarshi et al., 2022).Herbal medicine has long been used outside of orthodox medicine, but as new analysis and research demonstrate its benefits for both disease treatment and prevention, the practice is becoming more widely accepted. Plants that have long been used medicinally have been documented in history (Devarshi et al., 2022). Herbs were used in healing rituals by indigenous cultures, and others were developed in conventional medical systems that employed herbal therapies on a systematic basis. Researchers discovered that people intended to use similar and identical plants for similar purposes across the globe. According to recent estimates from the WHO, roughly 80% of people worldwide receive some form of primary healthcare from herbal medicines. The precise component of most herbs that has a medicinal effect is unknown. Whole herbs are made up of a variety of components that will probably combine to provide the intended therapeutic result. Herbalists would rather work with entire plants than just isolated parts(Devarshi et al., 2022). The components of whole plants extracts are numerous. Together, these elements generate therapeutic benefits and lessen the possibility of any one elements having negative side effects. Herbs are frequently combined to increase their efficacy, promote synergistic effects, and lessen their toxicity (Chhetri et al., 1970).

An important source of novel compounds with potential utility traditional medicine is responsible for the development of chemotherapeutic agent(Devarshi et al., 2022). The first step in reaching this objective is the screening of plants used in traditional .Many times, people believe that plant-based medications are less harmful and have fewer side effects than synthetic ones (Chhetri et al., 1970).

Divergent schools of thought are redefining herbal medicine in a contemporary clinical setting, and this is causing it to undergoes significant evolution. While practitioners are more likely to seek out specific, unbiased proof of a treatment's benefits, risks, and safety, many Western herbalist physicians are concerned that the mainstreaming of herbal medicine could pull it away from its traditional roots. However , Practitioners are also interested in having strong scientific proof that the products they suggest—or that their patients might already be using—have the necessary indications of risk and safety(Devarshi et al., 2022). A great deal of effort has gone into finding a through method for assessing the safety and effectiveness of herbal medicine while incorporating the concerns and encounters of each party participating in the delivery of healthcare, including patients, traditional healers, and medical professionals.

Medicinal plants have been shown in a previous study to be extremely helpful in wound treatment, increasing the speed at which wounds heal using the least amount of pain, discomfort, and scarring for the patients, Ointments made from herbal ingredients are also formulated in different dosage forms. An ointment is an externally applied viscous semisolid preparation used on body surface like skin, mucous, membranes of the nose, eyes , vagina , and anus (Yadav Abhishek & Samanta Krishanu, 2021). An ointment may or may not be medicated. A medication is dissolved, suspended, or emulsified in the base of medicated

ointments (Yadav Abhishek & Samanta Krishanu, 2021). Ointments are applied topically for a variety of uses , including as astringents, emollients, antipruritics, protectants, and keratolytics(Devarshi et al., 2022). The bases for ointment are typically anhydrous and comprise one or more medications in a suspension, solution, or dispersion. Ointment bases come in four varieties: water removable, water soluble , hydrocarbon (oligeanous) , and absorption. They are further divided into three categories based on the degree of action: diadermic, endodermic, and epidermatic. The goal of an antiseptic ointment is to inhibit or eradicate bacterial growth. (Chhetri et al., 1970).

Ointments are semisolid , viscous preparations with active ingredients that are either suspended or dissolved. Before adding the other ingredients, the ointment base must be heated to a temperature above melting. When the finished formulation or the base for the ointment is thick or cold , low shear or mixing speeds are usually used. When the ointment base is liquid , mixing speed and shear can be increased to evenly distribute the functional ingredients. To ensure that the material is constantly moving and effectively tranfers from the walls of the mixing vessel , ointment mixers usually use dual-motion counter –rotating blades with side scrapers. Solid ingredients can be added with the help of external powder educators. In addition to being hydrating, ointments are beneficial for dry skin. Because they only contain a base oil or fat and few other ingredients , they have a low risk of irritation and sensitization.

Petroleum and mineral oil, petroleum and waxes , or petroleum and fatty alcohol combinations are common ointment bases. The ratios and graded of these ingredients are chosen to provide the desired final product viscosity and spreadability.

