

ANTI-FUNGAL PROPERTIES OF CITRAL: REVIEW

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ABSTRACT

Superficial mycoses of the skin are among the most common dermatological infections, and causative organisms include dermatophytic, yeasts, and non-dermatophytic filamentous fungi. The treatment is limited, for many reasons, and new drugs are necessary. Numerous essential oils have been tested for both *in vitro* and *in vivo* antifungal activity and some pose much potential as antifungal agents. By using disk diffusion assay, we evaluated the antifungal activity of lemongrass oil and citral against yeasts of *Candida* species (*Candida albicans*, *C. glabrata*, *C. krusei*, *C. parapsilosis* and *C. tropicalis*). This study showed that lemongrass oil and citral have a potent *in vitro* activity against *Candida* spp.

KEYWORDS: lemongrass oil, citral, antifungal activity, *Candida* spp.

INTRODUCTION

Cutaneous fungal infections are common diseases in humans, and can also be caused by dermatophytic fungi and some yeasts. Superficial candidiasis is a common infection of the skin, oral cavity and esophagus, and vagina, although most infections occur in patients debilitated or who are immune-compromised. *Candida albicans* is responsible for many of these infections, but occasionally other members of the genus are associated, and generally infect the skin, nails, or mucous membranes.

Herbal medicines is still the mainstay of about 75-80% of the world's population, mainly in developing

countries, for primary health care because of better cultural acceptability, better compatibility with human body and lesser side effects. Herbal medicines consist of plant or its part to treat injuries, disease or illnesses and are used to prevent and treat diseases and ailments or to promote health and healing. it is a drug or preparation made from a plant or plants and used for any to such purpose. The aim of present study was to prepare herbal gel formulation containing ethanolic extract of antifungal herbal gel containing ethanolic extract of sennaalata, murrayakoenigii and aloevera. Topical gel formulation was designed by using ethanolic extract antifungal herbal gel containing ethanolic

extract of sennaalata, murrayakoenigii and aloe vera in varied concentrations. The gel was prepared by using carbopol 940(1%w/v), ethanol, propylene glycol, methyl paraben, propyl paraben, edta disodium, tri-ethanolamine and required amount of distilled water. the prepared gels were evaluated for physical appearance, ph, spread ability, drug content, swelling index, diffusion study, viscosity, homogeneity and grittiness. it was inferred from results that gel formulations were good in appearance and homogeneity. Antifungal herbal gel containing ethanolic extract of sennaalata, murrayakoenigii and aloe vera based gel proved to be the formula of choice, since it showed the highest percentage of extrudability, good spreadability and rheological properties.

Cymbopogon citratus(DC) Stapf (*Gramineae*) is an herb worldwide known as lemongrass. The tea made from its leaves is popularly used in Brazil as antispasmodic, analgesic, anti-inflammatory, antipyretic, diuretic and sedative. The volatile oil obtained from fresh leaves of this plant is widely used by the perfumes and cosmetics industries.

Lemongrass oil is characterized for monoterpenes compounds, and citral is the major component, present at levels of, approximately, 65-85%. Citral (3,7-dimethyl-2,6-octadienal) is the name given to a natural mixture of two isomeric acyclic monoterpene aldehydes: geranial (*trans*-citral, citral A) and neral (*cis*-citral, citral B) . In addition to citral, the lemongrass oil consists of small quantities of geraniol, geranylacetate and monoterpene olefins, such as myrcene.

SOLVENT EXTRACTION FROM LEMONGRASS LEAVES

Extraction of lemongrass oil from lemongrass leaves using steam distillation method.

Lemon grass leaves were purchased from local market and dried under shade. Dried lemongrass leaves were pulverized using domestic grinder and the powder was used for extraction. Lemon grass leaves will be boiled in water, and the steam will be condensed and collected. Since, citral is soluble in steam (but not in water), it will be carried up with the distillate. The upcoming steam carries away the oil from the plant material. ie. Lemongrass and both oil as well as steam pass to the condenser through vapour line, where these vapours get condensed and oil and water are separated in the separators. Oil being lighter is separated out from the top and water being heavier is taken out from the bottom of separators. The oil thus obtained is lemongrass oil having 80-85% citral content.

LEMON GRASS OIL

Synonyms: citronella grass oil, Indian melissa oil.

Biological source: The lemongrass oil is a volatile oil obtained by steam distillation from the leaves and aerial parts of the plants *cymbopogon citratis*.

Family: gramineae

Chemical constituents: lemongrass oil chiefly contains citral, in addition to methylheptenol, nerol, citronellal, dipentene and geraniol.

Medicinal properties of lemongrass and its oil:

Lemongrass has been traditionally used to remediate a plethora of medical conditions. This is due to the broad spectrum of secondary metabolites that it produces. It has been used to treat fever, cough, elephantiasis flu, leprosy, malaria and digestive problems among many other illnesses.

Medical conditions like hyperlipidemia hypercholesteremia and hyperglycemia lead to metabolic disorder like obesity and diabetes mellitus. It has been reported that lemon grass is bestowed with hypolipidemic, hypo-cholesteremic and hypoglycemia properties. Consumption of plant extracts have shows to bring about a reduction in plasma cholesterol and very low density lipids, both of which are highly correlated with heart disease.

The antagonistic activity of lemongrass towards pathogenic bacteria, protozoa and fungi has also been reported.

The bioactive compounds of lemongrass have also been shown potent antagonistic activity against viruses.

