INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

e-ISSN : 2583-1062

Impact Factor: 5.725

www.ijprems.com
editor@ijprems.com

Vol. 04, Issue 04, April 2024, pp: 693-700

REVIEW ON POLYHERBAL DUSTING POWDER

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ABSTRACT

The main goal of the work was to formulate and evaluate an antimicrobial polyherbal dusting powder. A dusting powder was formulated in this study. The powder was prepared by mixing everything ingredients in a mortar. The prepared dust was then evaluated for various parameters such as physical properties (color, smell, grit, appearance), solubility, Ph., micrometric properties such as particle size, surface area, density (bulk, tapped), angle of repose, Carr index, Hausner ratio, volume (bulk, tapped). It has been tested for antimicrobial activity against microorganisms such as Escherichia coli and Staphylococcus aureus. A mixed culture of the above two microorganisms was used for the microbiological test by the good diffusion plate method. These antimicrobial products have been tested based on the pathogenesis caused by various microorganisms. These microbes were cultured in a suitable nutrient medium for their growth. The sample was prepared by dissolving 1 g of powder in 10 ml of water. The sample was then transferred to the solidified agar medium, and pre-sterilized in an autoclave. Then the plates were coated with bacterial culture and kept in an incubator at 37°C for 48 hours to grow bacterial cultures. After the incubation period growth of microbes and their zone of inhibition surrounding the preparation was observed and measured. The formulation was found to be specifically effective against microbial strains. Primarily essential oils were highly effective against all microorganisms, namely E. coli and S. aureus. We concluded that the polyherbal backfill formulation was effective in antimicrobial activity and should be explored in the treatment of various topical skin conditions. Polyherbal formulations have gained considerable attention in traditional medicine for their synergistic therapeutic effects. In this study, a polyherbal dusting powder was developed using a combination of potent medicinal herbs known for their dermatological benefits. The powdered formulation was prepared using a standardized process and evaluated for physicochemical properties, microbial contamination, and skin compatibility. The polyherbal dusting powder exhibited desirable characteristics such as good flowability, uniform particle size distribution, and absence of microbial contamination. Furthermore, skin compatibility testing revealed no signs of irritation or adverse reactions, indicating its safety for topical application. The polyherbal dusting powder holds promise as a natural alternative for managing various dermatological conditions, with potential implications for improving skin health and well-being. Further clinical studies are warranted to validate its efficacy and safety for therapeutic use.

Keywords: Antimicrobial, staphylococcus aureus, diffusion, bacterial culture, polyherbal backfill, microbes

1. INTRODUCTION

Powders: The powder is a homogeneous mixture of more or less finely dispersed particles material in dry form. Pills are one of the oldest forms of medicine and are used both internally and externally. Introducing our new polyherbal dusting powder! Crafted from a blend of natural herbs, it's designed to soothe, protect, and refresh your skin. Say goodbye to discomfort and hello to a natural, gentle solution for your skincare needs.Our dusting powder is a finely milled blend of botanicals and minerals, perfect for keeping your skin dry, fresh, and comfortable. It’s ideal for areas prone to moisture and irritation, offering a natural alternative to conventional talcum powders. Say goodbye to discomfort and hello to a silky-smooth finish with our dusting powder. Our dusting powder is a natural blend of botanicals and minerals designed to keep your skin dry, fresh, and comfortable. It helps prevent moisture and irritation, providing a silky-smooth finish. Ideal for all skin types, it’s your go-to solution for staying feeling clean and refreshed throughout the day.

Definition

Powders are pharmaceutical formulations in powder form that are intended for external application, typically to the skin. These powders serve a variety of purposes, including relieving irritation, absorbing moisture, preventing chafing, and treating certain skin conditions. They are finely ground dry substances intended for local use

Composition

Polyherbal dusting powder consists of active and inactive ingredients. The active ingredient may be a therapeutic agent such as an antifungal or antibacterial agent. At the same time, inert ingredients often include talc, starch, zinc oxide, or other inert powders that contribute to the powder's texture and application properties.

Types: There are 2 types of dusting powders

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Vol. 04, Issue 04, April 2024, pp: 693-700

1) Medical – for superficial skin diseases, Medicinal powder is used. They should be free from pathogens. May contain some mineral components containing spores of tetanus, flatus, etc. a They should therefore be properly sterilized. They are do not use on open wounds or broken areas Leather, which is also listed on the label.

2) Surgical- Surgical backfill is used in body cavities and large wounds, for burns and even on the umbilical cord of babies. They are sterile powder. Plant layout

3. Objectives:

1) Determine antimicrobial activity in herbal plants against microbes.

2) Assess and inspect the wound medicinal efficacy of the selected herb drugs.

3) Improve patient outcomes.

4) Reduce harm to the patient.