An ointment base is the vehicle for an ointment. The clinical indication for the ointment determines the base to be used. The different types of ointment bases are:

- Absorption base
- Emulsifying base
- Hydrocarbon base
- Vegetable oil base
- Water-soluble base

Qualities of the Perfect Ointment

1. The ointment can be grit-free and smooth.
2. The base for the ointment shouldn't be medicinal in any way.
3. It must possess both chemical and physical stability.
4. The active ingredients in the ointment base should be evenly distributed after being finely split.
5. It should be easily applied and melt and soften at body temperature.
6. It shouldn't stop a wound from healing.

Qualities of the Perfect Ointment Base

1. Non-stimulating, non-sensitizing, inert, and odorless
2. Harmonious with the pH of the skin and the integrated medication.
3. Effective emulsifier or solvent.
4. Non-greasy, moisturizing, protective , and readily removable.
5. Easily release medication where it is applied..
6. It should not retard healing of wound.

Advantages of Ointment

1. They stay way from drugs that first pass metabolism.
2. They are a suitable dosage form for bitter-tasting medications..
3. Compared to liquid dosage forms, they are easier to handle and more chemically stable.
4. Easy for patients who are unconscious and have trouble taking medication orally.
5. They make it possible to apply drugs to affected areas specifically, minimizing unintended non targeted drug exposure and preventing side effects in the process.

Disadvantages of Ointment

1. Herbal remedies work more gradually than allopathic ones.
2. Odor and taste are hard to disguise.
3. The manufacturing process ought to be laborious and intricate.
4. Long term treatment was necessary.
5. Unless acetyl alcohol is added, it is physicochemically less stable than solid dose forms.

Where are washable and non-greasy ointment bases (oil-in-water) appropriate for use?

- They don’t become rancid or encourage the growth of microorganisms.
- They also don’t cause as much irritation.

Table.1. Some Marketed Herbal Ointments

Sr No.	Marketed Ointment	Manufacturer	Category / Uses
1.	Sage Herbal Acne Control Ointment	Sage Herbal	Antiacne
2.	Tanvi Ointment	Tanvi Herbals	Moisturiser
3.	Balaji Arsh Har Ointment	Knack Health Care	Used in piles
4.	Gjrit Kumari (Aloe Vera) Ointment	Streamline Pharma	Skin care

5.	Quick Reflif Herbal Ointment	Leeford Health Care	Analgesic

2. Plant Profile

2.1. Galinsoga Parviflora

Figure.1. Galinsoga Parviflora

In 1976 saw the introduction of Garinthoga parviflora from Peru to kew Gardens. However, it soon escaped into the wilds of England and Ireland , where it was briefly known as ‘’ Kew weed’’.(Ali et al., 2017).It comes from Central America and is also known as Adventina parviflora, which means "gallant soldiers." The Latin term galinsoga parviflora (parva meaning small, flor meaning flower)(Harshitha et al., n.d.). The name "parviflora" refers to a species that "has small flower."Garinthoga is also referred to as "Queen Soldier" or "Brave Soldier" in the United Kingdom. This plant is naturalized in Malawi and goes by the name "Mwamna Arrigone," which translates to "My husband is sleeping." It was first used at the close of the eighteenth century, and it gradually extended throughout many European nations. Within the Asterceae family, the genus Galinsoga parviflora is extensively dispersed throughout North and South America. Within the Asterceae family, the genus Galinsoga

parviflora is extensively dispersed across North and South America(Ali et al., 2017). Galinsoga parviflora is the name given to the plant by Spanish botanist and physician Ignacio Mariano Martinez de Galinsoga (Harshitha et al., n.d.). t has antifungal, antioxidant, antibacterial, and anti-diabetic qualities, among other pharmacological characteristics. The species Galinsoga, whose aerial parts are utilized as an anti-inflammatory in conventional medicine for the treatment of skin conditions like lichens and eczema(Ali et al., 2017). Blood of wounds or cuts can be coagulated by the juice of plants and applied to treat wounds (Ferheen et al., 2011). Blood of wounds or cuts can be coagulated by the juice of plants and applied to treat wounds(Al-Robai et al., 2023).

