iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** IV **Month of publication:** April 2025

DOI: https://doi.org/10.22214/ijraset.2025.68934

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue IV Apr 2025- Available at www.ijraset.com

Formulation and Evaluation of Antimicrobial Polyherbal Dusting Powder

Mr.Devang Shelke[1], Ms.Pooja Gaikwad[2], Mr.Nitin Gawai[3], Ms.Nikita Kolape[4], Mr.Swaraj Tamhane[5]
B. Pharmacy Department, Mahadev Kanchan College of Pharmaceutical Education and Research, Uruli Kanchan, Pune, Maharashtra, India

Abstract: ***The work's main objective were to formulate and analyze an antimicrobial polyherbal dusted powder. The sprinkling powder was produced for this particular research. Every one of the elements have been mixed in a mortar and pestle to generate the dusting powder. Physical features (color, odor, grittiness, while appearance), solubility, Ph, along with micromeritic attributes (particle dimension, extent of surface, density (bulk, tapped), angle of repose, Carr's index, Hausner's ratio, alongside volume (bulk, tapped) had all been analyzed for the prepared dusting powder. The effectiveness of antibiotics against microorganisms such as Staphylococcus aureus and Escherichia coli was studied. The microbiological the experiment carried out utilising the well-adapted diffuser cupping screen method utilizing a mix of cultures from the two microorganisms stated above. The infectiousness produced by several microorganisms were used to test these antibacterial agents. These microorganisms were cultivated in nutrient-rich media designed to be appropriate for their development. One gram of powder had to dissolve in the ten milliliters of water for generating the sample. After being autoclave sterilized, the sample was next transferred to the hard agar environment. Before a component of each of the plates had been streaked with a culture of bacteria and refrigerated for 48 hours at 370C to give the cultures to expand. Throughout the time of incubation, observations were made of the organisms' growth and the zone of inhibition that surrounding the mixture being used. This was found when the formulation functioned very effectively towards microbiology. populations. The aromatic oils showed highly effective versus S. aureus and E. coli, and additional microbes. We reach an inference that the polyherbal dusting powder formulation exhibited antibacterial action and should be evaluated for the treatment of a number of topical dermatological disorders.***[1]
Keywords: powder polyherbal dust.

I. INTRODUCTION

Ulcers develop when a skin patch is subjected to prolonged, constant pressure, particularly in bedridden people. This can harm the skin and underlying tissues, resulting in tissue necrosis and ischemia. A pressure ulcer is best described as "constant pressure resulting in alteration or deformation impairment." Pressure sores and decubitus ulcers can also be referred to as bedsores. Common locations for bedsores include the back of the head, the shoulders, the ankles and heels, the buttocks and tailbone spine, and the elbows. Bedsores are caused by shear, pressure, friction, and dampness. [2]

The National Pressure Ulcer Advisory Panel and the European Pressure Ulcer Advisory Panel classify bedsores into the following categories:

• Stage I (non-blanchable erythema): The affected area of skin turns discolored, appearing purple or blue on darker-skinned individuals and red on fair-skinned individuals. Under pressure, stage 1 pressure ulcers never turn white[2]

. • Stage II (Partial thickness): In stage II pressure ulcers, skin loss may result from damage to a portion of the dermis or epidermis, the skin's innermost layer. The ulcer could seem painful or blistering. [2]

• Stage III full thickness skin loss: This stage involves skin loss that extends to the skin's entire thickness. The underlying tissue sustains injury, while the muscles and bones remain unharmed. The ulcers resemble deep wounds with a hollow inside. [2]

• Stage IV (Full Thickness Tissue Loss): This is the most severe stage, and the surrounding cells begin to die as a result of the severe skin injury (tissue necrosis). Sometimes there might be severe injury to the joints, muscles, and bones. Patients are at the biggest risk of contracting a potentially deadly infection. Relieving pressure, cleansing the area, applying dressings, applying topical creams, treating incontinence, removing dead tissue, taking any necessary antibiotics, changing the diet, and talking about surgical possibilities are all ways to manage bedsores.[2]

