RESEARCH ARTICLE

Effect of chemically synthesized Coumarin derivative against *Candida albicans* as an antifungal agent

Singh Pooja and Padalia Unnati

Department of Microbiology, K.J. Somaiya College of Science and Commerce, Vidyavihar, Mumbai-77
*Corresponding author Email Id- ps354717@gmail.com

Manuscript details:

Available online on
http://www.ijlsci.in

ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)

Editor: Dr. Arvind Chavhan

Cite this article as:
Singh Pooja and Padalia Unnati (2015) Effect of chemically synthesized Coumarin derivative against *Candida albicans* as an antifungal agent, *Int. J. of Life Sciences,* Special Issue, A5: 105-106.

ABSTRACT

One Coumarin derivative of biological interest was synthesized by green synthesis method chemically. This derivative was evaluated for its antifungal activity against yeast *Candida albicans* by Agar Well Diffusion method. The Coumarin derivative was found to show antifungal activity against *Candida albicans.*

Keywords : Coumarin, Antifungal, Green synthesis, *Candida albicans*.

INTRODUCTION

Coumarins are well-known plant derived natural product that are verified to have antioxidant, anti-inflammatory (Sandhya *et al.*2010)), anti-coaggulation, estrogenic, dermal-photosentisizing, vasodilator (Joshi *et al.* 2012) molluscidal, anti-helminthic, sedative, hypnotic, analgesic, hypothermic and antiulcer activities (Monga *et al*., 2012). Coumarins are extremely variable in structure, due to the various types of substitution in their basic skeleton, which can influence their biological activity (Kumaresan *et al.,* 2013; Chaudhary and Datta, 2014). Coumarins are important oxygen containing fused heterocycles used in drugs and dyes and the incorporation of of fused component into parent coumarin converts it into natural coumarin that is found to have antidiabetic activity, anabolic antioxidant and hepato-protective activities (Chitra *et al.,* 2014; Cristina *et al.,* 2008). The synthesis of coumarins and their derivatives has attracted the attention of organic and medicinal chemists, as these are widely used as fragrances, pharmaceuticals and agrochemicals (Helcio *et al.,* 2015; Montagner *et al*., 2008; Kasumbawe *et al*., 2014). The present study aims to evaluate the antifungal activity of chemically synthesized coumarin derivative against pathogenic *Candida albicans* to be used as a potent antifungal agent.

MATERIAL AND MATERIALS

***1) General procedure for synthesis of Coumarin derivative*:** The Coumarin derivative of biological interest was synthesized by mixing Ethyl acetoacetate and Resorcinol in equimolar ratio in a conical flask.To this 30 units of Porcine Pancreatic Lipase was added followed by 5ml water and 5ml ethanol.This was incubated for 12hrs and poured in water.It was filtered washed with water and recrystallised from alcohol.

***2) Test Microorganism*:** The test Microorganism used was a pathogenic Candida *albicans*.

***3) In-Vitro Antifungal Activity*:** The antifungal activity of Coumarin derivative was 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 the coumarin derivative reconstituted in ethanol and DMSO (1:1). All the plates were incubated at Room Temperature of 25^0C for 72hrs. Antifungal activity indicated by an inhibition zone surrounding the well containing the compound 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

The Coumarin derivative was synthesized by green synthesis method chemically. The derivative was checked for its anti-fungal activity against yeast *Candida albicans* by Agar Well Diffusion method on Sterile Sabouraud Agar plate using Clotrimazole (1000ug/ml) as a positive control and DMSO (Dimethyl Sulphoxide) as a negative control. By measuring the diameter of zone of inhibition in mm, it was found that the product was effective in inhibiting the pathogen *Candida albicans* The results of antifungal activity shown by coumarin is in accordance with the findings of Helcio *et al*. (2015) and Montagner *et al*. (2008). A careful analysis of the data for antifungal activity shows that there may be the presence of hydroxy group in coumarin that may be found to possess antifungal activity against *Candida albicans* (Montagner *et al*., 2008).

Table1: Antifungal activity of synthesized CD.

Coumarin Derivative	*Candida albicans*- Zone of Inhibition(mm)
PRODUCT	20

CONCLUSION

The Coumarin Derivative was synthesized to check for its anti-fungal activity against *Candida albicans* by Agar Well Diffusion method.It was found that the Coumarin derivative showed antifungal activity. Hence, we can conclude that this derivative is active against pathogenic *Candida albicans* and can be used as potent antifungal agent.

REFERENCES

Chaudhary R and Datta M (2014) Synthesis of Coumarin derivatives", ECB, 3(1):63-69.

Chitra R *et al.* (2014) Synthesis, characterization and antimicrobial screening of coumarin copolymers, *Chem. Sci. tran,* 3(2):722-730.

Cristina M *et al.* (2008) Antifungal activity of coumarins, *Research Gate*, 63(c):21-28.

Helcio CM *et al.* (2015) , *J. of chem.*.

Joshi H *et al.* (2012)Synthesis and characterization of novel halogens substituted coumarin aldehyde, *Ind j. of chem & pharma. sci.,* 4 (1).

Kasumbawe *et al*. (2014) Antimicrobial and antioxidant activities of substituted halogenated coumarins", *J. of medi.plants and res,* 8(5).

Kumaresan S *et al.* (2013) Studies on the synthesis, characterization, antimicrobial and docking of two new coumarin derivatives",*Int J. advances in pharmaceutical research,* 4(4),1624-1628.

Monga P, Sharma D and Dubey A (2012) Overview of synthesis and activity of coumarins, *Int. Sci. Res J.* 4(1):

Montagner C *et al*. (2008) Antifungal activity of coumarins, *Pub Med,*63(1-2),21-28.

Sandhya B *et al.* (2010) Synthesis,characterization and pharmacological activities of coumarin derivatives, *Ind. J. of chem.& Pharm Sci,*1(1).