Description

Galinsoga parviflora is herbaceous , recent plant that can grow to a height of 80 cm, depending on the growing environment. The simple, opposite leaves have lower petioles and upper leaves do not have petioles. The blade of the leaf is oval and oblong in shape, with a sharp tip. Typical Compositae flowers, measuring 5 to 8 mm in diameter, are carried on axillary penduncles within the inflorescence (Sravanthi et al., 2019). It normally grow on a height of about 0.6 cm (Ali et al., 2017). The plant produce tiny flowers with yellow disk florets in the center surrounded by ray florets with pink or red tips(Ali et al., 2017). The flowering plant blooms from May through September. It frequently disturbs agricultural areas and habitats in a variety of temperate and subtropical regions worldwide. It grows easily in wastelands, roadsides, uncultivated areas, and soils that are sandy, loamy, or clay. (Ali et al., 2017).

Synonyms

- Venturentina parviflora (Cav.).Raf.
- Microglossa Baziasa Steud.
- Baker, Galinsoga hirsute
- Galansoga laciniata Retz.

- Microglossa Sabazia DC.

Table.2. Taxonomical Classification

Domain	**Eukaryota**
Kingdom	Plantae
Subkingdom	Tracheophytes
Phylum	Spermatophyte
Subphylum	Angiospermae
Class	Dicotyledonae
Sub division	Eudicots
Order	Asterales
Family	Asteraceae
Genus	Galinsoga
Species	Parviflora

Morphology

Leaves: The leaves are symmetrical and basic. Petioles on lower leaves measure between 2 and 15 mm in length. The blades are ovate and oblong, measuring 1-6.5 cm by 0.5-4.5 cm, with a shallowly serrated margin. Oval to oblong leaf blade with a sharp tip.

Inflorescence: The inflorescence is made up of standard 5-8 m wide composite flowers, or compositae or Asteraceae , that are carried on lengthy ancillary peduncles. The terminal and axillary head of the inflorecence is usually in pairs, with involures bracts arranged in two rows, glabrous, and scared of pales.

Flowers: Every flowers and capitulum has two different kinds of flowers: tubular hermaphrodites with yellow flowers in the center disc and ligulate females with white flowers at the margins. These are female ray flowers, typically having five white petals with a short ligule and a marked tube, or tubular disk flowers with yellow petals. Achenes with

pappus or portions of floral structures that are easily dispersed by wind or animals are known as dispersal units.

Fruits: Fruits are1-2 mm long achenes with ovate , or black , central achenes and papus made of white fimbriate scales that extend the length of the fruit , with marginal achenes lacking pappus.

Seeds: Brave soldiers are shallow germinators, able to germinate up to 2 cm (0.78 inches).

Chemical Constituents

The primary phytochemicals found in G. parviflora include flavonoids, phenolic acids, depsides, and related glycosides. Paturithrin, quercimeritrin, luteolin 7.-beta-d glucopyranoside, apigenin, 7-beta-glucoside, quercetagetin, galinthoside A and B, 7,3',4' - trihydroxyflavonones, and pentahydoxy flavanone are the flavonoids found in G. parviflora. Vanillic acid, isovanillic acid, p-coumaric acid, chlorogenic acid, p-hydroxyl benzoic acid, caffeoylglucaric acid, and hydroxyl phenyl acetic acid are among the other phenolic acids, also known as depsides. The investigation of G. parviflora using an aqueous extract indicated the presence of phytosterols, alkaloids, glycosides, saponins, and tannins. Figure presents the chemical structure that was chosen for the isolated bioactive compounds. The phytochemical studies identified 38 compounds, including steroids, flavonoids, aromatic esters, diterpenoids, derivatives of caffeic acid, and derivatives of phenolic acid, among other compounds. Eleven compounds were identified through the analysis of an aqueous ethanolic extract. These include triacontanol (1), beta-sitosterol (2), beta-sitosterol (3), stigmasterol (4), 7-hydroxy – beta – sitosterol (5), 7-hydroxyl stigma sterol (6), beta-sitosterol – 3 – o – beta – D – glucoside (7), 3,4- dimethoxy cinnamic acid (8), proto catehuic acid (9), fumaric acid (1)(Ali et al., 2017).

Medicinal Uses

- Galinsoga parviflora also has some medicinal uses as a tropical treatment for nettle stings.
- It also helps to prevent hypertension and cardiovascular diseases.
- The juice of the whole plant is applied to treat wounds. It helps to coagulate the blood of fresh cuts and wounds.
- The dried leaves are an essential flavoring for certain dishes.
- Used in the treatment of cold sores, common cold and flu, toothache, and eye diseases.
- Used as fodder for cattle.
- Humans also use it as a vegetable for preparing soups and salads.
- The roots provide effective remedy against beetle bites.
- In traditional medicine it is used in treatment of dermatological problems such as eczema and lichens.

