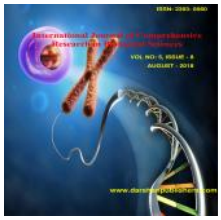
Available online at www.darshanpublishers.com
Volume -5; Issue -8; Year -2018; Pages: 1-5
ISSN: 2393-8560
DOI: http://dx.doi.org/10.22192/ijcrbs.2018.05.08.001
Abbr: Int. J. Compr. Res. Biol. Sci.



International Journal of Comprehensive Research in Biological Sciences

Research Article

IN-VITRO EVALUATION OF ANTI-MICROBIAL POTENTIAL OF THE SIDDHA FORMULATION KOSHTA CHOORANAM AGAINST *Propionibacterium acnes*

A. Sureka[*1], R. Dhanalakshmi[2], N. J Muthukumar[3], V. Banumathi[4]
[*1]Emergency Medical Officer, National Institute of Siddha, Tambaram Sanatoruim, Chennai 600047, Tamil Nadu, India.
[2] Medical Officer, Naturalife Hospital, Trichy, Tamil Nadu, India.
[3] Hospital Superintendent, National Institute of Siddha, Tambaram Sanatoruim, Chennai 600047, Tamil Nadu, India.
[4] Director, National Institute of Siddha, Tambaram Sanatoruim, Chennai 600047, Tamil Nadu, India.
Corresponding Author: **Dr. A. Sureka M.D(S)**
Emergency Medical Officer, National Institute of Siddha, Tambaram Sanatoruim, Chennai 600047, Tamil Nadu, India.
E-mail: *eva.sureka@gmail.com*

Abstract

Clinicians around the globe are constantly searching for antibiotics from alternate complementary sourcesdue to a growing concern on the development of resistance to the antibiotics in clinical use. Hence, there is a pressing need to develop a herbal formulation, which can act against the microorganisms causing range of infection in humans. Siddhar's in ancient times have formulated numerous siddha preparations from herbalsources which is effective againstthe pathogenic microbial species.*Propionibacterium acnes*is an opportunistic pathogen, causing a range of postoperative and device-related infections. These include infections of the bones and joints, mouth, eye and brain.KoshtaChooranam (KC) is a traditional siddha medicinal formulation whichcomprises of two indigenous medicinal herbs namely *Costusspeciosus*and *Citrus medica*. The main objective of the present investigation is to evaluate the anti-microbial profiling of the formulation KC against *Propionibacterium acnes*. Anti-bacterial activity of the selected bacterium is carried out by disc diffusion method using mullerhinton agar medium. The results obtained from the study clearly shows that the siddha formulation KC offers effective anti-microbial activity with a maximum zone of inhibition of15mm ata concentration of 100µg/ml when compared to standard streptomycin.It is concluded from the results of the present study that the siddha traditional medicine KC has promising anti-bacterial potential against the tested organism *Propionibacterium acnes* which renders greater benefit to mankind and represent a rich source of antimicrobial agents.

Keywords: Siddha, Herbal medicine, Koshtachooranam, *Propionibacterium acnes*, Anti-microbial agents.

Introduction

Propionibacterium acnes is a gram-positive human skin commensal that prefers anaerobic growth conditions and is involved in the pathogenesis of acne . Acne is one of the most common skin diseases, affecting more than 45 million individuals in the United States. It is estimated that nearly 20 percent of all visits to dermatologists are related to the treatment of acne [1]. Acne vulgaris has a substantial impact on a patient's quality of life, affecting both self-esteem and psychosocial development. Patients and physicians are faced with many over-the-counter and prescription acne treatments and choosing the most effective therapy can be confusing [2].Physical treatments for acne include comedone extraction, chemical peels and microdermabrasion, intralesioncortico-steroid injection for acne cysts, and high-intensity, narrow-band blue light photodynamic therapy, as well as injectable fillers and laser resurfacing for acne scarring. However, there is limited evidence in peer-reviewed literature to support such treatments [3].

