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Formulation and Evaluation of Antifungal Herbal Cream Using Psidium Guajava for skin Diseases

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ABSTRACT

The main aim of our research is to develop a novel herbal cream formulation consisting of guava leaves for the treatment of skin infections. Topical route is most suitable for skin diseases. The development of topical drug delivery system designed to have systemic effects appears to be more beneficial for a number of drugs on account of several advantages over conventional route of administration. A novel cream formulation consisting of antifungal herbal cream is prepared. The formulation was subjected to physio-chemical studies. Anti fungal studies were performed to find out the safety of materials used in the formulation. The developed cream consisting of Anti fungal cream was found to be safe and effective for the treatment of skin diseases.

Keywords: Antifungal skin cream, novel herbal cream, drug delivery system, Anti fungal studies

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1. Introduction

Psidium guajava L. known as Guava is a medicinal plant belonging to the family Myrtaceae. *P. guajava* is a well-known traditional medicinal plant used in various indigenous systems of medicine. It is widely distributed throughout India. The leaves and bark of *P. guajava* tree have long history of medicinal uses that is still employed today. Nature has blessed Guava or *Psidium guajava* with many essential nutrients. Historically, Guava is said to be cultivated in South Africa for commercial purpose and has

been brought to country India by the Portuguese. As a fruit, Guava is very common in Asian countries but occupies a greater space in western countries mainly because of its medicinal properties. The tree can be cultivated in any soil provided the climate is tropical or subtropical. India is the largest producer of Guava as on date followed by neighbouring country China.

Common Name : Apple Guava, Common Guava

Telugu Name : Goyy apandu

Hindi Name : Amrud

Taxonomy

Kingdom : Plantae
 Subkingdom : Tracheobionta
 Super division : Spermatophyta
 Division : Magnoliophyta
 Class : Magnoliopsida
 Subclass : Rosidae
 Order : Myrtales
 Family : Myrtaceae
 Subfamily : Myrtoideae
 Tribe : Myrteae
 Gender : Psidium
 Species : Psidium guajava



Figure 1

Table 1: Medicinal Uses of Various Parts of Guava Plant

Plant part	Compound	Medicinal uses
Leaves	Phenolic compounds, iso flavonoids, gallic acid, catechin, epicatechin, rutin, naringenin, kaempferol	Hepatoprotection, antioxidant, anti-inflammatory, anti-spasmodic, anti-cancer, antimicrobial anti hyperglycemic, analgesic activity
Pulp	Ascorbic acid, carotencoids (lycopene, β -carotene, β -cryptoxanthin)	Antioxidant, anti-hyperglycemic, Anti-neoplastic
Seed	Glycosides, Carotenoids, phenolic compounds	Antimicrobial activity
Skin	Phenolic compounds	Improvement of food absorption
Bark	Phenolic compounds	Strong antibacterial and anti-diarrhoeal activity

Table 2: Anti fungal activity

Extract	Conc	Micro organism
Hexane	50mg/ml	It showed the best antifungal activity against Trichophyton rubrum, Trichophyton tonsurans, Sporotrix schenckii, Microsporum canis, Cryptococcus neoformans, Candida parapsilosis, Candida albicans.
Acetone	50mg/ml	Only showed the activity against Cryptococcus neoformans, Candida parapsilosis, and Candida albicans
Methanol	50mg/ml	Only showed the activity against Cryptococcus neoformans, Candida parapsilosis, and Candida albicans.

2. Materials and Methods

Materials:

INGREDIENTS	CATEGORY
Psidium guajava extract	Antifungal agent
Stearic acid, Cetyl alcohol (oil phase).	Emulsifier, Emollient, lubricant. (cream base)
Distilled water (water phase)	Cream base
Bees wax	Water proofing agent, lubricant.(cream base)
White soft paraffin	Emollient. (cream base)
Sodium benzoate	Preservative
Rose water	Fragrance.
Glycerine	Thickening agent

Methods:

Collection of plant:

Leaves of guava (Psidium guajava) were collected from the herbal garden of Sri Krishna devaraya university college of pharmaceutical sciences. The collected leaves were washed with water and shade dried for 10 days and grind into pous powder using a mixer grinder.



