



RESEARCH ARTICLE

IN VITRO EVALUATION OF ANTI MYCOTIC ACTIVITY OF *CARICA PAPAYA* EXTRACT  
ON *CANDIDA ALBICANS*

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ABSTRACT

**Background:** An anti mycotic is a substance that kills or inhibits the growth of fungi. Papaya is also known as pawpaw or melon tree. *Carica papaya* is one of the accepted species in the genus *Carica* of the family *Caricaceae*. The fruits are the source of flavoring agent in candies, jellies, ice creams etc. It has protein digesting, antiseptic and antimicrobial properties. *C.papaya* has been widely used in the treatment of diabetes.

**Aim:** To evaluate the antimycotic activity of *Carica papaya* extract on *Candida albicans*.

**Methodology:** The antimycotic activity is carried out by agar well diffusion technique against the fungal pathogens and the zone of inhibition is measured in mm diameter.

**Result:** In the present study, *Carica papaya* was found to be effective against gram-positive *Candida albicans* organisms tested.

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INTRODUCTION

Medicinal plants represent a rich source of antimicrobial agents. They are used as medicines in different countries and are the resource of many potent and powerful drugs (Anitha Roy et al., 2011). The increasing frequency and incidence of microorganisms that are resistant to common and effective first choice drugs is on the increase (Eman, 2014). There was an alarming increase of infections caused by fungi which include different types of fungal pathogens (Ashfaq Ahamed, 2016). One such important opportunistic fungal pathogen is *Candida albicans*. They are the main cause of oropharyngeal candidiasis, gastrointestinal and female genital flora. Opportunistic pathogens results in hospitalization, may require expensive therapies and they also reduce the survival rate of people with HIV infection (European Journal of Biology and Medical Science Research, 2015 and Gholampour, 2015). In immunocompromised individuals candidiasis is the earliest infection to manifest (Atai, 2009). Many of the phytochemicals found in the herbs have beneficial effects and can be used to treat human diseases (Geetha, 2013 and Si-Yuan Pan, 2011). Papaya (*Carica papaya L.*) is prized worldwide for its nutritional properties (Antifungal, 2011 and Lugo de Cumare, 2004), *Carica papaya L.* leaves and seeds are known to contain

proteolytic enzymes like papain, chymopapain, alkaloids like carpain, carposmine, sulfurous compounds like benzyl isothiocyanate, flavonoids, triterpenes, organic acids and oils (Cowan, 1999 and Osuna-Torres, 2005). The ripe fruit of papaya usually eaten raw, without the skin or seeds but the unripe green fruit can be eaten in the form of curries, salads and stews (European Journal of Biology and Medical Science Research, 2015 and Lohiya, 2002). Recent studies have shown that, papaya is not only known for its nutritional benefits but it is also considered to possess medicinal properties. It rich in natural vitamin and minerals like vitamin C, vitamin AM thiamine, iron and fiber and are less in calories (Hamzia Ali Ajah, 2015 and Boshra, 2013). The fruit contains certain immune- stimulating and anti-oxidant agents (Eman, 2014 and Aruoma, 2006). The seeds are used as a potential post-testicular anti fertility drug and are used in the treatment of gastrointestinal nematode infections and they have shown anthelmintic activity (Eman, 2014; Lohiya, 2005 and Stepek, 2005). The fresh leaves of it are also efficacious in the treatment of gonorrhoea syphilis and amoebic dysentery (Hamzia Ali Ajah, 2015 and Gill, 1992). Therefore, The present study was carried out to assess the antimycotic effect of *Carica papaya* extract against *Candida albicans* in vitro.

MATERIALS AND METHODS

**Materials:** The Bacterial strains used was *Candida albicans*. The organisms was obtained from Department of Microbiology, Saveetha Dental College and Hospitals.

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## Methodology

The *Carica papaya* powder was dissolved in distilled water in following concentrations 2.5mg/ml, 5mg/ml and 10mg/ml so that 100 $\mu$ l delivers 250 $\mu$ g/ml, 500 $\mu$ g/ml and 1000  $\mu$ g/ml respectively.

### Agar well diffusion technique

Broth culture of the test organisms compared to Mac Farland's standard 0.5 were prepared. Lawn culture of the test organisms were made on the Muller-Hinton agar [MHA- M1084] plates using sterile cotton swab and the plates were dried for 15 minutes. Well measuring 4 mm depth was made on the agar with sterile cork borer. 100 $\mu$ l of the extract was added to the wells. The plates were incubated overnight and the zone of inhibition of growth was measured in mm diameter. All the test were done in triplicate to minimize the test error.

