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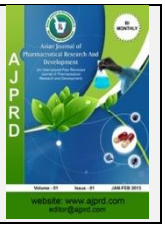

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Review Article

Review on Antimicrobial Polyherbal Cream

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A B S T R A C T

This review article explores the effectiveness of antimicrobial creams in addressing microbial infections and supporting skin health. It examines the mechanisms underlying microbial growth on the skin and the diverse range of antimicrobial agents utilized in cream formulations. Special emphasis is placed on the antimicrobial properties of various plants. Through comprehensive analysis, the article underscores the potential of antimicrobial creams as natural alternatives for managing skin infections and enhancing dermatological well-being.

KEYWORD: Skin health, microbial growth, Anti-microbial agent, and herbal matrials, cream.

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INTRODUCTION:

The largest and outermost organ covering the entire body is the skin. Consequently, the main purpose of skin is, above all, to shield internal organs, underlying muscles, bones, and ligaments from external biological, chemical, mechanical, and physical forces[1].The immediate enhancement of human life must be accompanied by the management of microorganisms' detrimental impacts. The human body and its surroundings naturally cohabit with a wide variety of microorganisms, but an unchecked and rapid growth of bacteria can cause some very serious issues. Three unwanted effects in textiles are prevented by the application of anti-microbial chemicals. The first consists of degradation phenomena such as fiber deterioration, coloration, and staining[2].Antibiotics can cause deleterious effects on the host, such as hypersensitivity, depletion of beneficial bacteria, immunosuppression, and allergic reactions. Alternative antimicrobial medications are necessary to treat infectious illnesses. One strategy involves screening native medicinal herbs for antibacterial characteristics. Medicinal herbs have potential for developing new antibacterial and antifungal chemotherapeutic drugs. The current inquiry is a preliminary screening of plant antimicrobials. The goal is to isolate and identify antibacterial compounds from plants with broad spectrum antimicrobial activity.We picked 82 plants from 42 families based on their medicinal history and application in Indian traditional medicine[3] .These compounds have little toxicity to cells and can effectively control and inhibit infections, making them promising materials for antimicrobial research. To address the negative impact of rapid bacterial and viral development, research has concentrated on developing antibacterial and antiviral medications with fewer adverse effects[4].The most prevalent kind of infections are skin and soft tissue infections (SSTIs), which impact about 14 million Americans annually. SSTIs can range in severity from small superficial infections to life-threatening infections, depending on the cause and degree of the microbial invasion. Gram-positive organisms like Staphylococcus aureus and Streptococcus pyogenes are the predominant organisms involved in the early stages of the infectious process, while gram-negative organisms like Escherichia coli and Pseudomonas aeruginosa are only found later in the process, i.e. when a chronic wound develops.An individual in good health prevents infection by triggering their immune system to eliminate foreign invaders. Macrophages start this process by migrating.

Germs Nonetheless, infection develops and impairs the normal wound healing process by causing the degradation of granulation tissue, growth factors, and extracellular matrix

components (collagen, elastin, and fibrin) if the immune system is unable to eliminate the pathogen. Consequently, it is essential to create wound dressings that can stop bacteria from penetrating the wound or stop microorganisms from growing. To do this, a variety of techniques are being employed to create wound dressings with bactericidal activity, including the use of materials having intrinsic bactericidal activity, surface modification, and the incorporation of antimicrobial chemicals. This article gives a summary of the most common antibacterial ingredients included in wound dressings as well as information on how they work. Additionally, some future perspectives and the most recent developments in the treatment procedures utilized in the clinic[5].

OVERVIEW OF SKIN DISEASE AND THE MICROBIALl AGENTS THAT CAUSE IT:[6]

1. **Acne**: Often caused by bacteria called Propionibacterium acnes.
2. **Impetigo**: Caused by either Staphylococcus aureus or Streptococcus pyogenes bacteria.
3. **Cellulitis**: Usually caused by bacteria such as Staphylococcus aureus or Streptococcus pyogenes.
4. **Folliculitis**: Can be caused by bacteria, fungi, or viruses infecting hair follicles.
5. **Ringworm (Tinea)**: Caused by various fungi species such as Trichophyton, Microsporum, or Epidermophyton.
6. **Athlete's Foot (Tinea Pedis)**: Caused by fungi, usually Trichophyton.
7. **Yeast Infections**: Caused by Candida species of yeast.
8. **Scabies**: Caused by the Sarcoptes scabiei mite.
9. **Leprosy**: Caused by the bacterium Mycobacterium leprae.
10. **Syphilis**: A sexually transmitted infection caused by the bacterium Treponema pallidum.