Figure 2

Collection of ingredients: All chemicals procured from the college laboratory. Rose water and cream base are procured from market.

Preparation of plant extract:

The dried leaf powder was used for extraction of phytoconstituents. The powdered plant leaves were stored in a air tight container and the powder was subjected to soxhlet extraction using methanol as solvent. 10 grams of dried leaf powder sample is extracted using 100 ml of methanol. The extract was collected and concentrated using a hot water bath. The crude semisolid extract was collected and stored in air tight container.



Figure 3

Formulation of herbal cream:

Preparation of cream base: Take steric acid and cetyl alcohol in maximum amount which are used as oil phase melt them on water bath. Again take distilled water and bees wax and glycol in maximum amount which are used as aqueous phase and heat it on water bath. Mix the two phases. Now cream base is prepared.

Preparation of cream using plant extract:

The prepared cream base was mixed with plant extract and rose water is added for fragrance. The ingredients are added in fixed ratio. Finally cream was prepared.

Table 3: The formulation design of cream

Ingredients	Formulations
Guava extract	10 ml
Sodium benzoate	2 gm
Glycerol	2 ml
Rose water	5 ml



Figure 4

3. Results and Discussion

Evaluation of herbal creams:

Determination of p^H:

The p^H of the cream can be measured on a standard digital p^H meter at room temperature by taking adequate amount

of the 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 and graded.



Figure 5

Spreadability:

Adequate amount of sample was taken between two glass slides and a weight of 100 gm is applied on the slides for 5 minutes 5 spreadability can be expressed as,

$$S = \frac{m}{t}$$

Where,

M= Weight applied to upper slide.

L= Length moved on the glass slide.

T= time taken.



Figure 6

Saponification value:

2 gm of substances refluxed with 25 ml of 0.5N alcoholic KOH for 30 minutes. To this 1 ml of phenolphthalein added and titrated immediately with 0.5N HCl, note the reading as "a". Repeat the operation omitting the substances being examined.



Figure 7

Note the treading as "b".

Saponification value= $(b-a) \times 28.05/w=61.71$

Where

W=weight of substance in grams

Acid value:

10 gms of cream is dissolved in accurately weighed 50 ml mixture of equal volume of alcohol and solvent and ether. The flask was connected to reflex condenser and slowly heated until sample was dissolved completely. To this 1 ml of phenolphthalein is added and titrated with 0.1N NaOH, until faintly pink colour appears after shaking for 30 sec.

Acid value = $n \times 5.61/w$

Where

N=the no of ml of 0.1N KOH solution.

W=the weight of substance in grams



Figure 8

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 in a slide and cover with a cover slip and examine it under a microscope. If the disperse globule appears red and ground colourless then it is o/w type and the reverse condition appears in w/o type of creams

After feel:

Emolency, slipperiness and amount of residue left after the application of fixed amount of cream was checked.

Irritancy study:

Mark an area of 1 sq.cm on the left hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy was checked, if any, for regular intervals upto 24 hrs and reported.

Stability Test:

- ❖ Phase separation.
- ❖ Moisture absorption studies.

Phase separation:

The formulated cream was kept intact in a closed container at 25-30 not exposed to light. Phase separation was observed carefully for every 24 hrs for 30 days. Any change in phase separation was checked.

Moisture absorption studies:

About 50 mg of cream was taken on a watch glass. A beaker was taken with full of water and was kept in a desiccator without adsorbents. Watch glass with cream was introduced into the desiccator it was left for 24hrs.



Figure 9

4. Conclusion

Formulation and Evaluation of Anti-fungal skin creams was prepared by using trituration method. Evaluation studies were performed. This herbal cream was prepared skin disease as these are more common. Guava leaves were used as they contain more Anti-fungal properties most cost effective in applying this cream.

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