3. Literature Survey

1. **S. Ferheen,et al.** in addition to conducting an in vitro experiment using the DPPH antioxidant assay alfa glucosidase and urease inhibition assay the research work studied phytochemical screening of bioactivity for testing of ethyl acetate in soluble fractions of G. parviflora .The result showed the presence of two known flavanone glucosides, galinsosides A and B.

2. **C.Schmidt,et al.** suggested utilizing third instar larvae and gravid adult female mosquitoes to conduct in vitro studies and examine the biological activities of a few

selected medicinal plants that are traditionally used in South Brazilian medicine. The most active plant species were investigated by G.parviflora and hydrophilic extract.

3. **N.Afza,et al.** assesses phytochemical screening for the leaves of G.parviflora leaves and S. aureus, B.Cereus,L.innocua,E.coli,Salmonella sp. and E. sakazakii.(Z)experiments in L.monocytigenes .The main bioactive components with antibacterial activity is)-3-hexen-1-ol(21.7%) . which is the major bioactive compounds with antibacterial activity.

4. **I.Mostafa,E.A.El-Aziz,S.Hafez,A.El-Shazly** reported on an in vitro experiment utilizing cancer cells, cirrhotic rats, B. subtilis, P.aerogenosa,E.coli, and C. albicans, as well as an examination of the chemical composition and bioactivity og G. parviflora. Eleven chemical components were found in the hyroditilled oil, and more than forty volatile components were found in the fractions of aqueous ethanolic extract.

5. **A.Bazylko,J.Borzym,A.Parzonko** evaluated the determination of the potential for new thiophene-dervied aminophosphoric derivatives from their herbicidal activity and in vitro experiment using selected bacteria which result show the species of the G.parviflora that had remarkable herbicidal activity on Alivibrio fischeri with no toxicity.

6. **T.Y.Zhang,et al.** determined isolation of biomolecules from G. parviflora and bioactivity testing for experiment using selected micro organisms which result that indicates potential antimicrobial activity and inhibitors of filamentous temperature sensitive protein Z.

7. **E.Studzinska-Sroka, et al.** recommended analysis of the phytochemical profile and anti-inflammatory properties of a hydroalcoholic extract from the herb G. parviflora.

4. Aim and Objective

4.1. Aim

To formulate and evaluate an Antifungal ointment made from extract of *Galinsoga parviflora*..

4.2. Objective:

1. To formulate the ointment.
2. To evaluate the ointment base.

5. Experimental Work

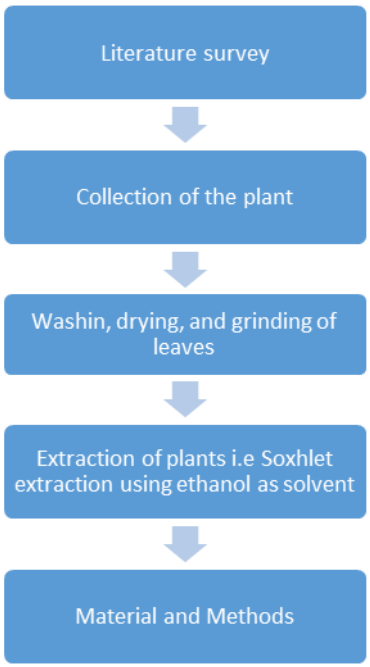

Figure.2. Process for Experimental Work

6. Experimental Section

6.1. Material and Methods

A. Gathering of Botanical Specimens

Gathered from the village of Kawaddara, Igatpuri, Nashik District, Maharastra , the laves of Galinsoga parviflora were botanically identified and authenticated at the Department of Botany, Commerce College, CIDCO, Nashik; K.S.K.W. Arts. Science. A specimen voucher has been left at herariu GP01 G is the speciem Voucher No.

B. Making the Extract

The leaves were gathered, carefully cleaned in distilled water, and allowed to dry for ten to fifteen days. under the normal conditions. Then the coarsely powdered material is then blended with the help of mechanical blender i.e 25 gram was imbibed with 150 ml of 90% ethanol and such powdered material was charged into the Soxhlet apparatus for 17 hours. To obtain a residue that was somewhat green, the extract was finally collected and concentrated. After that, the extract was kept in a cool, dark place in an airtight container.The mixture was then condensed to dry utilizing a heating mental for evaporation.