5) Evaluation of backfill from various parameters.

6) Absorb excess moisture: Dusting powder helps to absorb sweat and moisture on the skin, keeping it dry and comfortable.

7) Reduce friction: By creating a barrier between skin surfaces, it minimizes friction, which can help prevent chafing and irritation.

8) Prevent skin discomfort: Its formulation aims to alleviate skin irritation, itching, and discomfort caused by moisture and friction.

9) Provide a smooth finish: Dusting powder leaves the skin feeling silky-smooth and soft to the touch.

10) Refresh and soothe: Some dusting powders contain ingredients that offer additional benefits such as refreshing and soothing the skin, providing a sense of comfort and well-being.

11) Maintain hygiene: Dusting powder helps to maintain hygiene by keeping areas prone to moisture dry, reducing the risk of fungal or bacterial growth.

12) Enhance fragrance: Many dusting powders come with pleasant fragrances that leave a subtle scent on the skin, enhancing overall freshness.

13) Support skincare routines: It can be used as part of a skincare routine to complement other products and maintain overall skin health.

14) Offer versatility: Dusting powder can be used in various areas of the body, such as underarms, feet, and groin, making it a versatile solution for different skincare needs.

15) Provide a non-greasy alternative: Unlike some moisturizers or lotions, dusting powder provides a non-greasy solution for keeping skin dry and comfortable.

16) Improve comfort during physical activity: Dusting powder can help athletes and active individuals stay comfortable by reducing friction and moisture buildup during exercise or sports activities.

17) Aid in post-shaving care: It can be applied to the skin after shaving to soothe irritation, absorb excess moisture, and provide a smooth, comfortable feeling.

18) Enhance baby care: Gentle dusting powders formulated for babies can help keep their delicate skin dry and comfortable, reducing the risk of diaper rash and irritation.

19) Assist in wound care: Some dusting powders with antiseptic or healing properties can be used to help keep wounds dry and promote healing by creating a protective barrier.

20) Offer relief for certain skin conditions: Certain dusting powders may provide relief for specific skin conditions like heat rash, eczema, or prickly heat by soothing irritation and reducing discomfort.

Work plan:

• Selection of medicines
• Collection of excipients
• Selection of procedure
• Backfill formulation
• Backfill evaluation

a) Organoleptic properties

b) Micromeritic properties

4. Materials and methods

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Pure rose oil, clove oil, and almond oil were purchased from Vikas Medical Store, and other required chemicals such as starch, Talc, kaolin, and zinc stearate were issued from Chemical Industries.

Formula

Sr no	ingredients	F1	F2	F3	F4
01	Starch	25gm	25gm	25gm	25gm
02	Talc	55gm	55gm	55gm	55gm
03	Kaolin	15gm	15gm	15gm	15gm
04	Zinc stearate	5gm	5gm	5gm	5gm
05	Rose oil	1.0%	0.60%	0.80%	1.2%
06	Almond oil	8.0%	4.0%	6.0%	10.0%
07	Clove oil	0.50%	0.10%	0.30%	0.70%

Backfill rating:

Formulation evaluating dusting powders considers factors such as:

1. Ingredients: Look for natural, non-toxic ingredients to avoid irritation or adverse reactions.
2. Absorbency: A good dusting powder should effectively absorb moisture to keep skin dry and comfortable.
3. Fragrance: Some powders have added scents for a pleasant smell, but be mindful of potential allergens or irritants.
4. Texture: The powder should have a fine texture for smooth application and comfortable wear.
5. Longevity: Evaluate how long the powder stays effective before needing reapplication.
6. Packaging: Opt for products with secure, spill-proof packaging for convenience and hygiene.
7. Reviews: Check customer reviews to gauge overall satisfaction and effectiveness.
8. Price: Consider the cost relative to the quantity and quality of the product.

By assessing these parameters, you can choose a dusting powder that best meets your needs and preferences.

To evaluate the antimicrobial activity

Of a polyherbal dusting powder, several methods can be employed:

