

An article reviews of anti-cataract activity of hydroalcoholic extract of *Annona squamosa* leaves

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Abstract

Other medicines and natural remedies have been used for the treatment and health of people since ancient times. Medicinal plants are considered useful and of the most important purpose. It can be applied to botanical medicines, nutraceuticals, medicines, food products, cosmetics, etc. There is an increasing demand for. Custard apples. It is a versatile tree whose fruit is edible and a source of medicine and products. It is used as antioxidant, antidiabetic, hepatoprotective, cytotoxic activity, genotoxicity, antitumor activity, anti-inflammatory drug.

Cataract is nothing but visual impairment caused by a defect in the lens. It is one of the causes of blindness worldwide; It accounts for approximately 42% of all blindness. One significant risk factor for the development of posterior subcapsular cataracts is long-term glucocorticoid usage.

The preventive and therapeutic effects of many herbs such as onion, Chinese cinnamon and ginkgo, which have protective properties against cataracts, have been reported. This review demonstrates the therapeutic potential of custard apple leaf extract as an anti-cataract effect

Keywords: Pharmaceuticals; *Annona squamosa*; Antioxidant; Cataract; Leaves extract

1. Introduction

Globally, cataracts are the primary cause of blindness.

Diabetes is considered an important risk factor for cataract development. It is understood that the age of onset of cataracts is earlier in diabetic patients and the incidence is 5 times higher. It is reported that approximately 20% of cataract surgeries are performed only on diabetic patients. Lens clouding in cataracts is a problem of diabetes and is associated with oxidative and hyperosmotic stress. (Hajarnavis, 2019) The formation of cataracts is linked to oxidative damage in the lens, and the significance of antioxidant enzymes in averting both cataract development and oxidative damage in the lens is demonstrated by decline in antioxidant enzyme activity in cataractous lenses. Numerous treatments, including non-steroidal anti-inflammatory drugs (NSAIDs) and aldose reductase inhibitors, are being investigated for their potential to prevent cataract development. (Hajarnavis, 2019)

Global estimates show that approximately 2.2 billion people suffer from partial blindness, of which approximately 65 million are caused by cataracts. According to the National Eye Institute, the number of people living with this disease in the United States is expected to double from 24.4 million to approximately 15 million by 2050 [25]. Approximately 6

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0% of people in Africa and parts of South America are blind. It is also more common in women and less common in Hispanics and blacks. (Urimindi Pravallika, 2022)

Global Prevalence: According to the World Health Organization, these billions include people with distance vision loss, nearsightedness or blindness because the problem is not solved. Cataracts usually occur with age. This is the disease of the elderly. Reactive oxygen species in the eye lens kill biomolecules, including DNA, proteins, and phospholipids, causing lipid peroxidation and depletion of the antioxidant enzymes SOD and GSH, resulting in further oxidative stress. (Urimindi Pravallika, 2022)

2. Pharmacological actions of *Annona squamosa* plant (S. Gajalakshmi, 2011)

2.1. Antioxidant Activity

An initial phytochemical examination of the ASL extract indicated the presence of phenols, flavonoids, alkaloids, and saponins.

Sesquiterpenes, diterpene alcohols, triterpenes, and ketones are found in the leaves.

2.2. Vasodilator Activity

Vasodilators are drugs that can be used to treat blood arteries in the brain and heart and enhance blood flow to the extremities. On the rat aorta, the cyclic octapeptide cyclosquamosin B, which was extracted from Cherimoya seeds, may have vasodilator properties. The primary cause of cyclosulfonate-induced vasodilation is the blockade of voltage-gated calcium channels, which prevents calcium from entering the extracellular space.

2.3. Anti-bacterial and cytotoxic activity

Petroleum ether extract (PE), CHCl₃ extract (CE), EtOH extract (EE), annotemoyin-1, annotemoyin-2, squamocin, and cholesteryl glucopyranoside were found to exhibit the highest level of inhibition against gram positive organisms, including *B. cereus*, *B. megaterium*, *Staphylococcus aureus*, *S. b-haemolytica*, and *Sarnica lutea* and gram negative organisms, including *E. coli*, *S. dysenteriae*, *S. shiga*, *S. flexeneriae*, *S. sonnei*, *Salmonella typhi*, *P. aeruginosa*, and *Klebsiella spp.* The brine shrimp lethality bioassay was used to examine the cytotoxicity of the plant extracts, and the LC₅₀ values of the petroleum ether and chloroform extracts were computed. (S. Gajalakshmi, 2011)