The bioactive compounds of citronella grass have been investigated for their anticancerous properties also.

Lemongrass can also be used in the preparation of topical creams and in the manufacture of plant based oral drugs.

ANTIFUNGAL GEL AND ITS EFFECT

The antifungal activity exerted by citral against molds and yeast. The citral has the ability to destroy the integrity of the cell

membrane, releasing the cellular components of *Geotrichumcitri-aurantii* and dramatically inhibiting the mycelial growth of *Penicilliumitalicum* through a mechanism of cell membrane damage, compromising its integrity and permeability. The citral exhibits significant *in vitro* activity against *C. glabrata*, *C. krusei*, *C. parapsilosis*, and *C. tropicalis*, and especially against species of *C. albicans*. demonstrated the anti-*Candida* activity of six terpenoids; all showed excellent activity against *C. albicans* isolates, being the most effective linalool and citral.

Topical preparations are used for the localized effects at the effects at the site of their application by virtue of drug penetration into the underlying layers of the skin or mucous membranes. The main advantage of topical delivery system is to bypass first metabolism. Avoidance of the risks and inconveniences of intravenous therapy and of varied conditions of absorption, like PH changes, presence of enzymes, gastric emptying time are other advantage of topical preparation. Semi-solid formulation in all their diversity dominate the system for topical delivery, but foams, spray, medicated powders, solution, and even medicated adhesive systems are in use. The topical drug delivery system is generally used where the other system of drug administration fails or it is mainly used in pain management, contraception, and urinary in continence.

Gels are defined as semi rigid systems in which the movement of the dispersing is restricted by an interlacing three-dimensional network of particles or solvated macromolecules of the dispersed

phase. The USP defines gels as semisolid systems containing either suspensions made up of small inorganic particles, or large inorganic molecules interpenetrated by a liquid.

DISCUSSION

Skin and soft tissue infections caused by microorganisms, is an extremely common skin disorder that affects virtually all individuals at least once during life. Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic one. The plant lemongrasses are widely available plants in our area and have cosmetics and therapeutic application.

REFERENCE

1. Sudipta Das, Pallab k. Formulation and evaluation of herbal gel containing *clerodendronin fortunatum* leaves extract. International Journal of Pharm Tech Research, 2011; 3(1):140-143.
2. Mohammed Haneefakp, Shahimahanab K, Saraswathi R and Guru Prasad Mohanta . Formulation and evaluation of herbal gel of *pothosscandenslinn*. Asian pacific journal of tropical medicine, 2010; 3 (1): 988-992.
3. Mohammad Ali Shahtaebi, Gholam Reza Asghari, faridehRahmani and FetemehShafiee. Formulation and evaluation of herbal gel of *antirrhinum majus* extract and evaluation of its anti-propionibacterium acne effects. A review article in advanced Biomedical research, 2018; 7(2): 58.
4. Chah KF, Eze CA, Emuelosi CE, Esimone CO. Antibacterial and wound healing properties of methanolic extracts of some Nigerian medicinal plants. J Ethnopharmacol 2006; 104: 164 -7.
5. Fabricant DS, Farnsworth NR. The value of plants used in traditional medicine for drug discovery. Environ Health Pers 2001; 109 (Suppl 1): 69-75.
6. Senthil Kumar M, Sripriya R, Vijaya Raghavan H, Sehgal P. Wound healing potential of Cassia fistula on infected albino rat model. J Surg Res 2006; 131: 283-9
7. Meenakshi S, Raghavan G, Nath V, Ajay Kumar SR, Shanta M. Antimicrobial, wound healing and antioxidant activity of *Plagiochasma appendiculatum* Lehm. et Lind. J Ethnopharmacol 2006; 107: 67-72.
8. Suresh Reddy J, Rao PR, Reddy MS. Wound healing effects of *Heliotropium indicum*, *Plumbago zeylanicum* and *Acalypha indica* in rats. J Ethnopharmacol 2002;79: 249-51.
9. Kumar B, Vijayakumar M, Govindarajan R, Pushpangadan P. Ethnopharmacological approaches to wound healing - exploring medicinal plants of India. J Ethnopharmacol 2007; 114: 103-13.
10. Krishnan P. The scientific study of herbal wound healing therapies: current state of play. Curr Anaes Crit Care 2006;17: 21-7.
11. Ayyanar M, Ignacimuthu S. Traditional knowledge of Kani

- tribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. *J Ethnopharmacol* 2005;102: 246-55.
12. Ediriweeraa ERHSS, Grerub DD. Traditional medical practices of srilanka in orthopaedic treatment. *AYU* 2009; 30: 147-52.
13. Lalitharani S, Mohan VR, Regini GS, Kalidass C. GC-MS analysis of ethanolic extract of *Pothos scandens* leaf. *J Herbal Med & Toxicol* 2009; 3(2):159-60.
14. Shila Gurunga, Natasa Skalko-Basnet. Wound healing properties of *Carica papaya* latex: in vivo evaluation in mice burn model. *J Ethnopharmacol* 2009; 121(2): 338-41.
15. Tanaji Nandgude, Rahul Thube, Nitin jaiswal, Pradip deshmukh, Vivek chatap, Nitin hire. Formulation and evaluation of pH induced insitu nasal gel of salbutamol sulphate. *Int J Pharma Sci & Nanotechnol* 2008 ; 1 (2): 177-83.