1. Agar Diffusion Method: This involves inoculating a microbial culture onto an agar plate and applying the polyherbal dusting powder to wells in the agar. After an incubation period, the diameter of the zones of inhibition around the wells is measured to assess the powder's antimicrobial activity.
2. Minimum Inhibitory Concentration (MIC) Assay: This method determines the lowest concentration of the polyherbal dusting powder that inhibits the growth of a particular microorganism. Serial dilutions of the powder are prepared and inoculated with the microorganism. The MIC is the lowest concentration at which no visible growth occurs after incubation.
3. Minimum Bactericidal/Fungicidal Concentration (MBC/MFC) Assay: Similar to the MIC assay, but after determining the MIC, aliquots from each tube/well without visible growth are plated onto agar plates to assess whether the microorganisms are killed (bactericidal/fungicidal) at the MIC concentration.
4. Time-Kill Assay: This measures the rate at which the polyherbal dusting powder reduces the viability of microorganisms over time. Microbial cultures are exposed to the powder at a specific concentration, and samples are taken at intervals to assess viability.
5. Checkerboard Assay: This method evaluates the combined effects of the polyherbal dusting powder with antibiotics or other antimicrobial agents. Serial dilutions of both the powder and the antimicrobial agent are prepared, and their combinations are tested to determine any synergistic, additive, or antagonistic effects.
6. Biofilm Inhibition Assay: This assesses the ability of the polyherbal dusting powder to prevent the formation of microbial biofilms, which are often more resistant to antimicrobial agents. Microbial cultures are grown under conditions conducive to biofilm formation, and the powder's effect on biofilm formation is quantified.
7. Statistical Analysis: Data obtained from these assays can be statistically analyzed to determine the significance of the antimicrobial activity of the polyherbal dusting powder compared to control groups or standard antimicrobial agents.

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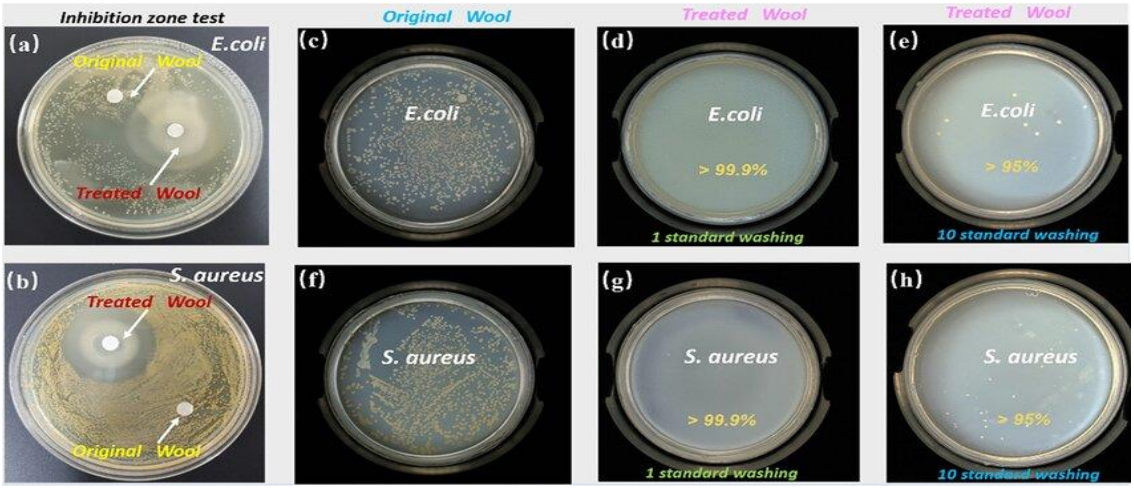
These methods, used individually or in combination, provide a comprehensive assessment of the antimicrobial properties of the polyherbal dusting powder against a range of microorganisms, including bacteria, fungi, and possibly viruses.



Statistical evaluation of a polyherbal dusting powder would typically involve various tests and analyses to assess its efficacy and safety. Here are some statistical methods commonly used in evaluating such products:

1. Clinical Trials: Conducting controlled trials with human subjects to assess the effectiveness of the polyherbal dusting powder compared to a control group or other standard treatment. Statistical methods such as t-tests, ANOVA, or chi-square tests can be used to analyze the results.

2. Efficacy Studies: Using statistical analysis to compare the performance of the polyherbal dusting powder against placebo or other active treatments. This can involve measuring specific outcomes or endpoints using appropriate statistical tests.

3. Safety Analysis: Assessing the safety profile of the polyherbal dusting powder through statistical analysis of adverse events reported during clinical trials or observational studies. This may involve calculating incidence rates, relative risks, or odds ratios.

4. Dose-Response Analysis: Investigating the relationship between the dose of the polyherbal dusting powder and its effects using statistical modeling techniques. This can help determine the optimal dose for efficacy while minimizing potential side effects.

5. Bioavailability Studies: Assessing the bioavailability of active ingredients in the polyherbal dusting powder using pharmacokinetic analysis and statistical methods such as area under the curve (AUC) calculations or non-compartmental analysis.

6. Quality Control: Employing statistical techniques to monitor the quality and consistency of the polyherbal dusting powder during manufacturing processes. This may involve statistical process control methods like control charts or capability analysis.

7. Meta-Analysis: Pooling data from multiple studies to provide a comprehensive summary of the effectiveness and safety of the polyherbal dusting powder. Meta-analytic techniques involve statistical synthesis of results from individual studies to derive overall effect estimates.

These statistical methods, among others, can help provide rigorous evaluation and evidence-based assessment of the polyherbal dusting powder's efficacy, safety, and quality.