2.4. Hepatoprotective Activity

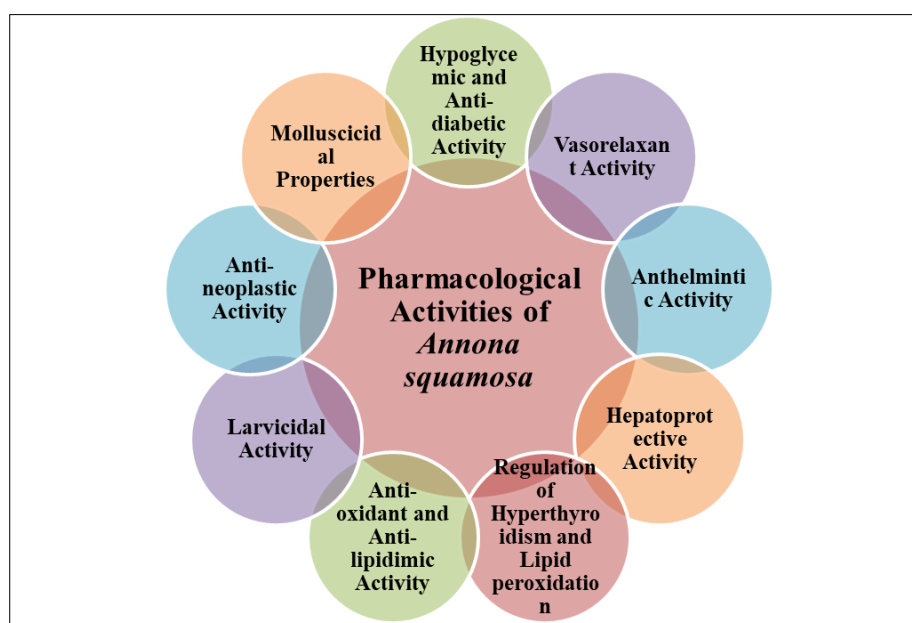


Figure 1 Pharmacological Activities of *Annona squamosa* L.

Natural treatment from medicinal plants is considered a good and safe indispensable treatment of liver toxins. To investigate its use in the treatment of hepatotoxicity in humans, the hepatoprotective effects of the anonymous alcohol extract and the aqueous extract were evaluated in animal hepatotoxicity. According to clinical research, custard apple extract may lessen the negative effects of isoniazid and rifampicin on the liver, but it cannot induce the liver damage that these medications produce. The antioxidant properties of the flavonoids in custard apple leaf extract may be the cause of its protective properties. Methanolic extract of *Annona cherimoya* has a protective effect against hepatotoxicity caused by isoniazid and rifampicin.

3. Preliminary phytochemical analysis (Jyoti, 2023)

Analysis of the presence of alkaloids, tannins and other phytoconstituents in the ethanolic extract of *Annona cherimoya*.

3.1. Test for phenol ferric chloride

Mix 1 milliliter of extract with 3 millilitres of distilled water, then add a few drops of an aqueous 10% ferric chloride solution. The development of a green tint signifies the existence of phenols.

3.1.1. Flavonoid Test

Shinoda Test

Add 1 ml of 1% ammonia solution to 2 ml of extract. The appearance of yellow indicates the presence of flavonoids.

3.1.2. Tannin Test

Ferric Chloride Test

First, mix 1 millilitre of 0.008M potassium ferricyanide with 1 millilitre of extract. Next, mix 1 millilitre of 0.02M ferric chloride with 0.1N HCl. A blue-black hue that appears denotes the presence of tannins.

Saponin Test

Test for Foam Combine put 5 ml of distilled water and 2 ml of crude extract in a test tube, then give it a good shake. Add a couple of olive oil drops. There were saponins present, according to stable data.

Testing of Triterpenoids

To 1.5 millilitres of extract, add 1 milliliter of the Libermann-Buchard reagent (concentrated sulphuric acid plus acetic anhydride). Triterpenoids are indicated by the development of a blue-green tint.

Acid Test

Apply a solution of sodium bicarbonate to 1 milliliter of extract. The presence of acid is indicated by the effervescent behaviour.

3.1.3. Alkaloid Test

Mayer Test

Two millilitres of Mayer's reagent are combined with about one millilitre of crude extract.