Figure.3. Soxhlet Apparatus

7. Pharmacognostic Studies

The following describes the standard procedure of both primary and secondary metabolites , including proteins, amino acids, carbohydrates, alkaloids, sapnonins, phytosterols, glycosides, phenols, tannins, terpenoids, in the preliminary phytochemical investigation analysis.

7.1. Test for Carbohydrates

- **Fehling's examination:-** Adding 1 ml of Fehling's A and B fixes to the filtrate , heat it for one minute. Brick red color due to the existence of sugars that reduce.

7.2. Test for Amino Acids

- **Test for ninhydrin**: Boil the test solution with 0.2% of Ninhydrin. Amino acids are indicated by the color purple.

7.3. Test for Alkaloids

- **Mayer's examination:**The filtrate underwent treatment using Mayer's reagent. Precipitate with a yellow coloration forms when alkaloids are present.
- **Hager's examination:** After treating the filtrate, Hager's reagent was applied.When a yellow precipitate forms, alkaloids are present

7.4. Test for Tannins

- **FeCl3 Solution:-** Add 1% Solution of FeCl3 for the extract. The color black signifies the existence of tannin.
- **Lead acetate solution:-** Add the extract and 1% lead acetate solution. The development of white color signifies the presence of tannin.

7.5. Test for Saponins Glycosides

- **Test for foam:-** A mixture of test outcome or water was shaken, and the froth formation that ought to remain steady for fifteen min was monitored. This finding suggest that saponins are present.

7.6. Test for Proteins

- **Millon's s test:-** Add 5 ml of Millon's reagent to 3 ml of filtrate **.** Warming causes the formation of white color, which then turns red, indicating the presence of proteins**..**
- **Biuret test:-** Add a few drops of 1% CuSo4 solution. The appearance of violet color signifies the presence of proteins.

7.7. Test for Steroids

- **Salkowski reaction:-** Chloroform (2ml) was combined with crude extract. After that 2 ml of concentrated sulphuric acid were added and gently shaken. The presence of a steroidal ring is indicated by a reddish brown color.

