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Short Communication

IN VITRO EVALUATION OF ANTIFUNGAL ACTIVITY OF METHANOLIC ROOT EXTRACT OF *SOLANUM SURATTENS* AGAINST *CANDIDA* SPECIES

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ABSTRACT

Candida is a kind of yeast that exists in the human body also and can cause infections if it grows in high amount. *Solanum surattens* also known as *Solanum xanthocarpum* is distributed to plains/lower hill region of India. The study was to assess *in-vitro* antifungal activity of methanolic root extract of *Solanum surattens* against *Candida albicans*, *Candida glabrata, Candida krusei* and *Candida tropicali*. Candidiasis is the most common infections. Based on the results, methanolic root extract of *Solanum surattens* might be a promising antifungal agent.

Keywords: *Solanum surattens*, Antifungal activity, Candidiasis.

1. INTRODUCTION

Candida is a kind of yeast that exists in the mouth, stomach and on skin of human body in small amount without causing any problems [1]. If it grows in high amount it can causes serious infection. Diseases caused by these yeasts are known as Candidiasis, which is mainly caused by *Candida albicans Candida krusei, Candida glabrata* and and *Candida tropicalis*. The diseases are commonly seen in immuno-compromised [1, 2] patients *i.e* AIDS patients. In India, the disease appears in approximately 58% of AIDS patients as the common opportunistic infection [3, 4]. The oral candidiasis or thrush is the earliest clinical symptom in AIDS patients [5]. In immune suppressed patients, the oral thrush may spread deep down to the oesophagus, lungs and finally invades the blood stream. The disease may spread to other vital organs including brain, liver, spleen and among renal transplant recipients [6-8]. Prophylaxis is rarely practiced in India as antifungal drug [9]. The commonly available drugs such as amphotericin B, clotrimazole, fluconazole, ketoconazole and azoles derivatives are used for the treatment of the disease. However, the management of *Candida* infections faces a number of problems including limited number of effective anticandidal agents, toxicity and their high cost [10-12]. Moreover, the prolonged use of these drugs has culminated in an emerging prevalence of drug resistance strains of *Candida* species [13, 14].

Since the difficulties associated with the management of *Candidal* infections, there is an imperative need for the development of new and effective antifungal agent. It is now well recognised that the exploration of traditional herbal remedies is a viable research initiative for new drugs molecules. The judicious use of medicinal herbs can even cure deadly diseases that have long defied synthetic drugs [15]. Even the World Health Organisation (WHO) estimates that about 70-80% of the world population trust on traditional health care system which are based on the use of medicinal plants [16, 17].

Indian herb, *Solanum surattens* (Syn.: *Solanum xanthocarpum*) is one of the members of the dasamula (ten roots) [18, 19] of the Ayurveda and known as Kantkari, a prickly spreading herb, belongs to family Solanaceae [20]. Its flowers are purple and berries are yellow when ripe [20]. It is distributed throughout India in waste places and road side between 1000 to 2000 meters [21]. *Solanum surattens* is used in medicine in various forms, such as decoction, electuary, ghrita [22] etc. Seeds of *Solanum surattens* showed antibacterial activity [23]. Solasodine was identified as an antispermatogenic/anti-androgenic principle [24]. Fruits are eaten as an anthelmintic and for indigestion [25]. Root is an expectorant, used in Ayurvedic medicine for cough, asthma, chest pain, flatulence, sore throat and toothache [25].

2. MATERIAL AND METHODS

2.1. Plant Material

The plant material (Roots of *Solanum surattens*) was collected from the locality of village Bassi, District Jaipur, Rajasthan, India.

2.2. Preparation of extract

The shade dried plant material (1.5 kg) was finely powdered and extracted with methanol in a 5 litre round bottom flask for 72 hrs on water bath. The extract was filtered hot and solvent was removed by distillation under reduced pressure where a semi-solid dark brown mass (11gm) was obtained. Half of the semi solid extract was suspended in methanol to prepare desired concentration of the extract. Rest of the extract was reserved for its phytochemical investigation.

2.3. Determination of Antifungal activity

Antifungal activity of the experimental plant was investigated against *C. albicans*, *C. glabrata, C. Krusei* and *C. tropicalis* by agar well diffusion method [26]. These yeasts were subcultured onto Sabouraud's dextrose agar, SDA (Merck, Germany) and respectively incubated at 37°C for 24h and 25°C for 2-5 days. Suspensions of fungal spores were prepared in sterile PBS and adjusted to a concentration of 106 cells/ml. Dipping a sterile swab into the fungal suspension and rolled on the surface of the agar medium. The plates were dried at room temperature for 15 min. Wells of 10 mm in diameter and about 7 mm apart were punctured in the culture media using sterile glass tube. 0.1 ml of several dilutions of fresh extracts was administered to fullness for each well. Plates were incubated at 37°C. After incubation of 24 h, bioactivities were determined by measuring the diameter of inhibition zone (in mm). All experiments were made in triplicate and means were calculated.

3. RESULTS AND DISCUSSION

The methanolic root extract of *Solanum surattens* showed significatent results. The results of this study indicate that the extract inhibit the growth of *C. albicans, C. glabrata, C. krusei* and *C. tropicalis*. Itraconazole was used as control standard for antifungal activity. Itraconazole showed 29mm, 27mm, 25mm and 24mm zone of inhibition against *C. albicans, C. glabrata, C. krusei and C. Tropicalis* respectively. Sample TE4 showed better antifungal activity with 31 mm zone of inhibition rather than Control standard (29 mm zone of inhibition) against *C. albicans.* While the sample TE1 and TE2 and TE3 showed inferior antifungal activity rather than Control standard with 18mm, 22mm and 25mm zone of inhibition for the same fungi respectively. Sample TE4 showed similar antifungal activity with 27 mm zone of inhibition rather as Control standard (27 mm zone of inhibition) against *C. glabrata.* While the sample TE1 and TE2 and TE3 showed lesser antifungal activity rather than Control standard with 20mm, 23mm and 26mm zone of inhibition for the same fungi respectively. All other samples TE1 to TE4 showed lesser antifungal activity rather than Control standard against *C. krusei* and *C. tropicalis*. The phyto-chemical analysis of methanolic root extract of *Solanum surattens* revealed that it contains various constituents such as alkaloids, steroids flavonoids, tannins and glycosides. The antifungal activity of methanolic root extract of *Solanum surattens* may be endorsed by these phytochemicals.

Table 1: Antifungal activity of Methanolic Root Extract of *Solanum surattens*

	Zone of inhibition (mm)			
Test Extracts	*C. albicans*	*C. glabrata*	*C. krusei*	*C. tropicalis*
TE1 (20µL/well)	18	20	17	16
TE2 (40µL/well)	22	23	20	18
TE3 (60µL/well)	25	26	22	20
TE4 (80µL/well)	31	27	24	23
Itraconazole (20µL/well)	29	27	25	24

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