©IJRASET: All Rights are Reserved

II. DUSTING POWDER

Cleansing powder is a powder that is applied to incisions or tissues to capture wetness and minimize irritation. A dusting powder is a concoction of finely ground chemicals and is applied superficially to treat burns, wounds, and surgical surgeries. In addition to helping to shorten congestion and present a cooling effect, the powder bases absorb the secretions and encourage a dryer action. [2]

III. TYPES

There are 2 types of dusting powder:

1) *Medical*

A medical powders are used for superficial skin conditions; they must be free of pathogens; some mineral goods may contain microorganisms of gas-induced gangrene, a history of etc., so they must be properly sterilized; their aren't recommended for open wounds or locations with skin damage, as mentioned on the package. [1]

2) *Surgical*

Professional cleaning granules can be applied to burns, severe injuries, physiological dental decay, including neonates' placental lines. These substances are sterilized. [1]

IV. PROPERTIES

1) It must remain consistently.
2) Absent it, local drainage ought not to proceed.
3) It should spread properly and run softly.
4) The patch needs to stay adhered to the epidermal after the entire placement operation.
5) It must possess a willingness to soak up and maintain comprehension.[4]

V. ADVANTAGES

1) Appropriate for elderly person individuals and small babies;
2) Simpler to carry around in comparison with fluids quantity formulations;
3) Superior stability in chemical form in comparison to liquid and quick onset of the impact,
4) Affordable;
5) Simple to put on incisions. [4]

VI. DISADVANTAGES

1) The powders containing gyroscopic or aromatic compounds are difficult for avoiding from decomposing;
2) Arenot right for treatments that are unstable under typical air conditions.
3) Being at possibility of encountering physiological fragility. [4]

VII.OBJECTIVE

1) To evaluation as well as validate the efficiency of the recommended natural remedies in wound rehabilitation.
2) To boost outcome from individuals.
3) To prevent danger to customers.
4) Investigation of different considerations for dusting powder. [4]

VIII. WORK SCHEDULE

1) Drug identification
2) An excipient collect
3) Choose selection the process. [1]
4) The dusting powder formulations (1)

IX. METHODS OF POWDER MIXING

1) Mixing using means of motion
2) Blending through fingers

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

- Trituration, or (the mortar with pestle)
- b) swirling (huge mouth lidded receptacle), slapping (spatula + tile) being the three methods.

X. EQUIPMENT FOR LARGE-SCALE MIXING

1) Carefully establish the complete blend that will avoid product damage.
2) It needs to be uncomplicated to clean and export.
3) To become resilient to dust.
4) Take up minimal energy and require little to no upkeep.

XI. SMALL-SCALE MIXING APPARATUS

1) *Spatulation*: Applying a spatula for combining powder on paper or tile, this kind of technique is sometimes used in tiny quantities or when the mortar and pestle process may not be appreciated. Because homogenous blended can fail, it is not appropriate for powders containing one or more mighty agents or for powders in substantial quantities.
2) *Mortar and pestle:* At a smaller scale interaction, a pharmacy worker frequently used a tool called a mortar and pestle. Here is merely one phase necessary for executing the mortar and pestle procedure. As a result, it proves particularly effective in cases where some mixing and particle size reduction are necessary, such as in crystalline material combinations. Mixing is an integrated method in which a heterogeneous physical system is manipulated to increase its homogeneity. The pumping of pool water to hold the right temperature and the stirring of pancake batter for eliminating lumps (deagglomeration) are well-known instances.
3) *Wrapping:* The packaging assures that things going to become disseminated to market economy for objectives comprising sale, storage spaces. and use were supplied properly. It explains the method to creating, comprehending and constructing packages in general. Some examples of frequent packaging materials are containers, boxes, cardboard boxes, cans, bottles, bags, envelopes, and wrappers. Many businesses continue to be looking for techniques and tactics to promote their products though new packaging and design as consequence of increasing demand for containers. In separate from keeping the commodities from breakage and loss, appealing and powerful packaging designs are also performed to gain the contemplation of the ending consumer.
4) *Packaging of dusting powders:*With the goal for easier topical administration, bulk powdered for use outside are frequently distributed in shaker-top cylinders. They may additionally be dispensed in a plastic container with a flip-top cover or a wide-mouth jar. For compositions that have volatile ingredients, the jar or plastic container can be firmly sealed to promote consistency and safeguard it from light and moisture. "For external use only" ought to have written into the package's label.
5) *Double – Wrapping:*Double-wrapping is mandatory for fluctuating or water-soluble drugs like Menthol, Thymal, Citric acid, Pepsin has etc. Doubled tying is also need to for medication those are impacted by the atmosphere; for that reason a wax paperwork is cut somewhat smaller than a demy paper material in each direction and arrange the two papers at once exactly like the basic wrapping procedure The labeling Patiently should be commanded which powder should be dissolved in a teaspoon of water or set on the back of the tongues before chewing and swallowing

