

Annona Squamosa stem extract: antifungal activity and its phytochemical analysis

Dhole NA

Department of Botany, Digambarrao Bindu Mahavidyalaya, Tamsa road, Bhokar-431801, Nanded, Maharashtra state, India

Manuscript details:

Received: 02.11.2020
Accepted: 29.12.2020
Published: 30.12.2020

Cite this article as:

Dhole NA (2020) *Annona Squamosa* Stem Extract: Antifungal Activity and Its Phytochemical Analysis, *Int. J. of Life Sciences*, 2020; 8 (4):805-807.

Available online on <http://www.ijlsci.in>
ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

ABSTRACT

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 conferred 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 µl) 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.

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

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

Table 2. Antifungal activity of stem extract *Annona squamosa*

Sr. No.	Microorganism	Zone of Inhibition (mm)			
		Stem extract of <i>Annona squamosa</i>			
		Ethanol extract	Ethyl acetate extract	Hexane extract	fluconazole (1.25 mg/ml)
1	<i>Candida albicans</i>	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.

Acknowledgment:

The authors are thankful to the Principal, Digambarrao Bindu Arts, Commerce and Science College, Bhokar for facilities and encouragements.

Conflict of interest:

The authors declares that there is no conflict of interest

REFERENCES

- Kalidindi N, Thimmaiah NV, Jagadeesh NV, Nandeeep R, Swetha S, Kalidindi B (2015) Antifungal and antioxidant activities of organic and aqueous extracts of *Annona squamosa* Linn. Leaves. *Journal of Food and Drug Analysis*, 23: 795-802.
- Lewis K, Ausubel FM. (2006). Prospects for plant-derived antibacterials. *Nature Biotechnology*, 24(12):1504-1507.
- Magaldi S, Mata-Essayag S, Hartung DE, Capriles C, Perez C, Colella MT, Olaizola C, Ontiveros Y (2004) Well diffusion for antifungal susceptibility testing. *International Journal of Infectious Diseases*, 8(1): 39-45.
- Mazid M, Khan TA, Mohammad F (2012) Medicinal plants of rural India: a review of use by Indian folks. *Indo Global Journal of Pharmaceutical Sciences* 2: 286-304.
- Yadav RNS, Agarwala M. (2011) Phytochemical analysis of some medicinal plants. *Journal of Phytology*, 3(12): 10-14.