JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

A REVIEW ON ANTIMICROBIAL HERBAL GEL

Author: – Nabiji Saqlain Mushtaque[1*] , DharashiveV. M[1] , Sameer Shafi, Saberi Bilal[1] , Altaf Mulla[1]

1. **Shivlingeshwar college of pharmacy, Almala. Tq, Ausa. Dist, latur Maharashtra, India.**

Corresponding Author –
Mr. Nabiji Saqlain Mushtaque
Shivlingeshwar college of pharmacy , Almala.
Tq. Ausa, Dist Latur. Maharashtra, India.

ABSTRACT :

In developing as well as developed countries infectious diseases are one of the major problems. They are caused by pathogenic microorganisms such as bacteria, fungi, viruses or parasites. Traditional medicinal plants are widely used to treat the microbial infections due to their rich source of antimicrobial activity & low cost. The different plant parts such as seed, fruit, root, bark, stem, leaf and even the whole plant were extracted using different solvents like ethanol, methanol, chloroform, petroleum ether, water etc. These plant extracts were tested by different diffusion methods against gram positive, gram negative bacteria and fungi to determine their antimicrobial activity. Identification of traditional remedies for skin is an important activity for the search of novel antimicrobial treatments against skin. There is a need for new topical agents for use in treating superficial skin infections. Medicinal plants possess antimicrobial properties which could be efficiently used as antimicrobial agents for topical use. This review provides a data of medicinal plants with antimicrobial activity thereby offering further scope for investigation of medicinal plant extracts to develop as effective antimicrobial medicines.

Keywords: Herbal gel formulation, Composition of gel, Evaluation test, and Antimicrobial test etc.

1. INTRODUCTION:

1.1. Herbs as a Medicine :

An condiment has several meanings and is defined as " crude medicine of vegetable origin employed for the treatment of complaint conditions frequently of habitual nature or to attain or maintain a condition of bettered health ". Sauces include crude material similar as leaves, flowers, fruit, seed, stems, wood, dinghy, roots, rhizomes or other factory corridor, which may be entire, fractured or powdered. shops have been one of the important sources of drugs ever since the dawn of mortal civilization. With all advancement in the field of medicine

exploration factory source decorates high position both in ultramodern as well as in traditional system of drug. - Herbal phrasings and Excipients Herbal medication called " Phytopharmaceuticals " or " phytomedicine " are medication made from different corridor of the shops. They came in different phrasings and lozenge forms including tablets, capsules, panaceas, maquillages, excerpt, tinctures, ointments, creams and gels. Herbal products in the crude state are also used. A single insulated principle deduced from shops similar as digoxin and reserpine tablets aren't considered as an herbal drug. medicines are chemical composites and they infrequently administered or allocated to cases in their native forms but are formulated into lozenge forms that insure large scale manufacture, reproducibility of product quality, accurate lozenge, prophetic remedial response, convenience of defining and administration as well as compliance with operation directive by the case.

1.2. Topical Delivery System:

he thing of any medicine delivery system is to give a remedial quantum of medicine to the proper point in the body to instantly achieve and also maintain the asked medicine attention. The route of administration has a significant impact on the remedial outgrowth of a medicine. Skin is one of the most readily accessible organs on mortal body for topical administration and is main route of topical medicine delivery system. Topical delivery can be defined as the operation of a medicine containing expression to the skin to directly treat cutaneous diseases(e.g. acne) or the cutaneous instantiations of a general complaint(e.g. Psoriasis) with the intent of containing the pharmacological or other effect of the medicine to the face of the skin or within the skin. Semi-solid expression in all their diversity dominate the system for topical delivery, but lathers, spray, treated maquillages, results, as well as treated tenacious systems are also in use. External topical that are spread, scattered, or else dispersed on to cutaneous apkins to cover the affected area. Internal topical that are applied to the mucous membrane orally, vaginally or on anorectal apkins for original exertion.

1.2.1. Advantages of Topical Drug Delivery System:

- Avoidance of first pass metabolism.
- Capability to fluently terminate the specifics, when demanded.
- A fairly large area of operation in comparison with buccal or nasal depression
- Capability to deliver medicine more widely to a specific point.
- Furnishing application of medicines with short natural half- life.
- Improving physiological and pharmacological response.
- Ameliorate patient compliance. • give felicity for tone- drug.