XII.DIFFERENT TYPES OF PACKAGING METHODS

1) Packaging that resists corrosion
2) Packaging for Pharmaceuticals
3) Packaging Made of Plastics
4) Adaptable Packaging

XIII. DRUG PROFILE

1) Kaolin
2) Talc
3) Starch
4) Zincstearate
5) Oil of rose

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

6) Clove oil

a) *Starch: Synonym:*sugars include potato, maize, and wheat. Starch contain two main component: 1. Amylose 2. Amylopectin Sources of starch: actually, starch arises from several kinds of dietary source. Corn, cassava, sweet potatoes, wheat, all of and grandchildren are the primary components of nutrition starch; in additional regions of this globe, sorghum that grains such as barley the rice family, and other grains are small sources. Granulates comprise an example of raw or native starch. It is employed as an adsorbent in its chemical form. It is the insoluble substance that remains after granular starch is partially dissolved by an enzyme. This creates the foundation for dusting powder and might be applied alone or in combination with talc or another ingredient.

b) *Talc:* An organic substance that is taken from the earth's soil, talc is a mineral that contains silicon, magnesium, hydrogen, carbon oxygen. Considering a physiological viewpoints, talc consists of a hydrous magnesium silicate. Such hardeed mineral is magnesium silicate, so it's now hydrated. A popular form of powdered talc that is often combined with corn starch is called baby powder. The material in question has a capability to break down and greasing. It can also be used to mimic its adsorbent behavior.

c) *Kaolin* The substance in question is applied to replenish moisture in tissues, alleviate inflammatory disorders, contribute in repairing the skin, and minimize skin discoloration. For a hydrogen-interacting contact, it is composed of a mixture of rotating layers of calcium sulphate and the mineral oxide/hydroxide, both hold firmly solidly.

d) *Stearate of zinc: IUPAC name:* zinc octadecanoate
Other names:Distearate sodium zinc: It is utilized extensively as a letting go agent, dusting agent, and stabilizer. Dusting powders use it as a drier lubricate that helps retain humidity in and eliminate chafing. It might possess therapeutic qualities.

e) *Clove Oil:* It answers the commonly recognized antibacterial qualities of clove oil. It can help improve the healing process of nicks, scrapes, and especially infections from bacteria. The oil's earlier version is the Syzygiumaromaticum ginger plant. Argentina and Indonesia are the two economies that produce the most clove oil. It may be applied to decrease transitory pain in the teeth. The percentage range of the largest obstructed amount that will occur is 0.062% to 0.500%. It responses well to viruses that come from S. aureus and E. coli. 4% caryophyllen, 11% beta-caryophyllen oxide, and 1% eugenol acetate make up 76% of clove oil's organic constituents. Eugenol offers anti-inflammatory and antibacterial properties.

f) *Rose Oil:*This blooming aromatic oil, particularly originated from the petals of several rose different species, particularly Rosa damascena and Rosa centifolia, additionally is referred to as rose otto or rose essential oil. Because of its tremendous health advantages, it is one of the most exotic and sought-after essential oils.

XIV. PROCEDURE

1) Measure each element in the desired amounts.
2) Place it to a flawlessly clean grinder and mortar. All the ingredients shall be blended before a fine powder is created.
3) In order to be absolutely certain that the number of particles is identical and fine, strain the substance using a 120# sieve.
4) Pour the powder into a single sheet of paper after it was already properly incorporated, use a spatula to help distribute it delicately, and ultimately clean it by scorching it to 1600 Celsius levels for an hour.
5) Run the mixture through again and make use of a spatula to lightly connect the powder. Cool the residue to room temp after sterilization it.
6) The dusting solution is afterwards relocated to a container including a label.

