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Original Article

Antifungal efficacy of herbs

Fahad M. Samadi[a,*], Shaista Suhail[a], Manjari Sonam[a], Neeta Sharma[b], Shruti Singh[a], Sushil Gupta[c], Ashwini Dobhal[d], Harsha Pradhan[e]

[a] Department of Oral Pathology and Microbiology K.G.M.U, Lucknow 226003, U.P, India
[b] Department of Botany, Lucknow University, Lucknow 226007, U.P, India
[c] Department of Oral and Maxillofacial Surgery, Kanpur, India
[d] Department of Oral and Maxillofacial Surgery, Dehradoon, India
[e] Department of Oral and Maxillofacial Surgery, Career Dental College, Lucknow, India

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ABSTRACT

Candida carriage was reported to be common in oral cancer patients, with C. albicans being the predominant species. The prevalence of diseases caused by Candida species have been found to increase in recent years. Aim: The aim of our study was to find the antifungal activities at MIC of selected fifteen plant leaves extracts prepared in three different solutions (methanol and ethanol) against the opportunistic pathogen Candida albicans isolated from oral cavity infections. It may also help the clinician to treat the patient not only for the particular lesion that is present, but also to treat the infection by Candida albicans so as to reduce its potential to malignant transformation. Material n methods: Leaves extract of selected plant prepared in methanolic and eethanolic solution have been chosen for the investigation of in vitro antifungal activity which acts as expectorant and not having toxic properties on humans while for comparison or control, antifungal drugs have been taken. Results showed that Candida albicans shows most sensitivity towards the standard antibiotic cotrimoazol but very less towards other drugs like Fluconazole, minocycline, erythromycin respectively which indicated Candida albicans shows some resistance character towards drugs while the herbal extracts of Lawsonia inermis, Withania somnifer, Curcuma longa, Cymbopogon citrates and Zingiber officinale gives the best inhibitory effect and they have the potential to control growth of Candida albicans.

1. Introduction

Presently, oral infection one of the most prevalent type of disease is a growing health problem around the world. Oral Carcinoma (SCC), a multistage process from normal to dysplastic lesions. A premalignant or precancerous lesion, a morphologically altered tissue in which cancer is more likely to occur and includes oral leukoplakia, oral erythroplakia, Erythroplakia and possibly oral Sub mucous fibrosis. Oral submucous fibrosis, a potentially malignant disease being predominantly found in people of Asian descent. Fibrosis is the histopathological hallmark of the disease that affects most parts of the oral cavity. The prevalence of the disease is on the rise in South Asia in the recent years. Oral leukoplakias, a white patch on the mucosal surface are histopathologically-diagnosed as *Candida* leukoplakia by the presence of hyphae in the superficial epithelium. *Candida* leukoplakia lesions have significantly increased malignant potential. *Candida albicans* is the most prevalent fungal species associated with oral leukoplakia and may contribute to malignant transformation of *Candida* leukoplakia. The term erythroplakia is used for a clinically and histopathologically similar process that occurs on the oral mucosa. Similar to the definition for leukoplakia, it is a clinical term that refers to a red patch that cannot be defined clinically or pathologically like any other condition. In oral cavity, the oral micro flora may be subsequently replaced by potentially pathogenic microorganisms, such as *Candida* sp., (from 72% to 92%), *Candida* carriage was reported to be common in oral cancer patients also, with *C. albicans* being the predominant species.[1,2] Candidal Oral colonization (up to 93%) and infection (up to 30%) are frequently noted in oral cancer patient.[3] The main reason may be the irradiation-induced histological changes which lead to oral mucositis, together with salivary quantitative and qualitative changes, which facilitate candidal growth. Beside that a possible explanation for the higher predisposition of irradiated patients to candidosis is due to reduced phagocytic activity of salivary granulocytes against this micro-organisms.[4]

Candida, an ubiquitous fungi, belongs to the phylum Ascomycota are thin-walled, small (4 to 6 microns) reproduce by budding and are

* Corresponding author.
E-mail address: fahadmsamadi@gmail.com (F.M. Samadi).

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Table 1
Diameters of the inhibition zones by leaves extracts of methanol.