Melasma is a common acquired condition of symmetric hyperpigmentation, typically occurring on the face, with higher prevalence in females and darker skin types. Multiple etiologies, including light exposure, hormonal influences, and family history, have been implicated in the pathogenesis of this disorder [4]. Treatments for melasma include topical, oral, and procedural therapies.

Since ancient times, herbal or plant-based medicines have served as a platform for the prevention and cure of diseases and to date many more constituents of these natural sources are yet to be explored. This has enlightened scientists to find out newer compounds from the herbal source to treat many infectious skin diseases. Reports show that most of the medicinal plants possess antimicrobial, antioxidant, and anti-inflammatory properties, which have paved a way in the prevention of many infectious diseases, and also have potential benefits for the society [5]. The present scenario of infectious diseases shows that there has been an alarming increase in the incidence of new and re-emerging infectious diseases [6]. Siddha medicines are pioneering in treating skin related infections with versatile poly herbal components. The author has made an attempt to evaluate the anti-microbial profiling of the Siddha medicinal formulation KC against *Propionibacterium acnes* by disc diffusion method.

Materials and Methods

Source and Formulation of Koshtachooranam:

Herbs *Costus specious* and *Citrusmedica* (Narathai) were purchased from a well reputed indigenous drug shop at Chennai, Tamil Nadu, India. All raw drugs were authenticated prior to their usage. Test drug KC was prepared as per the procedure detailed in siddha materiamedica. *Coastus specious* soaked in the juice of narathai(*Citrus medica*)is dried and powdered, it is mixed with honey and applied for acne and melasma.

Collection of Microorganism

To evaluate the anti-microbial property of the formulation KC, the cultures were procured from accredited pathology laboratories in Chennai. The organism used is*Propionibacterium acnes* which was confirmed by specific microbial assay prior to usage.

Anti-Microbial Assay [7]

The anti-microbial activity of the test drug KC was carried out by disc diffusion method. The test compounds were used at the concentrations of 25, 50 and 100 µg. The target microorganisms were cultured in Mueller–Hinton broth (MHB). After 24 h the suspensions were adjusted to standard sub culture dilution. The Petri dishes containing Muller Hinton Agar (MHA) medium were cultured with diluted bacterial strain.Disc made of Whatman No.1, diameter 6 mm was pre-sterilized and was maintained in aseptic chamber. Each concentration was injected to the sterile disc papers. Then the prepared discs were placed on

the culture medium. Standard drug Streptomycin (20µg) is used as a positive reference standard to determine the sensitivity of the microbial species. Then the inoculated plates were incubated at 37^{o} C for 24 h – 48 h. The diameter of the clear zone around the disc was measured and expressed in millimeters as the anti-microbial property.

Results

Effect of Koshta Chooranam against *Propionibacterium acnes*

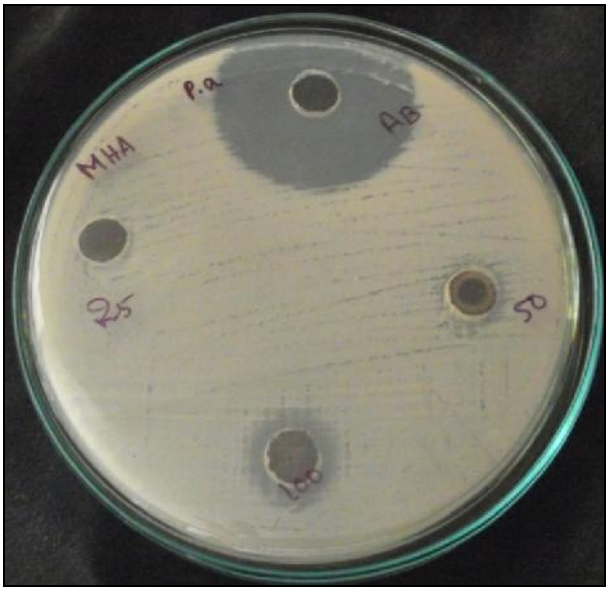
From the results of the present investigation it is evident that the sample KC possesses significant antimicrobial activity against *Propionibacterium acnes* at concentration of 50 and 100 µg ,were as the drug seems not effective at a concentration of 25 µg. Drug efficiency is represented by the of zone of inhibition. Test drug KC shows amaximum zone of inhibition of 15 mm at a concentration of 100 µg and 10 mm at a concentration of 50 µg when compared to that of the standard drug streptomycin (20µg) which shows a maximum inhibitory zone of about 39mm. The results are shown in Table 1 and represented in figure 1.