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Anti-microbial screening of the prepared formulation

sr no	formulation	Zone of inhibition in mm							
		Mix culture of E.coli and s.aureus							
		A1	A2	B1	B2	C1	C2	D1	D2
1	F1	32	28	29	22	26	17	30	30
2	F2	33	35	29	27	26	27	13	16
3	F3	22	31	27	23	20	24	29	18
4	F4	28	33	28	24	22	17	16	21

Antimicrobial Test

Preparation of microbial strains To assess the activity against bacteria like gram-positive B. subtilis, S. aureus, and gram-negative E. coli were used. Antimicrobial activity The antimicrobial activity of all extracts was evaluated using the agar as the medium by making well and allowing dilution of extracts. Microbial cultures 1-mL was inoculated in a sterile nutrient agar medium by using the pour plate technique. The sterile cork borer was used to prepare wells in the medium. The test drugs (a polyherbal formulation) and the standard drug (10 and 20 mg of povidone-iodine) was added to the well in an aseptic condition and allowed to diuse in media at room temperature. The inoculated plates were kept in an incubator at a controlled temperature of 37ºC for a further 24 hours. The zone of inhibition for all samples were measured in triplicate.

Skin Irritation Test

The skin irritation test is a procedure used to determine whether a product has the potential to irritate customers' skin. A total □ve groups are prepared containing four rats in each. These twenty rats were kept 15 days under experimental conditions to adjust to their new environment. Skin irritancy testing was done in accordance with the OECD Guideline. Before the experiment, each rat had its dorsal sides marked and shaved (1 cm from the midline of the vertebral column). Group I acts as the control group, group II as the untreated, group III for the polyherbal formulation (100 mg), group IV as the polyherbal powder (200 mg), and group V for the standard (povidone-iodine). All groups were subjected for exposure to respective formulation. The area around it was covered with dressing gauze. After a 24-hour exposure period, the elastic gauze was removed, being cautious not to irritate the skin. With distilled water, the test location was cleaned and using the Daze cutaneous irritation scoring method, erythema and edema in animals were inspected. At intervals of 1, 24, 48, and 72 hours, and the degree of erythema and edema was assessed based on the scores.

Wound Healing Activity:

Excision Wound Model20-26For the first 14 days rats were allowed to get acquainted with laboratory conditions of controlled temperature of 22 to 24°C and humidity of 45 to 55%. Total positive groups of four animals each were formed as shown in Table 4. It was a form of open wound that was used to examine the scar region. Diethyl ether was used to anesthetize animals. The anesthetized rat's dorsal thoracic region was imprinted at the point of 1-cm distance from the spinal column and 5 cm from its ear. Prior to the test

2. RESULTS AND DISCUSSION

1. Phytochemical Analysis

Phytochemical screening for various plant extracts of turmeric, neem, aloe, and marigold showed the presence of phytoconstituents

2. TLC Analysis

The result obtained from TLC of the successive extract. The Rf values for various constituents obtained are as per Table 6

3. Formulation Evaluation

The color of the powder was peach color with a mild aromatic odor and smooth and □ne appearance. The pH of formulations was found to be around 5.6. The particles of powder were ranged from 0.125 to 0.127 microns in size. The grittiness was absent in all three powder batches) Physical characteristics- The Physical Characteristics of the powder were evaluated. The color of the powder was white with Characteristics of odor and smooth appearance.

4. pH of the formulation- The pH of the dusting The powder was determined by a digital pH meter. 1gm of powder was dissolved in 100 ml of Distilled water and the pH was measured. The pH was found to be acidic.

5. Particle size- The particle size of the powder was found in the range was found to be 0.125 Mm [125 microns].
6. Abrasiveness- The powder was found to Absence of grittiness
7. Bulk density-The bulk density of the powder was found to be 0.32g/cm3
8. Tap density - The Tap density of the powder was found to be 0.36g/cm3
9. Angle of repose – The Angle of repose of the powder was found to be 230
10. Carr's index- The Carrs index of the powder was found to be 18%.
11. Hauser index- The Haussler ratio of the powder was found to be 1.23.
12. Moisture content- The Moisture content was found to be 3.30%w/v.

3. CONCLUSION

Formulation no. F4 of polyherbal dusting powder was found to comply with all properties of the powder and exhibited satisfactory results. The evaluation studies show better antimicrobial activity than other formulation batches. From the given study, it can be concluded that all four formulations of dusting powder prepared were good and had all the properties. Formulation F4 exhibited satisfactory results.

List of equipment used

1 autoclave

2 incubator

List of chemicals

1 starch

2 talc

3 kaolin

4 zinc stearate

5 agar

6 sodium chloride

7 peptone

8 beef extract

9 yeast extract

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