1.2.2. Disadvantages of Topical Drug Delivery System:

- Skin vexation of contact dermatitis may do due to the medicine and/ or excipients.
- Poor permeability of some medicines through the skin.

- Possibility of allergenic responses.
- Can be used only for medicines which bear veritably small tube attention for action.
- Enzyme in epidermis may denature the medicines.
- Medicines of larger flyspeck size not easy to absorb through the skin.

2. Gel :

A gel is a solid or circumfluous system of at least two ingredients, conforming of a condensed mass enclosing and transfused by a liquid. Gels and jellies are composed of small number of solids dispersed in fairly large quantum of liquid, yet they retain more solid- suchlike than liquid- suchlike character. The specific of gel and jelly is the presence of some form of cutaneous structure, which provides solid- suchlike parcels.

2.1. Composition of gel:

Antimicrobial gel typically contains the following ingredients:

Alcohol (ethanol or isopropyl alcohol): This is the active ingredient that kills germs.

Glycerin: This helps keep the gel from drying out and prevents it from irritating skin.

Carbomer: This helps thicken the gel and keep it from running off the skin.

Triethanolamine: This helps adjust the pH of the gel to make it more comfortable on skin.

Fragrance: This is added to give the gel a pleasant scent.

Colorant: This is added to give the gel an appealing color.

2.2. Uses:

Antimicrobial herbal gels are topical products that are formulated with natural ingredients known for their antimicrobial properties. These gels are commonly used for various purposes due to their potential benefits. Here are some common uses of antimicrobial herbal gels:

Hand sanitizer:

Antimicrobial herbal gels can be used as an alternative to conventional hand sanitizers. They contain natural ingredients like tea tree oil, aloe vera, or neem, which have antimicrobial properties and can help kill germs and bacteria on the hands.

Wound care:

Herbal gels with antimicrobial properties can be used to clean and treat minor cuts, abrasions, or wounds. These gels may help prevent infections and promote faster healing. Examples of antimicrobial herbal ingredients used in wound care include calendula, lavender, and eucalyptus.

Acne treatment:

Some herbal gels formulated with antimicrobial ingredients like tea tree oil or witch hazel can be used to treat acne. These gels may help reduce the growth of acne-causing bacteria, soothe inflammation, and promote clearer skin.

Skin infections:

Antimicrobial herbal gels can be beneficial for various skin infections caused by bacteria, fungi, or other microbes. They can be applied topically to the affected area to help inhibit the growth of pathogens and relieve symptoms. Examples include gels containing neem, turmeric, or a combination of antimicrobial herbs.

Foot care:

Herbal gels with antimicrobial properties can be used for foot hygiene and to combat common foot problems like athlete's foot or fungal infections. These gels can help control fungal and bacterial growth, reduce foot odor, and soothe discomfort.

Oral hygiene:

Some antimicrobial herbal gels are specifically designed for oral care. They may contain ingredients like tea tree oil, clove, or myrrh, which have been traditionally used for their antimicrobial properties. These gels can be applied to the gums or used for gentle mouth rinses to promote oral health and fight against bacteria causing bad breath or gum infections.

2.3. Advantages:

1. Antimicrobial gels are generally easy to use and can be applied quickly.

2. They are often more portable than liquid hand sanitizers, making them a convenient option for on-the-go protection.3. They can be used without water, which makes them useful in areas where clean water is not available.

4. Antimicrobial gels are generally safe for use on skin and do not cause irritation or dryness when used correctly.

2.4. Disadvantages:

1. Antimicrobial gels are not as effective at killing germs as traditional hand-washing with soap and water.

2. They may not be suitable for use on visibly soiled hands, as they are less able to remove dirt and grime than soap and water.

3. The alcohol content of some gels can be flammable, so they should be used with caution.

4. Some antimicrobial gels contain triclosan, which has been linked to a number of health concerns.

3. Formulation of Gel:

Gelling agent was dispersed in sufficient quantity of water. Propylene glycol-400 which is used as humectant or plasticizer was added to the dispersion. Other excipients such as methylparaben and propyl paraben was added with continuous stirring.In Carbopol gels, pH ofthe vehicle was brought to neutral by using TEA (Triethanolamine).The final weight of the gel was adjusted to 50 gm with distilled water. Then the mixture was stirred by using propeller for 2 hours at 500 rpm. After stirring, this homogenous gel appeared to be free of bubbles. It was kept at room temperature for 24 hours to check the consistency and stability of gel.

