

## **International Journal of Research Publication and Reviews**

Journal homepage: www.ijrpr.com ISSN 2582-7421

# Formulation and Evaluation of Antibacterial Cream using Annona Squamosa Leaf Extract

### Yash S. Damodar<sup>1</sup>, Prajakta P. Shinde<sup>2</sup>

S.M.B.T College of Pharmacy

#### ABSTRACT:

The flexible drought-resistant evergreen tree Annona Squamosa, also referred to as the "custard apple" and a member of the Annonaceae family, is becoming ever more vital due to its potential medical uses. Traditional folklore medicine has made use of several tree parts. To treat hysteria and fainting episodes, crushed leaves are sniffed; they are also used to wounds and ulcers, and a leaf decoction is taken to treat diarrhea. The market for pharmaceuticals, food supplements, cosmetics, health products, and plant-based medications is expanding. Current health information from bibliographic databases and abstracting systems like PubMed, Medline, and Google Scholar was used to create the current review. The deciduous plant Annona Squamosa Linn. is utilized in traditional medicine. The multipurpose tree Annona squamosa Linn produces edible fruits and is used aiding in industrial and healthcare equipment. Antioxidant, antidiabetic, hepatoprotective, cytotoxic, genotoxic, anticancer, and antilice condominiums are all who worked in Annona squamosa Linn. It is associated with alkaloids, carbohydrates, tannins, phenolic, and fixed oils.

Keywords: Annona squamosa Linn phytochemical constituent, pharmacological actions, toxicity, antibacterial, antidiabetic, anti-tumor.

#### Introduction:

As Annona genus is widely available in India this genus has been selected for the study. The bark, leaves, and roots of some species are used in folk medicines. The strong bark is used for carrying burdens in the Amazon Rainforest and for wooden implements, such as tool handles and pegs. The wood is valued as firewood, Yellow and brown dyes. A recent study suggests that the alcoholic seed extract contains anti-cancer compounds. Leaf extract have antinociceptive effect(1). *A. squamosa* leaves contain active substances such as flavonoids, glycosides, phenolics, tannins, phytosterols, alkaloids, and saponins. These compounds show therapeutic effects such as antioxidants, anticancer, antimicrobial, antiviral, anti-melanogenic, and anti-inflammatory activities.

Taxonomy Kingdom: Plantae Division: Magnoliophyta Class: Magnoliopsida Order: Magnoliales Family: *Annonaceae* Genus: *Annona* L. Species: *Annona squamosa*(2)

#### Collection and extraction of plant material:

The leaves were washed thoroughly, shade dried and finely powered. The dried powdered leaves were extracted with three different solvents such as water, acetone and chloroform. For aqueous extraction, ten grams of the powdered leaves was mixed with 100ml distilled water, boiled for two hours and filtered. Whereas acetone and chloroform extracts were prepared by mixing ten grams of powdered leaf samples with 100ml of each solvent separately in mechanical shaker for 48 hours at room temperature(3).

#### 13620

#### **Pharmacological Investigation**

The methanol extract exhibited the largest zone of inhibition for Annona squamosa leaf, followed by petroleum ether and aqueous extracts, according to the antibacterial screening using the agar cup method. All test microorganisms except Salmonella typhimurium were inhibited in their growth by Annona squamosa extracts. Because i) the same active ingredients were present in water extracts, albeit in small amounts, and ii) the active ingredients were soluble in organic solvents and hence absent from water extracts, aqueous extracts exhibited lower activity than methanol extracts(4).

#### **Antimicrobial Screening**

Escherichia coli (MTCC 443), Staphylococcus aureus (MTCC 96), Pseudomonas aeruginosa (MTCC 741), and Bacillus subtilis (MTCC 441) were the standard strains utilised. Mueller Hinton Agar (MHA) was inoculated with 1% of the test bacterial strain's standard inoculum (106–107 CFU) using the pour plate method.

In the MHA, wells with a 6 mm diameter were then bored. Each well was filled with plant extracts, which were then let to stand and diffuse for one hour at room temperature while being incubated for a complete day at 37° C. Using an antibiotic zone reader, the Inhibition Zone Diameter (IZD) came to be to the closest millimetre. The cylinder agar diffusion method, as outlined by Fyhrquist et al., was used to calculate the MIC(5).

#### **Antidiabetic Activity**

In rats with STZ-induced hyperglycemia, the current study found that A. squamosa root extract has antidiabetic effects. Blood glucose levels rise as a result of insulin insufficiency and diabetes mellitus brought on by STZ. After two hours, diabetic rats given A. squamosa root extract showed hypoglycemia, with the greatest effect occurring at six hours. Based on the findings, it is believed that the root extract may have stimulated the release of insulin and caused the blood glucose level to be restored.

Moreover, elevated peripheral glucose utilisation may potentially be the cause of the extract's reported reduced blood glucose-lowering effect in STZinduced diabetic rats. Glibenclamide, a common hypoglycemic medication, and the Aq. extract of Annona squamosa roots had similar antihyperglycemic effects.

