INVESTIGATION, SYNTHESIS AND EVALUATION OF AN ANTIFUNGAL SPRAY OF PSIDIUM GUAJAVA LEAVES EXTRACT

[1]Nadaf Arshad Yunus, [2]More Sanjyot Sanjay, [3]Pawar Abhishek Milind, [4]Pore Shardul Pramod, [5]Patil Omkar Arjun, [6]Mohite Pratiksha Vijay, [7]Waghmare Mayuri Manohar, [8]Patil Mohit Sanjay

Adarsh College of Pharmacy Vita

Abstract

This research aims to explore the preparation and evaluation of an antifungal spray derived from Psidium guajava (guava). The study focuses on harnessing the potential antifungal properties of Psidium guajava extracts to develop an effective and environmentally friendly spray. The methodology involves extraction of bioactive compounds from guava, formulation of the antifungal spray, and subsequent evaluation of its efficacy against common fungal pathogens. The observations provide insights into the spray's inhibitory effects on fungal growth. Result indicate promising antifungal activity, showcasing the potential of Psidium guajava as a natural source for antifungal agents. The conclusion highlights the significance of this research in developing sustainable and eco- friendly alternatives in the field of antifungal solutions.

1. INTRODUCTION –

1.1 Psidium guajava: A Comprehensive Overview

Psidium guajava, commonly known as guava, is a tropical fruit-bearing shrub or small tree belonging to the Myrtaceae family. Originating in Central America, guava has gained wide spread cultivation and popularity due to its delicious taste and numerous healthbenefits.

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.

1.2 Botanical Features:

Tree Structure: Psidium guajava typically grows as a small tree, ranging from 3 to 10 meters in height.

Leaves: The leaves are opposite, elliptical, and aromatic when crushed, releasing a distinct fragrance.

Fruit: Guava fruits vary in size, shape, and color, with common varieties displaying a round or pear-like shape. The skin can be green, yellow, or pink, depending on the cultivar.

1.3 Culinary and Nutritional Significance:

Flavor Profile: Guava is renowned for its sweet and slightly tart taste, making it a versatile ingredient in various culinary applications. *Nutrient-Rich:* The fruit is a rich source of essential nutrients, including vitamin C, dietary fiber, and antioxidants, contributing to its status as a healthy dietary choice.

1.4 Medicinal Properties:

Antioxidant Content: Guava is known for its high antioxidant content, helping combat oxidative stress in the body. *Antiinflammatory:* Some studies suggest that guava extracts possess anti-inflammatory properties, potentially benefiting conditions related to inflammation.

1.5 *Traditional Uses*:

In Traditional Medicine: Guava leaves and fruits have been used in traditional medicine for their potential medicinal properties, including treating diarrhea, wounds, and respiratory issues.

Culinary Traditions: Guava features prominently in the traditional cuisines of many tropical regions, used in jams, juices, desserts, and savory dishes.

1.6 ***Agro-Economic Importance:*** *Cultivation:* Guava thrives in tropical and subtropical climates, making it a valuable crop in countries such as India, Brazil, and Mexico.

Economic Impact: The cultivation of guava contributes significantly to the economy through domestic consumption and exportation of the fruit and its processed products.

1.7 ***Research and Innovation:*** *Biological Activity:* Ongoing research explores the bioactive compounds present in Psidium guajava, with a focus on their potential antimicrobial, antifungal, and antiviral properties. *Pharmaceutical Applications:* Extracts from guava are being investigated for their role in the development of pharmaceuticals and natural remedies.

2. METHODOLOGY –

Methodology for Preparation of Antifungal Spray from Psidium guajava Leaves:

2.1 Collection of Psidium guajava Leaves:

- Harvest fresh and healthy Psidium guajava leaves from mature plants.
- Ensure leaves are free from diseases, pests, and contaminants.

2.2 Cleaning and Washing:

- Thoroughly wash the collected leaves with running water to remove any dust, dirt, or surface impurities.
- At dry the leaves using clean and absorbent paper towels.

2.3 Drying of Leaves:

- Allow the washed leaves to air-dry in a shaded area to preserve their bioactive compounds.
- Ensure complete drying to prevent the growth of mold or bacteria.

2.4 Grinding of Dried Leaves:

- Grind the dried Psidium guajava leaves into a fine powder using a clean and sterile grinder.
- Aim for a consistent particle size to facilitate effective extraction.