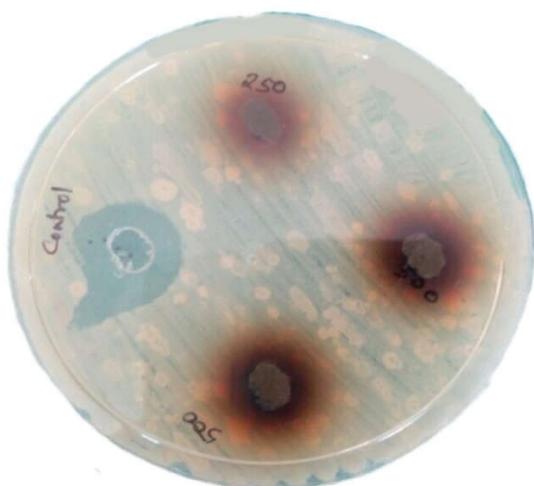


Figure 1. Showing antimycotic activity of *Candida albicans* by using agar well diffusion method

Table 1. Antimycotic activity of *Carica papaya* on *Candida albicans*

Conc of Extract $\mu$ g/ml	Zone of Inhibition mm diameter
250	20
500	26
1000	29
Control	22

## RESULTS

The antimycotic activity of the *Carica papaya* at different concentrations was screened by agar well diffusion technique and the zone of inhibition was measured in mm diameter. The results are given in the table 1. The activity of *Carica papaya* extract was compared with the control. Different concentrations (250 $\mu$ g/ml, 500 $\mu$ g/ml, 1000 $\mu$ g/ml) of extract were used and the zone of inhibition was measured. When the concentration is 250 $\mu$ g/ml the inhibition was found to be 20mm diameter. Similarly for 500 $\mu$ g/ml and 1000 $\mu$ g/ml it was found to be 26 and 29mm diameter and for the control it is 22mm diameter. The result shows that as the concentration of the extract increases the zone of inhibition also increases.

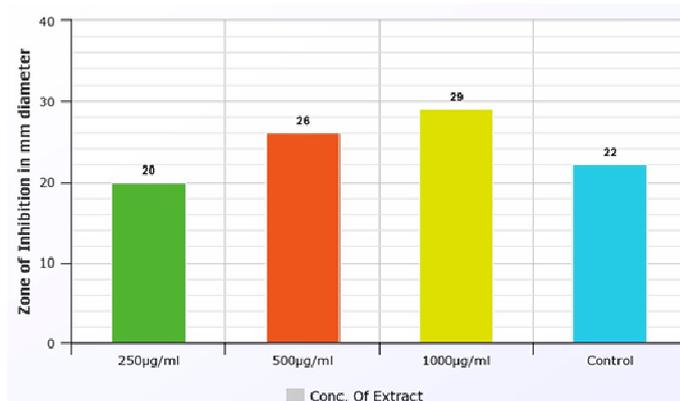


Figure 2.

## DISCUSSION

The present investigations are being carried out to evaluate the antifungal medicinal properties of *Carica papaya* plant against *Candida albicans*. Papaya is a powerhouse of nutrients and is available throughout the year. It is a rich source of three powerful antioxidant vitamin C, vitamin A and vitamin E; the minerals, magnesium and potassium; the B vitamin pantothenic acid and folate and fiber (Aravind, 2013). Every part of *Carica papaya* is of economic value and its use ranged from nutritional to medicinal (Ikeyi Adachukwu, 2013 and Grayson, 2001). The seeds are used in the treatment of sickle cell diseases, poisoning related disorder. The extract has a reputation as a tumor destroyer agent (Grayson, 2001 and Ezugwu, 2008). Papaya contains two primary compounds, papain and chymopapain. Phenolic compounds are seen in more quantities in male trees. Other elements like alkaloids, butonic acid, flavonols, linalool, tannins and terpinolene are seen in leaves, fruit, seeds, roots and bark of the tree. The fruit contains potassium, calcium, iron, magnesium, zinc, copper and manganese.

## Conclusion

The results of this study suggest good correlation between medicinal use and the in vitro antimycotic activity. It has been concluded from present study that certain plant extracts are a source of cheap and effective fungicides of *Carica papaya* extract and also it doesn't have human and environment health implications. The results of our present study shows that the extract used have significant antimycotic activity against *Candida albicans*.

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