ANTIMICROBIAL AGENTS:

Humanity has been using, developing, and applying natural and manmade antimicrobial treatments to textile items for ages. A natural or artificial material that destroys or stops the growth of microorganisms like bacteria, fungus, and algae is called an antimicrobial agent.

The word "antimicrobial agents" refers to any chemicals, medications, or other materials that have the ability to either kill or inhibit the growth of microorganisms. Antibiotics, antivirals, antifungals, and anti-parasitic medications are examples of antimicrobial agents.

According to a different definition pertaining to the textile industry, an antimicrobial agent is any natural or artificial material that either destroys or prevents the growth of microorganisms including bacteria, fungus, and algae on a textile.[(7)]Antibiotic resistance in infectious microbial strains is facilitated by the widespread use of antibiotics in clinical medicine, agriculture, and veterinary care. This poses a serious challenge to treating pathogenic microbes and has prompted a search for novel antimicrobial agents, primarily from plant extracts, with the aim of discovering new chemical structures that can overcome the aforementioned drawbacks.[(8)]

1. **Chemical Antimicrobial Agents**: Antibiotics, Metal oxide nanoparticles, Metal nanoparticles.
2. **Herbal Antimicrobial Agent:** Lemon balm, Eucalyptus, Primrose, Ginger, Mint, Tribulus, Garlic, Portulaca, Clove, Fennel, Cinnamon, Eryngium, Turmeric, Delonix regia, Neem[4]

Table 1: An overview of the primary biological components and therapeutic uses of herbal antibacterial agents

Sr. No	Herbal Material	Medicinal Use	Main Chemical Compound	Ref.
1.	Clove	Antioxidant, antibacterial, inflammatory, mutagenic, allergenic, and anti-cancer properties	Eugenol, acetate of eugenol,- caryophyllene, 2-heptanone, and humulene	(9,10)
2.	Ginger	Antioxidant, antibacterial, neuroprotective, diabetes-preventive, analgesic, gastrointestinal, cardiovascular, anti-inflammatory, anticancer, and antihypertensive properties.	Gingerols, paradols, phenolic acids, and shugaols,monoterpenoids, sesquiterpenoids, phenolic compounds, aldehydes, ketones, alcohols, and esters,	(11,12)
3.	Delonix regia	anti-inflammatory, anti-oxidant, cardioprotective, wound-healing, antibacterial, antifungal, and antimalarial.	Tannins,Saponins,Flavonoids, Steroids,alkaloids,carotenoids, Anthocyanin pigments, Glycosides,carbohydrates, And phenolic compounds.	(13)
4.	Neem	Skincare, Treating acne, Antidandruff, immune-boosting,anti-inflammatory effects	Nimbin, nimbanene, 6-desacetylnimbinene, nimbandiol, nimbolide, ascorbic acid, n-hexacosanol, amino acid, 7-desacetyl-7-benzoylazadiradione, 7-desacetyl-7-benzoylgedunin, 17-hydroxyazadiradione, and nimbiol	(14)

5.	Fennel	anti-inflammatory, antibacterial, and antioxidant	Phenolic compounds, anethole, fenchone, 2-pentanone, and benzaldehyde-4-methoxy.	(15)
6.	Mint	Antioxidant, antibacterial, anti-inflammatory, and anti-cancer	Flavonoids,mentol,oxygenated terpenoids.	(16)
7.	Garlic	Antioxidant, Antimicrobial, Antidiabetic, Anticancer, Cardioprotective, Anti-inflammatory	Phenolic and polysaccharide compound, Allicin, Free amino acids,fiber.	(17,18)
8.	Cinnamon	cholesterol-lowering, immunomodulatory, antibacterial, anti-inflammatory, anticancer, and cardiovascular	cinnamaldehyde, cinnamate, cinnamic acid, and essential oils.	(19,20)
9.	Hibiscus	antiseptic, anti-spasmodic, diuretic, antioxidant, antipyretic, and sedative properties. Hibiscus can also be used to treat indigestion, control bleeding in piles.	Tannins, phlobatannins, saponins, cardiac glycosides, flavonoids, terpenoids.	(21)
10.	Turmeric	Hypoglycemia, anticoagulant, antibacterial, anti-inflammatory, and anticancer	D-phellandrene, cineole, tumerone, borneol, zingiberene, vitamin C, and d-sabinene	(22,23)

1. Clove:

Synonyms: Clove bud , Laung, Caryophyllum

Biological Source:It consists of dried flower buds of Eugenia caryophyllus (Sprengel)Bullock & Harrison (Syzygium aromaticum Linn).

