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Annona Squamosa stem extract: antifungal activity and it's phytochemical analysis

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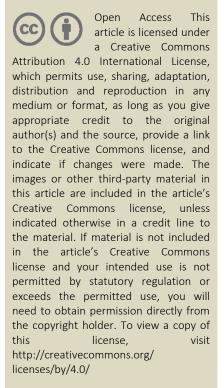
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The antifungal activity of various *Annona squamosa* solvent extracts against *Candida albicans* was investigated using the agar diffusion technique. Different solvent extracts of *Annona squamosa* stem were tested qualitatively for phytochemical analysis. *Annona squamosa* hexane extract had the best antifungal effectiveness against *Candida albicans* and contained substantially all phytochemical ingredients.

Keywords: *Annona squamosa* stem, *Candida albicans*, antifungal activity, agar diffusion method, Phytochemical analysis.

INTRODUCTION

Herbal products have been more popular in developed nations as well as in a number of other countries in recent years. According to the World Health Organization, herbal medicine is now used by 80 percent of the world's population for some component of primary health care (Mazid et al. 2012). Many of the plants are used to cure a range of ailments in ethnomedicine. Antimicrobial medications either kill or stop microorganisms from multiplying. Antimicrobial agents applied on non-living items or outside the body are known as disinfectants. Microorganisms continue to outperform humans in the production of bioactive small compounds for medication development. Many antibiotics have confers resistance in microorganisms, posing a significant clinical challenge in the treatment of infectious illnesses. The microbes' tolerance developed as a result of the excessive use of commercially antimicrobials frequently used to fight infections (Lewis and Ausubel, 2006). As a result, researchers were driven to look for novel antimicrobial compounds from a variety of sources, especially from herbal resources.

MATERIAL AND METHODS

Collection of plant parts:

Plant material: The plant *Annona squamosa* (Annonaceae) obtained from Bhokar area, Dist. Nanded, was recognised and certified by a taxonomist

from Yeshwant Mahavidyalaya, Nanded-431602, Maharashtra.

Preparation of Plant extracts:

Annona squamosa stems were harvested and dried in the shade. The dried stem was ground into a fine powder using a mixer. The fine powder of the plants was extracted using the Soxhlet device and several solvents, including ethanol, ethyl acetate, and hexane. Finally, the extracted material was concentrated and put to use for other applications.

Preliminary Phytochemical analysis:

Phytochemical analysis was performed using *Annona* squamosa solvent stem extracts using a standard procedure (Yadav and Agarwala, 2011).

Test microorganisms:

In the present study, the test microorganisms (*Candida albicans*) obtained from culture collection Centre, School of Life Sciences, S. R. T. M. University, Nanded-431606, Maharashtra. The collected *Candida* cultures was repeatedly subcultured and used for present experiment.

Antifungal activity by agar diffusion method:

Using the agar diffusion technique, the antifungal activity of various solvent extracts of Annona

squamosa was evaluated. The subcultured candida suspension (100 μ l) was made and employed for agar medium spreading. Antifungal activity was determined using 3 mg of concentrated different extracts (Magaldi *et al.* 2004). After adding the sample, the plates were left for an hour to allow the extract to diffuse. The plates were kept for 24 hours at 37°C in an incubator, and the inhibitory zone was measured in millimetres (mm). The standard was fluconazole 1.25 mg/ml.

RESULTS AND DISCUSSIONS

Preliminary phytochemical analysis of *Annona squamosa* extracts revealed the presence of saponin, phenols, tannins, glycosides, terpenoids, flavonoids, alkaloids, and coumarins in ethanol, ethyl acetate, and hexane extracts, with the exception of saponins, glycosides, and terpenoids in the ethyl acetate extract. Table 1 shows the findings of the phytochemical analysis. The presence of a high concentration of phytochemicals in the plant results in a greater level of biological activity. Table 2 shows the antifungal activity of different solvent *Annona squamosa* extracts. In comparison to fluconazole, the hexane extract of *Annona squamosa* had the highest antifungal activity (6 mm), whereas the ethyl acetate extract (3 mm) and the ethanol extract (2 mm) had lowest activity.

| Sr. | Phytochemical Test | Stem extract of Annona squamosa | | | | |
|-----|--------------------|---------------------------------|---------|----------------|--|--|
| No. | | Ethanol Ethyl acetate | | Hexane extract | | |
| | | Extract | extract | | | |
| 1 | Saponins | + | - | + | | |
| 2 | Phenols | + | + | + | | |
| 3 | Tannins | + | + | + | | |
| 4 | Glycosides | + | - | + | | |
| 5 | Terpenoids | + | - | + | | |
| 6 | Flavonoids | + | + | + | | |
| 7 | Alkaloids | + | + | + | | |
| 8 | Coumarins | + | + | + | | |

 Table 1. Preliminary phytochemical analysis of stem extract of Annona squamosa

Table 2. Antifungal activity of stem extract Annona squamosa

| Sr. No. | Microorganism | | Zone of Inhibition (mm) | | | | |
|---------|------------------|---------|---------------------------------|---------|--------------|--|--|
| | | | Stem extract of Annona squamosa | | | | |
| | | Ethanol | Ethyl acetate | Hexane | fluconazole | | |
| | | extract | extract | extract | (1.25 mg/ml) | | |
| 1 | Candida albicans | 2 | 3 | 6 | 10 | | |

The presence of a diversity of phytochemicals in the extract may also be responsible for a significant inhibitory zone. Antifungal action is due to the presence of various flavonoids, alkaloids, terpenoids, phenols, saponins, and coumarins (Kalidindi *et al*, 2015). According to several scientific research high levels of phytochemicals and bioactive substances indicate a greater potential treatment for inhibiting a variety of harmful microorganisms.

CONCLUSIONS

As per the studies, the hexane extract has the maximum activity, which might be due to the presence of chemical components with antifungal activity, as well as the fact that the extract contains the most of the phytochemical compounds. More study is needed to detect and purify compounds from *Annona squamosa* stem extract that might be utilised as an alternative to synthetic commercial pharmaceuticals.

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Conflict of interest:

The authors declares that there is no conflict of interest

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