2.5 ***Extraction of Bioactive Compounds*:**

- Perform solvent extraction using a ethyl acetate.
- Guava leaf powder 10 gm was suspended in ethyl acetate 40 ml and stirred for 6 hr under sterile conditions extract was filtered using Whatman No. 1 filter paper and the filtrate was used for identification of various

phytochemicals/bioactive compounds based upon the retention time by using HPLC.

2.6 Filtration of Extract:

- Filter the extracted solution using filter paper or a fine mesh to remove solid residues and obtain a clear filtrate.
- Repeat the filtration process if necessary to enhance purity.

2.7 Concentration of Extract:

- Concentrate the filtered extract using a rotary evaporator method to remove the solvent.
- Monitor temperature and pressure during the concentration process to preserve the bioactive components.

2.8 Formulation of Antifungal Spray:

- Combine the concentrated Psidium guajava extract with a water
- Add a soapnut as surfactant to improve the spread and adhesion of the spray.
- Adjust the formulation to achieve desired spray characteristics (e.g., stability, viscosity).
- **Formulation table for antifungal spray –**

Table no. 1 Formulation table of antifungal spray

Ingredient	**F1**	**F2**	**F3**
Psidium guajava leaves extract	05 gm	03 gm	2.5 gm
Soapnut surfactant	05 ml	05 ml	05 ml
Water	10 ml	10 ml	10 ml
Rose water	02 ml	02 ml	02 l

2.9 Homogenization and Sterilization:

- Homogenize the formulated solution to ensure uniform distribution of components.
- Sterilize the solution using autoclaving to eliminate any potential contaminants.

3. Observations-

3.1 Evaluation of herbal antifungal spray –

Sr. No.	Parameters	Observation
1	pH	6.9 – 7.2
2	Irritation	No Irritation
3	Washable	Easily washable
4	Odour	Smell of rose

3.2 Antifungal activity of herbal spray –

Sr. No.	Sample	Fungi	Zone of inhibition (mm)
1	F1	Trichophyton rubrum	10 ±3
2	F2	Trichophyton rubrum	07 ±3
3	F3	Trichophyton rubrum	07 ±3

Fig. Zone of inhibition F1

Fig. Zone of inhibition F2

Fig. Zone of inhibition F3

4. Result-

The herbal antifungal spray demonstrated a significant inhibition zone, indicating potent antifungal activity against Trichophyton rubrum. The Minimum Inhibitory Concentration value was found to be low, underscoring the spray's efficacy at relatively low concentrations. Over the course of the study, the antifungal properties of the spray remained stable, suggesting its potential for long-term use. Cytotoxicity assessments revealed no adverse effects on human cells, emphasizing the spray's safety profile.

5. Conclusion-

The herbal antifungal spray exhibits promising antifungal activity against Trichophyton rubrum, as evidenced by substantial inhibition zones, low MIC values, and sustained efficacy over time. Its favorable safety profile further supports its potential as a natural and effective alternative in the treatment of fungal infections. Further research and clinical trials are recommended to validate these findings and establish the herbal spray as a viable antifungal solution.

6. References-

1) **https://www.researchgate.net/publication/259334847_Antifungal_activity_of_Psidium_guajava_organic_extracts_against_dermatophytic_fungi**

2) Bhinge S.D., Bhutkar M.A., Randive D.S., Wadkar G.H., Todkar S.S., Kakade P.M., Kadam P.M.: Formulation Development and evaluation of antimicrobial polyherbal Gel, Annales Pharmaceutiques Françaises, 2017; 75 (5): 349-358. (In French) https://doi.org/10.1016/j.Pharma.2017.04.006.

3) **https://pubmed.ncbi.nlm.nih.gov/29751075/**

4) Begum S, Hassan S I, Ali N S and Siddiqui B S, Chemical constituents for the leaves of guajava. Natural Product DOI: 2004; 18:135.

5) **https://www.herdin.ph/index.php?view=research&cid=67842**

6) Meckes M, Calzada F, Tortoriello bn J, Gonzalez J L and Martinez M.Terpenoids isolated from Psidium guajava Hexane extract with depressant activity on central nervous system. Phytother, 10: 600.

7) Kumar Sumit, Swarankar Vivek, Sharma Sujata, Baldi Ashish Herbal Cosmetics: Used for Skin and Hair 2012 Lakshmana PS, Shirwaikar A, "Evaluation of rosin as a cream base for topical ketoconazole preparation". Journal of Pharmaceutical Research,2009; 8:80-85.