Table 1: Zone of Inhibition data of Anti-bacterial activity of the formulation KC

Bacterial Strain	***Propionibacterium acnes***		
Concentration	**25 µg**	**50 µg**	**100 µg**
KC	-	10 mm	15 mm
Streptomycin (20µg)	39 m		

- = Not active

Figure 1: Effect of KC against *Propionibacterium acnes*



Discussion

Natural products have been traditionally accepted as remedies for many diseases. The beneficial medicinal effects of plant products typically result from the combinations of secondary metabolites present in the plants [8]. Herbal and polyherbal preparations have been known since antiquity to possess notable biological activities, including antibacterial, antioxidant, and anticancer properties. It is a popular belief that they present minor side effects. Infectious diseases are the leading cause of death worldwide. The ever increasing resistance of pathogens to antibiotics

as well as the undesirable side effects of certain antimicrobial agents has necessitated the discovery of novel bioactive compounds [9].

Costusspeciosus, an important medicinal herb cultivated in India belongs to family Costaceae (Zingiberaceae). This plant is used as food and medicine by the Kannikars, the primitive hill tribes of South India. Sap from leaves, young stems are used against diarrhea ,cough, cuts, wounds, scabies, antidote for snake bite, jaundice, arthritis , burning sensation, constipation, leprosy, skin diseases, asthma, bronchitis, inflammations, anemia , intestinal warms, worm infection, rash, nose pain and to stop vomiting .The rhizomes of Costusspeciosus are bitter, astringent, acrid, cooling, aphrodisiac, purgative, anthelminthic, depurative, febrifuge, expectorant, tonic , improve digestion, and is a stimulant herb that clears toxins [10].

Citrus medica (Citron) possess various bioactive components in all parts of the plant. The major bioactive compounds present are iso-limonene, citral, limonene, phenolics, flavonones, vitamin C, pectin, linalool, decanal, and nonanal, accounting for several health benefits. Pectin and heteropolysachharides also play a major role as dietary fibers. The potential impact of citron and its bioactive components to prevent or reverse destructive deregulated processes responsible for certain diseases has attracted different researchers' attention. The fruit has numerous nutraceutical benefits, proven by pharmacological studies; for example, anti-catarrhal, capillary protector, anti-hypertensive, diuretic, antibacterial, antifungal, anthelmintic, antimicrobial, analgesic, strong antioxidant, anticancerous, antidiabetic, estrogenic, antiulcer, cardioprotective, and antihyperglycaemic activity [11].

Propionibacterium acnes are associated with the inflammatory process in acne lesions [12]. Uncommonly, Propionibacterium spp. have been identified with or without other aerobic or anaerobic bacteria as causes of infections, including brain abscesses, subdural empyema, parotid and dental infections, conjunctivitis associated with contact lens, pulmonary infections, peritonitis, and osteomyelitis [13-15]. From the results of the present investigation it is evident that the sample KC possesses significant antimicrobial activity against*Propionibacterium acnes* at a concentration of 50 and 100 µg were as the drug seems not effective the concentration of 25 µg. Drug efficiency is represented in the form of zone of inhibition. Test drug KC shows maximum zone of inhibition of about 15 mm at the concentration of 100 µg and 10 mm at the concentration of 50 µg when compare to that of the standard drug streptomycin (20µg) which shows the maximum inhibitory zone of about 39mm.

Conclusion

The number of multi-drug resistant microbial strains and the appearance of strains with reduced susceptibility to antibiotics are continuously increasing. Further in developing countries, synthetic drugs are not only expensive and inadequate for the treatment of diseases but also often with adulterations and side effects. Therefore, there is a need to identify new infection-fighting strategies to control microbial infections. It is concluded from the results of the present study that the siddha medicinal formulationKoshtaChooranam (KC) composed of medicinal herbs has an immense anti-bacterial potential against the tested organism *Propionibacterium acnes*.