In healthy rats, the ethanolic extract of Annona squamosa Linn leaves has significant hypoglycemic action. In normal rats, the dose of 350 mg/kg body weight decreased the peak blood glucose at 1 hour during the glucose tolerance test by 17.1%, whereas the dose decreased the fasting blood glucose level by 6.0% within 1 hour. A dose of 350 mg/kg of extract given to rabbits with alloxan-induced diabetes for 15 days lowers fasting blood glucose by 52.7% and urine sugar by 75%.(4)

#### Anticancer

Given that oxidative stress has been linked to the aetiology of numerous illnesses, including diabetes and cancer, Annona squamosa exhibits potent antioxidant action. Thus, it might have anti-carcinogenic qualities [40]. The cytotoxic potential of Annona squamosa fruit pericarp extract was evaluated against He La and Dalton's lymphea cells. The chloroform extract was shown to be cytotoxic to the various cell lines examined, indicating that the fruit pricarp of Annona squamosa may develop anticancer properties.

Research in the literature has demonstrated that the active constituent bullatacein has anticancer properties in the treatment of kidney and breast cancer [49]. Additional phytochemicals with anticancer action have been reported, including tannin, citric acid, corydiene,  $\beta$ -carotene, liponene, lipidenine, and mallic acid.

Annonaceous acetogenins exhibited antitumor activities against leukaemia, liver, prostate, pancreatic, and cervical cancer both in vitro and in animals. The most effective activity was exhibited by the ingredient polyphosphorus bullatacin G. Polyphosphorus bullatacin G and in vitro anonaceous acetogenins shown strong anti-tumor activities against human breast and laryngeal cancer cells in cell growth suppression tests. Furthermore, anonaceous acetogenins prevented mitochondrial NADH oxidoreductase and the respiratory chain of mitochondria from transmitting, which led to a sharp drop in cell energy, the loss of P-glycoprotein activity, and the defeat of multidrug resistance (MDR).(6)

#### Cardiovascular System:

Annona squamosa leaves are thought to have hypotensive properties. Leaves that contain (-)-kaur-16-en-19-oic acid and (-)-xylopine shown potent hypotensive effects [42]. A tetra hydroisoquinoline alkaloid with cardiotonic properties was extracted from Annona squamosa leaves [53]. Relax the blood vessels.

Cyclosquamosin B suppressed depolarised aortic contraction under high K+, reduced norepinephrine (NE)-induced aortic contraction in rats, and somewhat inhibited NE-induced blood vessel contraction when nicardipine was present. The process may be because voltage-dependent calcium channels are inhibited, which lowers the amount of Ca2+ that enters the cells.

#### Liver & Biliary System

The plant's leaves are used to treat liver conditions that are not urgent. Additional research revealed that leaves' alcoholic and water extracts may have hepatoprotective effects on rats [55]. Clinical research has shown that giving rats methanolic extract of Annona squamosa at doses of 250 and 500 mg/kg considerably reduced the rise in serum marker enzyme levels, including ALT, AST, and ALP, as well as increase GT serum bilirubin, that was caused by isoniazid and rifampicin. The extract's effects were contrasted with those of the common medication Silymarin [56]. According to studies, the extract's hepatoprotective impact might be caused by the flavonoid component's ability to scavenge free radicals, which could result in hepatoprotection. This could be because the flavonoid found in Annona squamosa leaves has an anti-oxidative effect.

#### **Thyroid Hormones**

Annona squamosa leaf extract was discovered to be a thyroregulatory remedy. Prior research demonstrated that while plants have a thyroid-inhibiting impact on mice, they also change the hepatic LPO in a dose-dependent way.

According to studies, leaf extract has antithyroid and antiperoxidative properties at low concentrations, while at greater concentrations it exhibits thyroid inhibitory properties but also hepatotoxic effects via raising LPO. Thus, it implies that the largest dose is dangerous.

While T3 is thought to be the most metabolically active thyroid hormone produced in the liver by monodeiodinating T4, circulating thyroid hormone T4 is secreted by the thyroid gland.

#### Reference

- Bhattacharya A, Chakraverty R. The pharmacological properties of Annona squamosa Linn: A Review. Int J Pharm Eng ABhattacharja et al [Internet]. 2016;4(2):692–9. Available from: http://www.abhipublications.org/ijpe
- Safira A, Widayani P, An-Najaaty D, Rani CAM, Septiani M, Putra YAS, et al. A Review of an Important Plants: Annona squamosa Leaf. Pharmacogn J. 2022;14(2):456–63.
- Kumar NS, Dhanyaraj FS. Phytochemical analysis and antimicrobial activities of sesbania grandiflora (L) leaf extracts. Int J Pharm Sci Rev Res. 2016;36(1):144–8.
- 4. Pandey N, Barve D, Pharmacy TITCO, Nagar A, Bhopal MP. Review Paper Phytochemical and Pharmacological Review on Annona squamosa Linn. Int J Res Pharm Biomed Sci. 2011;2(4):1404–12.
- 5. Patel JD, Kumar V. Annona squamosa L .: Phytochemical analysis and Antimicrobial Screening. 2008;1(1):34-8.
- Srivastava S, Lal VK, Pant KK. Medicinal potential of Annona squamosa: At a glance. J Pharm Res [Internet]. 2011;4(12):4596–8. Available from: http://www.bicco.com/herb\_photo.html.