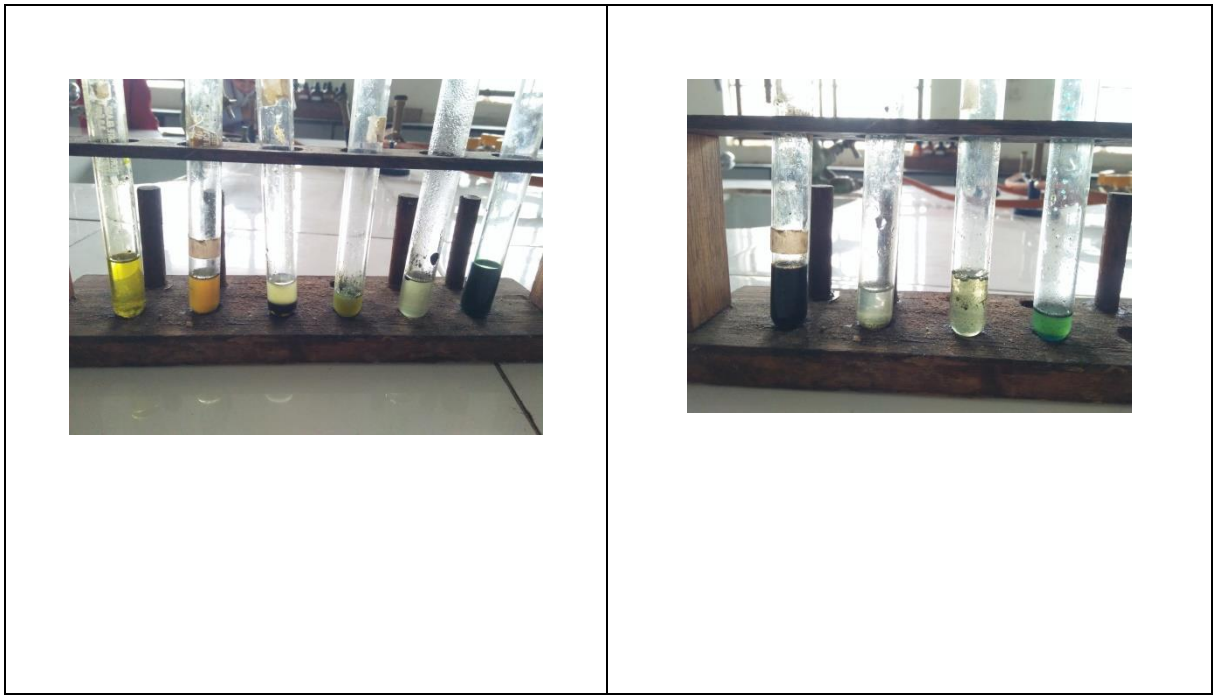

Figure.4. Phytochemical Test

Table.3. Phytochemical Test

Qualitative Phytochemical test	Result
Carbohydrates	Negative
Amino acids	Negative
Steroids	Positive
Alkaloids	Positive
Tannins	Positive
Saponin Glycosides	Positive
Proteins	Negative

8. Standardization of Plant Material

8.1. Determination of Total Ash Value

Total ash is designed to measure the total amount of material produced after incineration of the ground drug at about 450 degree Celsius to remove all the carbons. The ash of any organic material of their non-volatile inorganic compounds. This value varies within wide limits and is therefore an important parameter for the purpose of evaluation of crude drugs. More direct contaminations , such as sand or earth , is immediately detected by the ash value.

8.2. Procedure

The 2 g of air dried powder of *Galinsoga parviflora* was transferred into a silica crucible and incinerate at a temperature not exceeding 450 degree Celsius until free from carbon, cooled , and weighed. The percentage of ash was calculated with reference to air-dried material.

1. Weight of crucible = 56.95 g
2. Weight of crucible + Air dried material = 58.96 g
3. Weight of crucible + Ash = 57.55 g
4. Total ash = 0.6 g
5. Percentage of total ash = 1.01 % w/w

Figure.5. Determination of Total Ash Value

8.3. Extract Preparation

The fresh leaves of *Galinsoga parviflora* was collected in October 2023, the leaves was washed and dried at RT (Room temperature), then converted into a coarse powder by the help of grinder and passes through a sieve number 18 to get the uniform size. To get rid of chemical constituents, powdered leaves was defatted using ethanol (40–60%). Using a Soxhlet device, the defatted leaves were further extracted with ethanol.The extracts were dried completely in a vacuum oven until all traces of ethanol were eliminated. In a refrigerator set between 2-8 °C, the extracts were stored7(Shrivastav et al., 2022). In October 2023, fresh leaves of Galinsoga parviflora were harvested. The leaves underwent a process of washing, drying at room temperature, and grinding. Finally, they were ground into a coarse powder and sieved through number 18 to achieve a consistent size. Using 40–60% ethanol, powdered leaves were defatted to remove chemical components. The defatted leaves were further extracted with ethanol using a Soxhlet device.The extracts were thoroughly dried in a vacuum oven to remove any remaining ethanol. The extracts were kept in a refrigerator with a temperature range of 2 to 8 °C.

8.4. List of Ingredients and Their Uses

Table.4. List of Material

Sr No.	Ingredients used	Role of ingredients
1.	Leaves of *Galinsoga parviflora*	Active ingredient
2.	Ethanol	Solvent
3.	Liquid paraffin	Emollient
4.	Wool fat	Stabilizer
5.	Yellow soft paraffin	Moisturizing agent
7.	Cetostearyl alcohol	Emollient or stabilizer
8.	Triethanolamine	Preservative

8.5. Formulation of Ointment

a) First, weigh the finely grated hard paraffin that will be placed in the evaporating dish on the water bath to create the ointment base. The remaining ingredients, such as wool fat, bees wax, cetostearyl alcohol, and yellow soft paraffin, should be added after the hard paraffin has melted. Gently stir to promote homogenous melting and mixing, then allow the ointment base to cool.

Figure.6. Melting of Ingredients on Electric Water Bath

Figure.7. Levigation Method

b) Create the herbal ointment by carefully weighing the Galinsoga parviflora extract and adding it to the ointment base using the levigation method. This will result in a smooth paste that is two or three times the base's weight. Next, add preservative (rose water or triethanolamine) to the ointment to keep it safe from microorganisms. Finally, transfer the ointment into an appropriate container(Jadhav et al., 2023).