Acknowledgments

I wish to acknowledge my thanks to The Noble research solutions, Chennai for their technical support for this research work.

References

1. Ajay Bhatia. *Propionibacterium acnes* And Chronic Diseases. Washington (DC): National Academies Press (US), 2004.
2. Magin P, Adams J, Heading G, et al. Psychological sequelae of acne vulgaris: results of a qualitative study. Can Fam Physician 2006;52:978–979.

3. Strauss JS, Krowchuk DP, Leyden JJ, et al. Guidelines of care for acne vulgaris management. J Am Acad Dermatol .2007; 56:651–663.
4. Oluwatobi A. Melasma: an Up-to-Date Comprehensive Review. Dermatol Ther (Heidelb). 2017; 7(3): 305–318.
5. Bhatia L, Bishnoi H, Chauhan P, Kinja K, Shailesh S. *In-vitro* comparative antioxidant activity of ethanolic extracts of *Glycosmis pentaphylla* and *Bauhinia variegate*. Recent Res Sci Technol. 2011;3:01–3.
6. VidyaViswanad, Aleykutty NA, Jaykar B, Zachariah SM, Thomas L. Studies on antimicrobial and antioxidant activity of Methanolic extract of *Samadera indica*. Int J PharmaSci Rev Res. 2011;11:59–64.
7. Christian GJ , Ramaswamy RS , Sivaraman D, Nijavizhi M , Anusha S. Anti-microbial Screening of Siddha Herbo-mineral medicinal formulation Kanagalinga Mezhugu against Selected Urogenital and Enteric Pathogens. IOSR Journal of Dental and Medical Sciences.2016, 15(1):38-43.
8. Bellini MF, Angeli JPF, Matuo R, Terezan AP, Ribeiro LR, Mantovani MS. Antigenotoxicity of *Agaricus blazei* mushroom organic and aqueous extracts in chromosomal aberration and cytokinesis block micronucleus assays in CHO-k1 and HTC cells. Toxicology in Vitro. 2006; 20(3):355–360.
9. Mishra AK, Mishra A, Kehri HK, Sharma B, Pandey AK. Inhibitory activity of Indian spice plant *Cinnamomum zeylanicum* extracts against *Alternaria solani* and *Curvularia lunata*, the pathogenic dematiaceous moulds. Annals of Clinical Microbiology and Antimicrobials. 2009 ;8:1-9.
10. V. A. Pawar. *Costus speciosus*: An Important Medicinal Plant. International Journal of Science and Research (IJSR) .2014;3 (7):28-33.
11. Chhikara N. *Citrus medica*: nutritional, phytochemical composition and health benefits - a review. Food Funct. 2018;9(4): 1978-1992.
12. Beylot C, Auffret N, Poli F, Claudel JP, Leccia MT, Del Giudice P, Dreno B. *Propionibacterium acnes*: an update on its role in the pathogenesis of acne. J Eur Acad Dermatol Venereol. 2014 ;28:271-8.
13. Brook I, Frazier EH. Infections caused by Propionibacterium species. Rev Infect Dis 1991;13:819-822.
14. Brook I, Petit TH, Martin WJ, Finegold SM. Aerobic and anaerobic bacteriology of acute conjunctivitis. Ann Ophthalmol .1978; 11:13-16.
15. Brook I. Infection caused by Propionibacterium in children. Clin Pediatr (Phila).1994; 33:485-490.

Access this Article in Online	
	Website: www.darshanpublishers.com
Quick Response Code	Subject: Siddha Medicine
DOI:10.22192/ijcrbs.2018.05.08.001	

How to cite this article:
A. Sureka, R. Dhanalakshmi, N. J Muthukumar, V. Banumathi. (2018). *In-vitro* evaluation of anti-microbial potential of the Siddha formulation Koshta chooranam against *Propionibacterium acnes*. Int. J. Compr. Res. Biol. Sci. 5(8): 1-5.
DOI: http://dx.doi.org/10.22192/ijcrbs.2018.05.08.001