4. Evaluation of gel formulation:

4.1. Determination of pH:

The pH value of gel expression was determined by using a pH meter.

4.2. Appearance and homogenity:

All developed gels were tested for physical appearance and unity by visual observation.

4.3. Viscosity:

The dimension of density of the set gel was done with Brookfield viscometer. The reading was taken at 100 rpm using spindle no. 6 .

4.4. Spreadability:

Spreadability denotes the extent of area to which the gel readily spreads on application to skin or the affected part. Two sets of glass slides of standard dimensions were taken. The gel formulation was placed over one of the slides. The other slides was placed on the top of the gel, such that the gel was sandwiched between the two slides in an area occupied by a distance of 6.0 cm along the slide.100gm weight was placed upon the upper slides so that the gel between the two slides was pressed uniformly to form a thin layer. The weight was removed and the excess of gel adhering to the slides was scrapped off. The two slides in position were fixed to a stand without slightest disturbance and in such a way that only the upper slide slip off freely by the force of weight tied to it. A 20gm weight was tied to the upper slide carefully. The time taken for the upper slide to travel the distance of 6.0 cm and

separated away from the lower slide under the influence of the weight was noted. The experiment was repeated three times and the mean time taken for calculation.

Spreadability was calculated by using the following the formula:

$$S = (\boldsymbol{M} \times \boldsymbol{L})/\boldsymbol{T}$$

Where,

S = Spreadability

M = Weight in the pan (tied to the upper slide)

L = Length of the glass slide

T= Time (in sec) taken to separate the slides.

4.5 Bloom Strength

The bloom strength of the gel was determined by means of Texture Analyzer equipped with 5 kg load cell using a cylindrical probe of 0.5 diameter as fixture. The sample in the container was placed centrally on the platform beneath the cylindrical probe. After calibrating the height of the probe, the test was commenced. A trigger force of 10 g was used for the study.

4.6 Extrudability

The gels were incubated at room temperature for 2 h before measuring their extrudability using an HDP/FE forward extrusion cell of the TA-XT2 Texture Analyzer equipped with a 5 kg load cell. Prior to measurement, the gel was manually stirred and loaded (100 g) into the cell. The compression force was measured at the following conditions: pre-test speed 1 mm/s, test speed 1 mm/s, trigger force 10 g, post-test speed 10 mm/s, compression distance 20 mm, and outlet diameter of extrusion cell 3 mm.

4.7 Stability Study

Stability of the gel formulation were studied at different storage condition (80C and 400C) Samples were withdrawn at 7, 15 and 30 days and checked for their physical characteristics like appearance, homogeneity, pH, viscosity and spreadability.

5. Antimicrobial activity of the optimized Polyherbal gel:

The following Standard cultures of American Type Culture Collection (ATCC) strains were used in the study:

1. Staphylococcus aureus ATCC-6538P)

2. Escherichia coli (ATCC- 8739)3.

3. Candida albicans (ATCC- 18804)

5.1. Antimicrobial activity by Cup plate method:

The sterile Petri dishes were filled with Muller Hinton Agar medium which was then inoculated with a suitable dilution of a test organism (Staphylococcus aureus (ATCC- 6538P), Escherchia coli (ATCC- 8739) and Candida albicans (ATCC-18804).Four cylinder or cups were made in the medium with the sterile borer in each plate. The formulated polyherbal gel, standard disc and solvent control were prepared. A uniform amount of 0.2 ml solution was added to the cup and incubated at 370C for 24 hrs. The well diffusion test was performed in triplicates and antimicrobial activity was expressed as the mean of inhibition in diameter(mm).

5.2. Antibacterial assay:

15 mL of Mueller-Hinton Agar was poured in sterilized petri dishes and allowed to air dry under laminar air flow. After solidification of agar, plates were inoculated with 100 µL of overnight grown bacterial culture adjusted to 0.5 McFarland Turbidity Standards. After inoculation, wells were made using sterile cork borer andone-third of the well was filled with prepared hydrogel. Plates were incubated for 24 hours in a BOD incubator at 35o C (Relative humidity ≥ 80%) and zone of inhibition was measured after 24 hours. Here, blank gel and Renicol were taken as negative and positive controls, respectively.

