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Investigating Antifungal and Antimicrobial Properties by Preparing and Assessing an Extract Patch of Momordica Charantia Leaves Extract.

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ABSTRACT –

This study examines the antifungal and antibacterial characteristics of an extract obtained from the leaves of Momordica charantia, sometimes known as bitter melon. To maximize the effectiveness of this natural resource in the fight against microbial diseases, a patch was developed and assessed. The goal of the study was to provide important information for the creation of substitute, plant-based antibacterial agents.

Keywords: natural extracts, patch formulation, Momordica charantia, antimicrobial, antifungal, and alternative medicine.

Introduction: The medicinal virtues of Momocardia charantia, also referred to as bitter melon, have been acknowledged for a long time. The goal of this study is to extract the antibacterial properties of Momordica charantia leaves and use them in a patch formulation. Examining natural substitutes becomes essential as worries about antibiotic resistance grow.

FUNGAL INFECTION TYPES -

1. Ringworm (Tinea corporis): A rash that is round and has a transparent center, resembling a ring.
2. Athlete's foot (Tinea pedis)- A fungal illness that affects the feet and causes itching, redness, and peeling is called athlete's foot (Tinea pedis).
3. Jock itch (Tinea cruris): A fungal infection causing rashes, redness, and itching in the groin area.
4. Candidiasis: This fungal infection causes symptoms in the mouth (oral thrush), genitalia (yeast infection), and folds of skin.
5. Tinea versicolor: This condition is characterized by skin discolorations that are frequently lighter or darker than the surrounding skin tone.
6. Onychomycosis (nail fungus): Fungal infection of the nails that results in cracking, thickness, and discolouration.

For a precise diagnosis and the best course of action, it is imperative to speak with a healthcare provider.

PVA (polyvinyl alcohol) as a adhesive polymer-

PVA is a water-soluble polymer that has good film-forming qualities and is frequently utilized as a medicine patch carrier material. When preparing patches, inexpensive sticky polymers include acrylic-based adhesives. But it's important to think about the particular needs of herbal patch.

Evaluation test-

Several evaluation tests are commonly conducted for patches to ensure their quality, efficacy, and safety. Some key tests include:

1. Adhesion Test:
   - Assess the patch's ability to adhere to the skin without causing irritation.
2. In Vitro Release Test:
   - Determine the release profile of active ingredients from the patch.
3. Content Uniformity:

- Ensure uniform distribution of herbal extract or active ingredients across the patch.

4. Physical Appearance:
   - Examine the patch for color, texture, and any signs of defects.
5. Thickness and Weight Uniformity:
   - Measure the thickness and weight of patches to ensure consistency.
6. Drug Content:
   - Quantify the amount of active ingredient in the patch to verify it meets the intended dosage.
7. Skin Irritation Test:
   - Evaluate the potential for skin irritation or sensitization caused by the patch.
8. Microbial Limits Test:
   - Check for the presence of microorganisms to ensure the patch's sterility.
9. Peel Adhesion Test:
   - Measure the force required to peel the patch from the skin.
10. Water Vapor Transmission Rate (WVTR):
    - Assess the patch's permeability to water vapor, affecting its breathability.
11. Stability Testing:
    - Subject the patches to various storage conditions to evaluate their stability over time

METHODOLOGY:

1) Gathering and production of Momocardia charantia leaf extract:

- New Psidium guajava leaves were gathered and carefully cleaned.
- The leaves were pounded into a fine powder and allowed to air dry.
- Water or ethanol were used as appropriate solvents to extract the powder.
- To create a concentrated solution, the extract was filtered and evaporated in an oven rotary evaporator.

2) Preparation of antifungal patch -

- To make an antifungal patch, take 2.5 g, 5 g, and 7 g of polyvinyl alcohol polymer, in that order.
- The 20 gm leaf extract of Psidium guajava was mixed with the polymer matrix in respected order.
- After casting the mixture, a polyethylene was left to dry. The backing layer is made of polyethylene.

Formulation	**Polyvinyl alcohol**	**Extract**
F1	2.5 gm	20 gm
F2	5 gm	20 gm
F3	7 gm	20 gm

3) Assessment of the antifungal patch:

- A number of fungi associated with skin illnesses, such as Candida species and dermatophytes, were chosen, including: 1) Aspergillus niger 2) Escherichia coli 3) Trichophyton rubrum.
- Agar plates that had been inoculated with the appropriate fungi were covered with the antifungal patch.
- The plates were incubated at a temperature suitable for the growth of fungi.
- The inhibitory zones were measured and evaluate by using standard.

OBSERVATION –

1) **Activity of Sample of Patch of Momordica charantia leaves extract on various fungii and microbes-**

Sr. No.	Fungi and Microbes	Zone of inhibition (mm)
1	Aspergillus niger	19±2
2	Trichophyton rubrum	13±2
3	Escherichia coli	23±2

2) **Evaluation Parameters for Patch-**

Sr. No	Parameters	Observation
1	Adhesion	Adhesive
2	Flexibility	Flexible
3	Microbial Contamination	Absent
4	Remove	Easily removable

3) **Irritation test when patch applied on skin-**

Sr. No.	Sample	Irritation caused when applied on skin
1	A	No Irritation
2	B	No Irritation
3	C	No Irritation

Results:

The Momordica charantia leaves extract patch has strong antifungal and antimicrobial activity, according to preliminary data. Determining minimal inhibitory concentrations and inhibition zones demonstrated how effective the prepared patch was against a variety of infections.

Discussion:

Momordica charantia leaves contain bioactive chemicals that are responsible for the antibacterial activity that has been found. The patch formulation offers a convenient and targeted delivery method that may improve the natural extract's ability to fight infections.

Conclusion-

The results of this study highlight the potential antifungal and antibacterial properties of Momordica charantia leaf extract when applied as a patch. The results point to the possible application of this natural resource as a supplementary or alternative strategy in the fight against microbial diseases, which could aid in the creation of long-lasting and strong antibacterial drugs.

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