Family:Myrtaceae.

Target of Bacteria:S. Typhimurium, S. aureus, L. monocytogenes, and E. coli.([4])

Geographical Source:t is native from the Mollucca Island and traditionally cultivated in

Tanzania (Zinziber), Madagascar, Indonesia, Srilanka and India (mainly in Nilgiri hills,

Kanyakumari, Kottayam and Quilon hills of Kerala).[(4)]

2. MENTHA (MENTHA OIL)

Synonyms: Peppermint oil, Oleum mentha piperita, Mint oil.

Source biological: The steam distillation of the blooming tops of Mentha plants yields mentha oil.*Mentha piperita* Linn.

Family: Labiatae.

Target of Bacteria:staphylococcus aureus and Escherichia coli**.**[(4)]

Geographical origin: It is grown in the USSR, Bulgaria, Japan, England, France, and Italy.and India (Jammu and Uttar Pradesh).[(25)]

3. CINNAMON

Synonyms: Dalchini, Ceylon Cinnamon, Cinnamon bark.

The biological source of cinnamon is the dried bark of the Cinnamomum plant, which is separated from the outer cork and the underlying parenchyma by the growth of shoots on the cut stumps.

Family: Lauraceae.

Target of Bacteria:staphylococcus and E.coli.[(4)]

Geographical source: Srilanka, Malabar Coast of India, Jamaica and Brazil. [(25)]

4. FENNEL

Synonyms: Foeniculum species, Saunf, Fennel fruits.

Biological source: It consist of dried ripe fruits obtained from cultivation of *Foeniculum*

vulgare Miller.

Family: Umbelliferae.

Target of Bacteria:S. dysenteriae.[(4)]

Geographical source: Fennel is native of Mediterranean countries. It is grown in Japan, India, Germany, France, Russia, and Romania. It is grown in several states of India, including

Gujarat, Maharashtra, Punjab, Rajasthan, Uttar Pradesh and West Benga.[(25)]

5. Neem

Synonyms: Bead tree, Pride of China, Nim, Margosa, Holy tree, Indiar, Lilac tree, Nimba tree, and Miracle tree.

Biological source: Azadirachta indica leaves, either fresh or dried, and seed oil.

Family: Meliaceae

Target of Bacteria: Staphylococcus spp, Streptococcus spp, Pseudomonas spp, E. coli, Salmonella typimurium, Staphylococcus aureus, and MRSA.[(4)]

Geographical source: India, Myanmar,Tropical countries.[24]

6. Royal Poinciana:

Synonyms: Delonix regia, Poinciana regia, Peacock flower, Flame-of-the-forest

Biological source: It consist of flowering plant Delonix regia

Family: Fabaceae

Target of Bacteria: Salmonella typhi,Staphylococcus aureus.[4]

Geographical source: Madagascar, India, Africa, and Northern Australia.[26]

7. Turmeric:

Synonyms: curcuma, curcumin, halada, haldi, haridra, nisha, pian jiang huang, rajani, and safran bourbon.

Biological source: It obtained from the dried rhizomes of curcuma longa.

Family: Zingiberaceae.

Target of Bacteria: Gram-positive and Gram-negative bacteria.[4]

Geographical source:tropical South Asia, specifically southern India and Indonesia.[27]

Cream Formulation:

"Creams are semolid emulsions applied topically on the skin or mucous membranes." [8]

SKULL SKIN CREAMS They are separated into two categories:

Oil-in-Water (O/W) creams are made up of tiny oil droplets distributed in a continuous phase, while an oil-in-water (O/W) emulsion is an emulsion in which the oil is distributed as droplets throughout the aqueous phase. Creams called Water-in-Oil (W/O) are made of tiny water droplets scattered throughout an oily phase that is constant. The emulsion is of the water-in-oil (W/O) type when the dispersed phase is water and the dispersion medium is oil.[29]

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