XV. EVALUTION OF DUSTING POWDER

1) *Physical characteristics:* The powder's smell, color, and form are examined employing conventional visualizations.[4]
2) *PH:* The pH is the formulation determines whether it is acidic or basic it is. The pH of sprinkling powder has been modified to avoid aggravating the skin.[4]
3) *Particle size:*Employing the magnifying glass and sieve investigation, the freshly mixed powder's particle size was verified. Abrasive was determined by dragging the powder throughout something after which using a microscope to observe the surface's responsiveness. [4]
4) *Bulk density (BD) and tapped density:*Just before being set in a pre-weighed, calibrated 25 ml container containing indications for 0.5 ml, the powder had been passing though a no. 18 sieve. The major capability was established following the cylinder was properly pounded repeatedly on a level the surface. After hammering at 250 pellets per minute in increments of 500, 750, and

1250 taps, the tapped volume has been determined employing a tap density tester. This density relates the bulk quantity divided with bulk volume. Secured density is established by calculating the overall weight of the granules by their total volume. [4]

5) *Angle of repose:*Observations of angle of reflection are suitable for investigate powder flow dynamics. To determine it, the funnel tackle was chosen. At the height of 4 cm, the tip of the funnel was anchored to the bench. With the construction of the cone using 5 g of material, measurements were made of the radius (r) of its center and the height (h) of the individual grains constituting the cone. The vantage point of repose was calculated using the formula below: Repose angle is similar to tan-1 (h/r), where r equals the particle cone's radius while h is its height. [4]
6) *Carr's index :* Considering bulk weights and perforated densities, Carr's the compressibility index was developed to ascertain the flow properties and compressibil[ity of powders. Carr's index is established using the equation: tap density - bulk density / tap density * 100. [4]
7) *Hausner ratio :*It demonstrates flow's characteristics. Both the capillary and bulk densities supply the property. Higher granulated flow is indicated by an inferior Hausner ratio, whereas better granule flow is evidenced by an even greater ratio. The Hausner ratio is to be found using the following calculation: The Hausner number is equal to tapping density divided into bulk density. [4]
8) *Moisture content :*The percentage that is composed of the moisture can be determined using the formula: * original weight - final weight / original weight = moisture percentages.
9) *Antimicrobial Activity:*sweeping powder's antibacterial abilities have been examined using the well-diffusion cup plate method against E. Coli, Salmonella aureus, and candida species were obtained from the laboratory of Immense Culture in Pune.