Leaf extracts	Volume of extract (ml)	100 mg/ml	50 mg/ml	25 mg/ml	10 mg/ml	5 mg/ml
Lawsonia inermis	0.2	27 ± 0.13	24 ± 0.26	21 ± 0.17	18 ± 0.04	17 ± 0.22
Withania somnifera	0.2	24 ± 0.11	22 ± 0.08	20 ± 0.22	18 ± 0. 34	16 ± 0.16
Zingiber officinale	0.2	22 ± 0.25	21 ± 0.15	18 ± 0.09	15 ± 0.43	13 ± 0.12
Curcuma longa	0.2	30 ± 0.57	27 ± 0.21	26 ± 0.42	23 ± 0.13	22 ± 0.06
Cymbopogon citrates	0.2	19 ± 0.49	18 ± 0.39	13 ± 0.19	12 ± 0.28	11 ± 0.21
Tamarindus indica	0.2	14 ± 0.09	14 ± 0.20	13 ± 0.28	11 ± 0.24	10 ± 0.36
Limonia acidissima	0.2	10 ± 0.16	09 ± 0.11	08 ± 0.24	08 ± 0.16	07 ± 0.04
Psidium guajana	0.2	15 ± 0.20	13 ± 0.18	12 ± 0.02	12 ± 0.17	10 ± 0.17
Annona reticulata	0.2	12 ± 0.19	11 ± 0.23	10 ± 0.34	09 ± 0.12	08 ± 0.17
Swertia chirata	0.2	16 ± 0.28	15 ± 0.18	1 ± 0.14	11 ± 0.29	10 ± 0.43
Euphorbia hirta	0.2	30 ± 0.32	28 ± 0.06	27 ± 0.20	26 ± 0.23	24 ± 0.15
Pogostemon parviflorus	0.2	26 ± 0.41	22 ± 0.16	19 ± 0.14	17 ± 0.41	15 ± 0.06
Adenocalymma alliacum	0.2	25 ± 0.22	23 ± 0.03	22 ± 0.31	17 ± 0.02	14 ± 0.23
Echinophora platybola	0.2	31 ± 0.17	25 ± 0.12	23 ± 0.22	21 ± 0.19	20 ± 0.20
Cuminum cyminum	0.2	18 ± 0.19	15 ± 0.23	13 ± 0.34	11 ± 0.12	07 ± 0.17

Fig. 1. xxx.

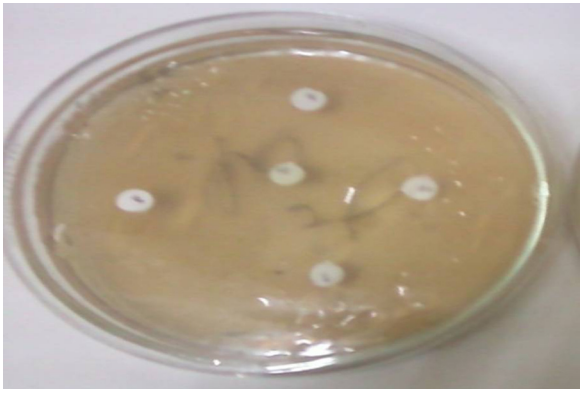

Fig. 2. Close-up of inhibition Zones.

one of the most common causes of opportunistic mycoses worldwide. They grow rapidly and mature in 3 days. The colonies of *Candida* are cream yellowish in color. The texture of the colony may be pasty, smooth, dry, wrinkled and dull, depending on the species. They can be recovered from environmental, human and other mammalian sources. The prevalence of diseases caused by *Candida* species have been found to increase in recent years, mainly in pregnant, diabetic, elderly or immune-compromised individuals, or those who are receiving antibiotic or corticosteroid treatment as appear to be predisposing factors for *Candida* infection.[5] Clinically important *Candida* species in humans includes *Candida albicans*, *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis* and *Candida dubliniens* is among which *C. albicansis* the most prevalent pathogenic species which is responsible for the majority of oral and systemic infections.[6] More recently, it has been suggested that *Candida albicans* species may be the causative agents of oral precancer.[4] There have been some reports in the literature linking the presence of *Candida albicans* with the clinical condition of linear gingival erythema that is occasionally seen in HIV-infected patients.[7] Mycological studies have shown that *C. albicans* represents over 80% of isolates from all forms of human candidosis.[8] However, in the past ten years, a fivefold increase in candidaemia has been reported,[9] and the current incidence of candidaemia per 1000 admissions in Europe ranges from 0.17 to 20 depending on the country and patient group studied.[10] There are no drugs which can effect extremely to treat oral infections caused by *Candida*. There is a general call for new emerging drugs that are highly effective towards oral infections which possess low toxicity, and have a minor environment impact. Novel natural products offer opportunities for innovation in drug discovery. A considerable number of antifungal agents currently used in the clinic are of natural origin. All the drugs from the plants are substances with the particular therapeutic actions