6. CONCLUSION:

Necessity is the mother of invention. This mistreatment fully applies to rural or ancient societies, which have to discover solutions to almost all their needs and problems from the natural resources around them. In recent years, ethnomedicinal studies received much attention as this brings to light the many little knowns and unknown medicinal slice, especially of plant origin. In the present article, we have reviewed the permanent literature to congregate the botanical, ethnobotanical, phytochemical and pharmacological information on eucalyptus neem and lemongrass. Examine literature discuss that the plant is having unfavorable pharmacological activities. The analysis of literature also pinpoints the fact that although the number of diseases for which eucalyptus neem and lemongrass finds used as medicine is fairly large yet its therapeutic effectiveness has been evaluating only in few cases. Because of the wide range of medicinal uses of the plant, more clinical and pharmacological studies must be managed to proposed unexploited potential.

7. Acknowledgement:

The authors are thankful to principal, Dharashive V. M. for providing encouragement and valuable guidance throughout the review work. Also I would like to thanks my supervisor, for all his help, guidance and assistance throughout course of the work.

.

8. References:

1. Farooqi A A, Shreeramu B A, "Cultivation of Medicinal and Aromatic Crops" Universities Press (India) Ltd, Hyderguda, Hyderabad, India. Ed Ist 2001. 1-10.

2 http:/www.Indianmedicine.nic.in/ayush.

3 Ansari S H, "Essentials of Pharmacognosy" Birla Publication, New Delhi, Ed.4th 2011.469-524.

4 WHO Drug Information, Vol-14, No 4, Geneva; 2000, 237-243.

5. Enshaieh S, Jooya A, Siadat AH, Iraji F. The efficacy of 5% topical tea tree oil gel in mild to moderate acne vulgaris: a randomized, double-blind placebo controlled study. Indian journal of dermatology venereolleprol 2007; 73(1): 22-25.

6 Mohsin J. Jamadar, Rajmahammadhusen shaikh. Preparation and Evaluation of herbal gel formulation. Journal of Pharmaceutical Research and Education 2017; 1(2):201-224.

7.[P.P.Sharma. Formulation, Manufacturing and Quality Control. 5thedition.Vandana publications, Delhi; 2014;149-152.]

8 [Donnelly, Ryan F., et al. "Microneedle-Mediated Transdermal and Intradermal Drug Delivery." Microneedle-Mediated Transdermal and Intradermal Drug Delivery, 2012,]

9.[Sherwood, Andrew, et al. "Age Moderates the Short-Term Effects of Transdermal 17βEstradiol on Endothelium-Dependent Vascular Function in Postmenopausal Women."]

10 [McLennan, Danielle N., et al. "Subcutaneous Drug Delivery and the Role of the Lymphatics." Drug Discovery Today: Technologies, 2005,]

11. Ganesh Misal, Gouri Dixit, Vijay Gulkari. Formulation and Evaluation of Herbal gel, Department of Pharmacognosy, Department of pharmaceutics, J.L. Chaturvedi College of Pharmacy, Nagpur, and Maharashtra, India.

12. Meenashree B, VasanthiNancy VJ. Immaculate Mary, Evaluation of total phenolic content and antimicrobial activities exhibited by the leaf extracts of Musa Acuminata (banana), Vels niverity, Department of Biotechnology, pallavaram, Chennai-117, India.

13. Fairuz Fadhilah Mohd Jalani, Suharni Mohamad. Antibacterial effects of banana pulp extracts based on different extraction methods against selected microorganism. Asian Journal of Biomedical and Pharmaceutica.

14. Arani D, Shreya G, Mukesh S, Antibacterial property of Piper betel leaf against clinical of bacteria, International Journal of Pharmaceutical Sciences and Research, 2, 2011, 104-109.

15. Ali K, Zuhal Z, Nihal D, Antibacterial activity of some plant extract, Indian Journal of Pharmaceutical Education and Research, 2, 2017, 44-48.