RESEARCH ARTICLE

Evaluation of antifungal activity of chemically synthesized Chalcone derivatives against *Candida albicans*

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ABSTRACT

Three Chalcone derivatives of biological interest were prepared by Claisen-Schimdt condensation of freshly distilled acetophenones with aromatic aldehydes in the presence of 10% sodium hydroxide and ethanol at room temperature.The purity of these compounds were checked by Thin Layer Chromatography method.These derivatives were evaluated for their antifungal activities against yeast *Candida albicans* by Agar Well Diffusion method.All the three derivatives are found to exhibit antifungal activity against *Candida albicans.*

Keywords: Chalcone, Antifungal, Claisen-Schimdt Condensation, *Candida albicans*.

INTRODUCTION

At present there is a growing interest in the discovery of new antimicrobial agents to bate against pathogenic microorganisms especially those that are resistant to antibiotics (Thanh-Dao *et al*., 2011). So, Chalcones constitute an important group of natural products having a wide variety of properties such as anti-inflammatory, anti-ulcer, anti-cancer, anti-bacterial, anti-fungal, anti-mitotic activity (Vibhute and Baseer, 2003). Chalcone serve as precursors for the synthesis of classes of flavanoids which are common substances in plants (Kumbhar, 2014). Chalcones are also key precursors in synthesis of many biologically active compounds useful in medicines (Habib and Kulkarni, 2013; Tiwari et a., 2010; Kulkarni *et al*., 2009). Depending upon the substitution of aromatic ring, the chalcone exhibit different antimicrobial activity (Osman *et al*. 2012; Sato *et al*., 1997). Recently the anti-candidal activity of phytochemicals with a

chalcone skeleton (1,3-diphenyl -2-propene-1-one) was studied (Martina *et al*., 2015). Design and synthesis of new compound with appropriate therapeutic importance is a major challenge in medicinal chemistry (Bhale *et al*., 2013). Thus, the present study aims to evaluate for the antifungal activity of Chalcone derivatives of biological interest so that they can be used as a potent antifungal agents against pathogenic *Candida albicans*.

MATERIAL AND MATERIALS

All the chemicals used for the synthesis of chalcone derivatives were obtained from Loba Chemie, India. The media components used were from Hi-media, India. All other chemicals used were of analytical grade and were prepared in distilled water.

1) General procedure for synthesis of Chalcone derivatives:

The Chalcone derivatives were synthesized by taking a mixture of 10%Sodium Hydroxide solution (25ml) in a 250ml round-bottomed flask by shaking well and keeping the flask in an ice-bath. Then freshly distilled Acetophenone (5ml) and Benzaldehyde (4.5ml) were added with constant stirring continuously for 2-3 hrs at 15-30^{0}C and then was kept overnight in a refrigerator. The solid obtained was filtered in a Buchner funnel,under suction by washing with cold water, dried in air and crystallized from rectified spirit.

2) Test Microorganism:

The test Microorganism used was a pathogenic *Candida albicans*.

3) In-Vitro Antifungal Activity:

The antifungal activity of chalcone derivatives were evaluated by Agar Well Diffusion method using a culture density of 1.5x10^{8}cfu/ml by visually comparing the density with 0.5Mcfarland standard. The 20ml of Sterile Sabouraud Dextrose Agar was poured into each sterile petri plate and the plates were swabbed with 100uL of the test fungi and were kept for 20 minutes at room temperature for adsorption. Then using sterile cork borer of 8mm diameter, wells were bored in seeded agar plates and these were loaded with a 100uL volume with concentration of 1000ug/ml of each of the three compound reconstituted in ethanol. All the plates were incubated at Room Temperature of 25^{0}C for 72hrs. Antifungal activity indicated by an inhibition zone surrounding the well containing the compounds was recorded if the zone of inhibition was greater than 8mm. DMSO was used as a negative control and Clotrimazole (1000ug/ml) was used as a positive control.

RESULTS AND DISCUSSION

In all 20 different yeast isolates were obtained from all the sources. These isolates were purified and maintained on sterile xylose agar slants and refrigerated for further studies. Their ability to utilize xylose was screened in xylose peptone medium. The garden soil isolate was able to utilize 5% xylose within 72h as compared to other isolates. This soil isolate was named as “Sx”. This isolate was further employed for xylitol production. Identification of this isolate was carried out by morphological (Fig No.1) cultural (Fig.2) biochemical tests (Table No. 1).

Table 1.Antifungal activity of synthesized Chalcone Derivatives

Chalcone Derivative	*Candida albicans*-Zone of Inhibition(mm)
PRODUCT-1	12
PRODUCT-2	15
PRODUCT-3	9
POSITIVE CONTROL	22
NEGATIVE CONTROL	NA

NA-Not Applicable, Zone of inhibition was measured in mm

CONCLUSION

The Three Chalcone Derivatives were synthesized to check for their anti-fungal activity against *Candida albicans* by Agar Well Diffusion method.It was found that all the three derivatives showed antifungal activity. Hence we can conclude that these derivatives are active against pathogenic *Candida albicans* and can be used as potent antifungal agent.

REFERENCES

Bhale Pravin *et al.* (2013) Synthesis and antimicrobial screening of chalcones containing imidazo [1,2a] pyridine nucleus",*Research journal of chemical sciences*,3(12):38-42.

Habib Seema I and Kulkarni Prafullkumar A (2013) Synthesis and antimicrobial activity of some new chalcones of pyridine/pyrrole carboxaldehyde", *Der Pharmacia Lettre.* 5 (2) : 101-104.

Kulkarni GB, SivaReddy A, Padmavathi A and Ramdevi Konda (2009) 3D-QSAR Studies of antibacterial chalcones", *International Journal of ChemTech Research.*1(3):717-721.

Kumbhar DD, Waghmare BY, Pathade GR, Pardeshi SK (2014) Synthesis and evaluation of chalcones as an anti-bacterial and anti-fungal agents",*Der Pharmacia Lettre*.6(1):224-229.

Martina Ritter *et al.* (2015) Green synthesis of chalcones and microbiological evaluation, *J.Braz.Chem.Soc*,26(6):1201-1210.

Osman Souad A, Yosef Hisman Abdallah A, Hafez Taghrif S, Abdallah A.El-Sawy, Mousa Hanan A, Hasan Ashraf S (2012) Synthesis and antibacterial activity of some novel chalcones",*Austrailian Journal of Basic and Applied Sciences*.6(3):852-863.

Sato Masaru, Hironori Tsuchiya, Mioko Akagiri, NobuhikoTakagi, Munekazu Iunima (1997) Growth inhibition of oral bacteria related to denture stomatitis by anti-candidal chalcones", *Australian Dental Journal*.42(5): 343-346.

Thanh-Dao Tran *et al*. (2011) Synthesis and Antimicrobial activity of novel heterocyclic chalcones", *International electronic conference on synthetic organic chemistry,*15:1-30.

Tiwari Balkrishna, Pratapwar AS, Tapas AR, Butle SR and Vtakar BS (2010) Synthesis and antimicrobial activity of some chalcone derivatives",*International Journal of ChemTech Research.*2(1),pp.499-503.

Vibhute YB and Baseer MA (2003) Synthesis and antimicrobial activity of new series of chalcones as antibacterial agents",*Indian Journal of Chemistry.*42(B),pp.202-205..