Figure.8. Formulation of Ointment

Table.5. Formula for preparation of ointment

Sr No.	Name of ingredient	F1	F2	F3
1.	Active ingredient	0.2 g	0.2 g	0.1 g
2.	Wool fat	0.5 g	0.5 g	0.5 g
3.	Hard paraffin	0.5 g	0.5 g	0.5 g
4.	Cetostearyl alcohol	0.5 g	0.5 g	0.5 g
5.	Yellow soft paraffin	8.2 g	8.2 g	8.2 g

8.6. Evaluation Parameters of Ointment

The final ointment was evaluated by various parameters such as Color, Odor , pH, Consistency, Solubility, Washability, Non-irritancy Test, Spreadability, Diffusion Study.

8.6.1. Colour

Colour evaluation has been tested by visible examination by using a black and white background and any change has been observed for change in colour(Sawant & Tajane, 2016).

8.6.2. Odour

Odour of the ointment has been tested with the three volunteers for more accurate observation(Sawant & Tajane, 2016).

8.6.3. Consistency

The prepared ointment was found to be Smooth and no greediness is observed.

8.6.4. Solubility

Soluble in boiling water, ether and alcohol.

8.6.5. Washability

The formulation was applied to the skin of two volunteers and then the ease extend of washing

with water was checked.

8.6.6. Non-irritancy Test

An herbal ointment prepared was applied to the skin of two volunteers and observed for the effect.

8.6.7. pH

About 2 gm of the ointment was taken in a beaker followed by 100 ml of distilled water. Resulting solutions were heated up to 70°C.The pH of ointments is determined using a digital pH meter.

Figure.8. Determination of pH

8.6.8. Spreadability

The spreadability was determined by placing an excess sample in between two slides which were compressed to uniform thickness by placing a definite weight for a definite time. The time required to separate the two slides was measured as spreadability(Sawant & Tajane, 2016).

Spreadability was calculated by the following formula S=M×L/T

Where, S= Spreadability

M= Weight tide to the upper slide

L= Length of glass slide

T= Time taken to separate the slides

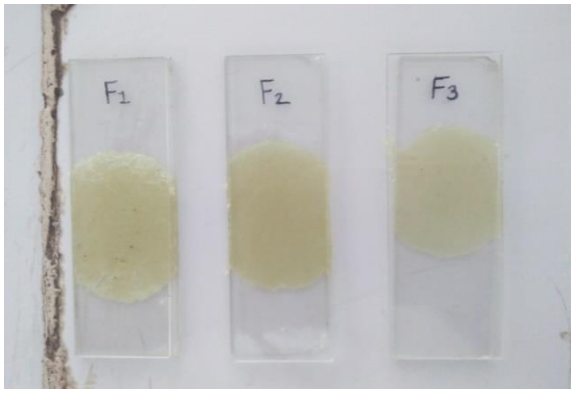

Figure.9. Spreadability

8.6.9. Diffusion Study

The diffusion study was carried out by preparing agar nutrient medium. A hole board at the center of medium and ointment was by placed in it. The time taken by ointment to get diffused through was noted. (after 60 minutes)

8.6.10. Stability study

A physical stability test of the herbal ointment was carried out for four weeks at various temperature conditions like 2°C, 25°C, and 37°C. The herbal ointment was found to be physically stable at different temperatures i.e., 2°C, 25°C, and 37°C within four weeks. F1, F2, and F3 all are Stable.

9. Antifungal Activity

The different extracts of whole plant of *Galinsoga parviflora* were subjected to antifungal studies against *Candida albicans.*

9.1. Medium

Agar nutrient

9.2. Zone of Inhibition

A suitable dilution of a broth culture or a broth suspension of the test bacterium or fungi is flooded on the surface of a solid medium (agar nutrient). The plate is tilted to ensure uniform spreading and the excess broth pipetted off. Inoculations may also be performed by spreading with swabs. After drying the plates (37∘C for 30mins) antibiotic are applied with sterile syringe in the well. After overnight incubation, the degree of sensitivity is determined by measuring the zones of inhibition of growth around the well.