4. Conclusion

In conclusion, this article review examines the potential of *Annona squamosa* leaves, commonly known as Soursop, as a source of natural anti-cataract compounds. The hydroalcoholic extract demonstrates promise in reducing lens opacity, potentially due to its antioxidant properties. Further research is needed to confirm these Findings and explore safe and effective dosages for human use. If successful, this natural extract could offer a valuable therapeutic option for cataract treatment, providing a potentially more affordable and accessible solution for communities with limited access to conventional healthcare.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Christiana Ajanaku et al; In-vitro antibacterial, phytochemical, antimycobacterial activities and GC-MS analyses of *Bidens pilosa* leaf extract, *Journal of Microbiology, Biotechnology and Food Sciences*, 2018. 312-323.
- [2] Christiana O. Ajanaku et al; Antimicrobial and GC-MS Analyses of Stem and Root Extracts of *Bidens pilosa* Linn., *Oriental Journal of Chemistry*, 2019. 28-40.
- [3] A.M. Hajarnavis et al; Anticataract effects of *S. cumini* and *A. marmelos* on goat lenses in an experimental diabetic cataract model, *Journal of Ayurveda and Integrative Medicine*, 2020. 500-563.
- [4] Jeevalatha A et al; Profile of bioactive compounds in *Rosmarinus officinalis*. *Journal of Drug Delivery and Therapeutics*. 2022;12(1):114-122.
- [5] Ruan ZP et al; Evaluation of the antioxidant activity of *Syzygium cumini* leaves. *Molecules* 2008. 412-453.
- [6] Rekha N et al; Effect of Aqueous extract of *Syzygium Cumini* pulp on antioxidant defense system in streptozotocin induced diabetic Rats, *Iran Pharmacol Ther* 2008. 2418-2517.
- [7] Hussain K et al; Antioxidant Activity and isolation studies of extracts of seeds of *Syzygium cumini* L. *Planta Med* 2015. 458-504.
- [8] S.Gajalakshmi et al; Pharmacological Activities of *Annona squamosa*: A Review, *International Journal of Pharmaceutical Sciences Review and Research*, 2011,1052-1506.
- [9] Chengyao Ma et al; A Review on L.: Phytochemicals and Biological Activity, *The American Journal of Chinese Medicine*, 2017. 845-905.
- [10] Omena MC et al; Larvicidal activities against *Aedes aegypti* of some Brazilian medicinal plants. *Bio. Techn.* 2007. 1495-1607.
- [11] Kulkarni N et al; Insecticidal action of some plant extracts against *Albizia defoliator* Rhesala imparata Walker (Lepidoptera; Noctuidae). *Entomon*, 1997; 22(2):75-79.
- [12] Das NG et al; Preliminary Evaluation of Mosquito Larvicidal Efficacy of Plant Extracts. *J of Vect. Dis.* 2007; 44(2):145.
- [13] Chang FR et al; Novel cytotoxic annonaceous acetogenins from *Annona muricata*. *J Nat. Prod.* 2001; 64:925-931.
- [14] Omena MC et al; Larvicidal activities against *Aedes aegypti* of some Brazilian medicinal plants. *Bio. Techn.* 2007; 98(13):2549-2556.
- [15] Hag E et al; Toxic and growth retarding effects of three plant extracts on *Culex pipiens* larvae (Diptera: Culicidae). *Phyto. Res.*1999; 13:388-392.
- [16] Kalariya N et al; Human lens epithelial layer in cortical cataract. *Indian J Ophthalmol* 46: 159–162.
- [17] Adson A et al; Quantitative approaches to delineate paracellular diffusion in cultured epithelial cell monolayers. *J Pharm Sci* 83: 1529–1536.
- [18] Hightower K (1995) et al; The role of the lens epithelium in development of UV cataract. *Curr Eye Res* 14: 71–78.
- [19] Ibaraki N et al; Human lens epithelial cell line. *Exp Eye Res* 67, 1998: 577–585.
- [20] Toropainen E. et al; Culture model of human corneal epithelium for prediction of ocular drug absorption. *Invest Ophthalmol Vis Sci* 42, 2001: 2942–2948.
- [21] A.M. Hajarnavis et al; Anticataract effects of *S. cumini* and *A. marmelos* on goat lenses in an experimental diabetic cataract model, *Journal of Ayurveda and Integrative Medicine*, 2020.
- [22] S.Gajalakshmi, R. Divya et al; Pharmacological Activities of *Annona squamosa*: A Review, *International Journal of Pharmaceutical Sciences Review and Research*, 2011.

- [23] Chengyao Ma et al; A Review on L.: Phytochemicals and Biological Activities , The American Journal of Chinese Medicine, 2017.
- [24] A.M. Quílez et al; Potential therapeutic applications of the genus Annona Local and traditional uses and pharmacology , Journal of Ethnopharmacology, 2018.
- [25] Arambašić Jelena et al. Haptoglobin and the inflammatory and oxidative status in experimental diabetic rats: antioxidant role of haptoglobin , Journal of Physiology and Biochemistry, 2012.
- [26] Christiana Ajanaku. In-Vitro Antibacterial, Phytochemical, Antimycobacterial Activities And Gc-Ms Analyses OF Bidens pilosa LEAF EXTRACT , Journal of Microbiology, Biotechnology and Food Sciences, 2018.
- [27] Christiana O. et al; Antimicrobial and GC-MS Analyses of Stem and Root Extracts of Bidens pilosa Linn , Oriental Journal of Chemistry, 2019.
- [28] Wild Fruits: Composition, Nutritional Value and Products , Springer Science and Business Media LLC, 2019.