XVI. MATERIAL REQUIREMENTS

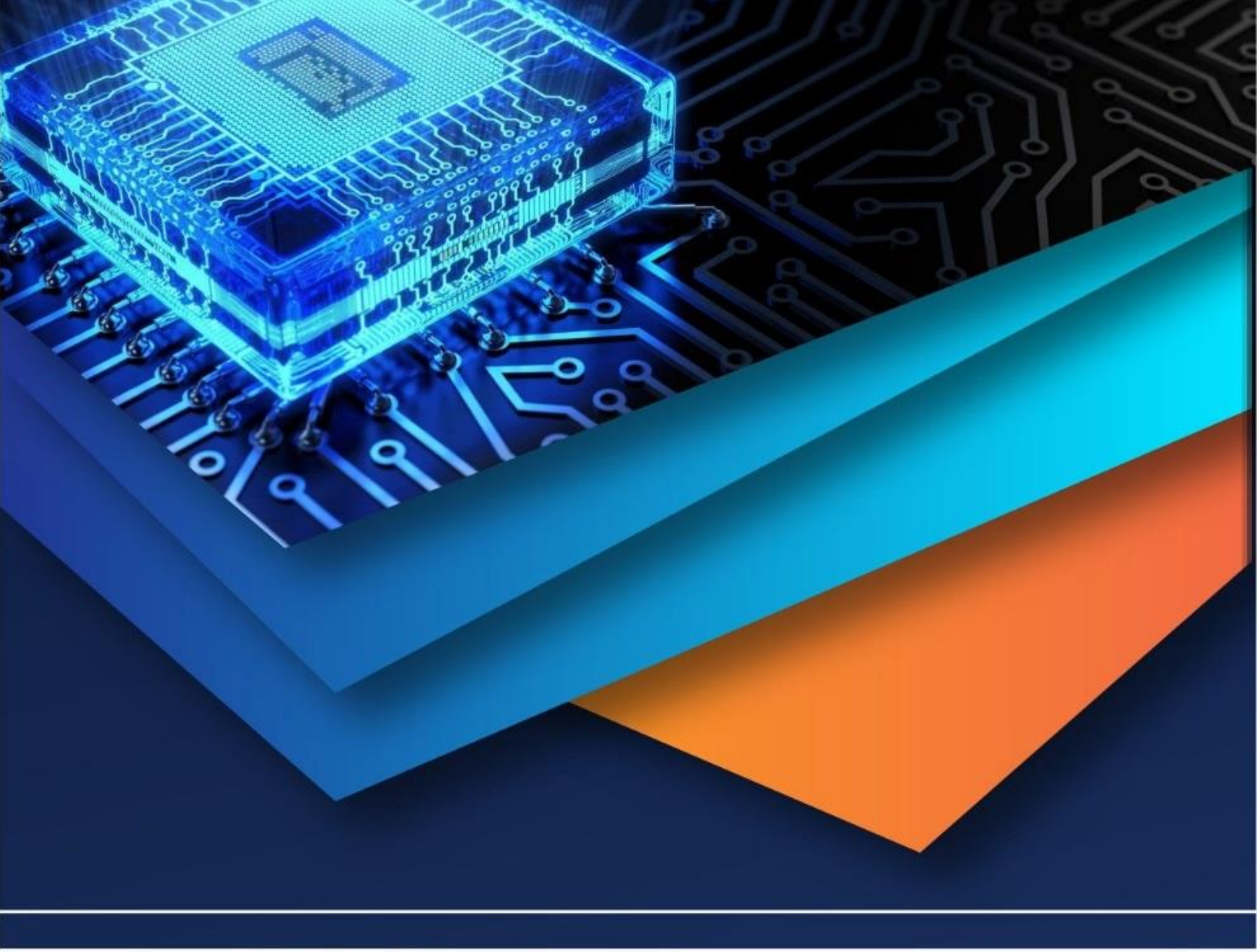
1) disinfected Petri plates with clean pine holes.
2) nutritional broth (such as organisms propagation).
3) E.Coli,s.Aureus,with candida cultures of fungi.

XVII. CONCLUSION

The purpose of the study aimed to generate a thin layer of powder comprised combined talc, carbohydrates, kaolin, zinc stearate, rose oil, with clove oil. It came to light that the antifungal that polyherbal dusting powder formulation conformed with all particle properties while generating positive outcomes. Good antimicrobial activity against E. coil, S. aureus, and Candida has been demonstrated during the evaluation study. [3]

REFERENCES

[1] S.P. Karande*1, Y.U. Rahangdale1, H.S. Kanhere1, S.K. Rathod1, S.Y. Dhabale2, Formulation of antimicrobial polyherbal dusting powder and its evaluation, International Journal for Pharmaceutical Research Scholars (IJPRS) V-9, I-4, 2020 ISSN: 2277 - 7873 RESEARCH ARTICLE © Copyright reserved by IJPRS 1
[2] Sunita N Surse*, Shweta I Sonawane, Priyanka P Sananse, Rani S Kankate, Moreshwar P Patil, Sanjay J Kshirsagar, Wound Healing Potential of Polyherbal Dusting Powder for the Treatment of Bedsores, Received: 07th August, 2023; Revised: 06th October, 2023; Accepted: 09th October, 2023; Available Online: 25th December, 2023
[3] Mr. Abhang Omkar Rajkumar1, Mr. Gaikwad T.A.2, Formulation and Evaluation of Herbal Dusting Powder, International Journal of Research Publication and Reviews Journal homepage: www.ijrpr.com ISSN 2582-7421
[4] Manesh B. Gunjal , Dr. Rajendra M. Kawade , Santosh D. Kande, FORMULATION OF ANTIFUGAL & ANTIMICROBIAL POLYHERBAL DUSTING POWDER FROM ARGEMONE MEXICANA L AND ITS EVALUTION,IJCRT,ISSN: 2320-2882



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)