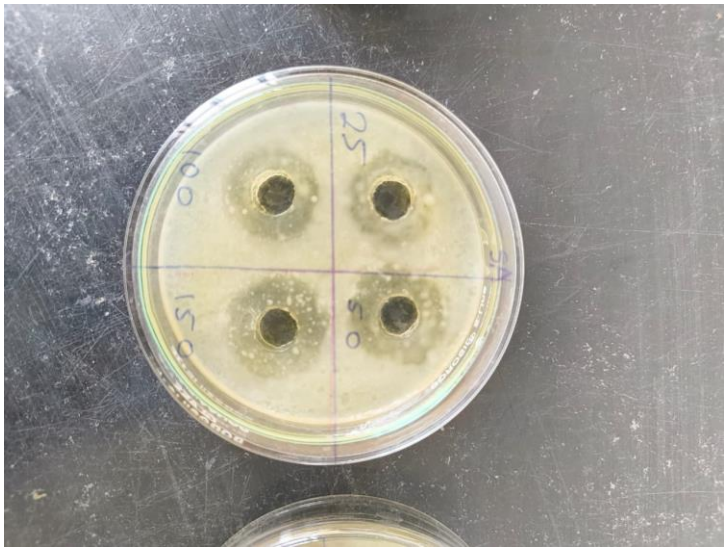

Figure.7. Zone of Inhibition

10. Result and Discussion

To prepare and assess the ointment, the current study was carried out. *Galinsoga parviflora* was used to make the ointment formulations in various batches. In this instance, a straightforward extraction method was used to create a herbal extract with a good yield and no negative effects on the chemical constituents or their activity. The ointment was made using the levigation method, which ensured that the herbal extract and ointment base were uniformly mixed and would remain stable over time. The study of the physicochemical properties produced satisfactory findings regarding the study of solubility, pH, consistency, spreadability, washability, non-irritancy, and diffusion. The formulations' pH values fall within the standard range of 7.2–6.8. The spreadability test results indicate the region that the prepared.

Table.6. Evaluation Parameter

Evaluation Test	F1	F2	F3
Appearance (colour)	Light green	Light green	Light green
Odour	Characteristic	Characteristic	Characteristic
Consistency	Smooth	Smooth	Smooth

Solubility	Soluble in boiling water and ether	Soluble in boiling water and ether	Soluble in boiling water and ether
Washability	Easily washable	Easily washable	Easily washable
Non –irritancy test	Non-irritant	Non-irritant	Non-irritant
pH	7.2	7.2	6.8
Spreadability	10 g.cm/sec	10 g.cm/sec	14 g.cm/sec
Diffusion study	0.7 cm	0.7 cm	0.6 cm

11. Conclusion

From the present study it can be concluded that it is possible to develop ointments containing herbal extracts and can be used as the provision of a barrier to protect skin. Plants are more potent healers because they promote the repair mechanism in the natural way. Herbs play a major role in treatment because of fewer side effects, low cost, and easy availability. From ancient times *Galinsoga parviflora* is used for their various medicinal properties. Thus, this ointment could become a medium to use these medicinal properties effectively and easily as a simple dosage form. The present formulation study showed that it is feasible to prepare, develop and evaluate the ointment containing herbal extract.

12. Future Work

Future studies for conducting clinical trials to evaluate the efficacy and safety of the ointment in treating various skin conditions such as eczema, dermatitis or minor wounds. It also bioactivity studies for exploring the ointment's potential anti-inflammatory, antimicrobial, antioxidant, or wound healing properties through in vitro and in vivo experiments. Further for developing novel topical delivery systems or formulations (e.g., nanoparticles, liposomes) to enchance the penetration and bioavailability of active compounds in the ointment. Safety

assessment for conducting comprehensive studies to evaluate the long-term safety profile of the ointment, including potential toxicity or allergic reactions.

13. Summary

The plant exhibits a number of therapeutic qualities. The leaves have been known to treat a variety of conditions, including lichens, ringworm, eczema , hemorrhages, malaria, anemia with jaundice, colorectal cancer, analgesics , liver problems, toothaches, inflammation, colds, and sore. Additionally it is used to treat a variety of fungal illness. The key ingredients , including tannins, terpenoids, steroids. It also aids in prevention of cardiovascular disorders and hypertension. The entire plant's juice is applied to wounds to help clot the blood from recent cuts.

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