WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 10, 992-998. Review Article ISSN 2277–7105

AVERRHOA CARAMBOLA: AN OVERVIEW

Sapna Shrikumar[1]*, Akshaya Unni K. C.[2], Sreelakshmi K. P.[3] and Drisya M. K.[4]

[1](Dean and HOD), [2](M. Pharm Scholar), [3,4](Assistant Professor)

Department of Pharmacognosy, Nehru College of Pharmacy, Pampady, Thrissur.

Article Received on
03 April 2024,

Revised on 24 April 2024,
Accepted on 13 May 2024

DOI: 10.20959/wjpr202410-32478

***Corresponding Author**
Dr. Sapna Shrikumar
Dean and HOD Department of Pharmacognosy, Nehru College of Pharmacy, Pampady, Thrissur.

ABSTRACT

The fruits and leaves of *Averrhoa carambola* Linn belong to family Oxalidaceae is widely used for diabetics and used for gentle debility in ayurvedha. It contains rich source of phytoconstituents having anti hyperlipidaemic and antioxidants such as flavonoids, amino acids, gallo tannins and polyphenols. The fruits of the plant are edible. Both fruits and leaves are used in folk medicine as a appetite stimulant, diuretic, antidiarrheal, febrifugal agent and treatment eczemas The decoction of leaves is used in treating hypoglycaemia, hypocholesterolaemia antimicrobial and anti-inflammatory issues. In these studies, we have given a report of its uses pharmacognosy and its future aspects.

KEYWORDS: *Averrhoa carambola* Linn, Taxonomy, Medicinal uses

INTRODUCTION

Averrhoa carambola is an evergreen tree belong to family Oxalidaceae. *Averrhoa carambola* is commonly known as" Kamrakh". *Averrhoa carambola* is rich in iron, potassium, copper, pantothenic acid. Fruits of Carambola are popular in many parts of the world and have many beneficial and nutritional effects. It is mainly cultivated in China, Asia, America. It is also known as Star fruit because of its shape. Star fruit contain high level of ascorbic acid which is to be responsible for its sweet-sour taste.

Taxonomical classification

Scientific name: *Averrhoa carambola*

Kingdom - Plantae

Subkingdom -Tracheobionta

Super division - Spermatophyta

Division - Magnoliophyta

Class - Magnoliopsida

Subclass -Rosidae

Order - Geraniales

Family - Oxalidaceae

Genus - Averrhoa Adans.

Species *Averrhoa carambola* L. – carambola

Nomenclature

The carambola has different names in different places.

Bengali – Kamranga, Assamese - Kordoi, Marathi – Karambal, Telugu - Ambanamkaya, English - Carambola, Starfruit, Hindi - Kamrakh Gujarati - Kamrakh, Tamil – Thambaratham.

Botanical description

Averrhoa carambola reaches up to 6-9 cm in height. It grows well in well drained clay-loam soil with Ph of 5.5-6.5. The plant has flowers and fruits in every year. It has small clusters of 6mm wide downy flowers seen on twigs of leaves. The fruits are about 4-6inches ant it varying its colour from whitish to a golden yellow colour. There can be about 23 seeds in Carambola fruit. But usually, 4 to 5 seeds are seen and seeds are fleshy. The bark is light brown in colour and are smooth or finely fissured.

Figure 1: Fresh ripe fruit of *Averrhoa carambola* Linn.

Figure 2: Redish purple flowers of *Averrhoa carambola* Linn.

Figure 3: *Averrhoa carambola* tree.

Geographical distribution

Carambola fruits are common in Australia, China, Malaysia, Indonesia, Florida Taiwan and Philippines. Star fruit is originated from Moluccas and Ceylon. In south east Asia and Malaysia, it has been cultivated for 100s of years. In India it is commonly found in Southern states along the West Coast, from Kerala up to West Bengal.

Pharmacological activities

Anti-inflammatory activity

Cabrini., *et al*. revealed that ethanolic extracts of leaves of *Averrhoa carambola* L. and its ethyl acetate, butanol, and hexane fractions are best for decreasing croton oil-induced ear oedema and mobile migration in mice. This plant is used for pores and skin inflammatory disorders.[13]

Hypotensive effect

Aqueous extract of *Averrhoa carambola* L. (Oxalidaceae) shown hypotensive effect in rats by both in vivo and in vitro strategy.[13]

Hepatoprotective effect

Hepatoprotective impact of *Averrhoa carambola* fruit extract used to be mentioned on carbon tetrachloride-induced hepatotoxicity in mice.[4]

Antioxidant activity

A team of researchers mentioned that residue from megastar fruit is a true supply for meals components and antioxidant nutraceuticals.[5] This learn about additionally confirmed that big name fruit (*Averrhoa carambola* L.) is a super supply of herbal antioxidants and that polyphenolics are its predominant antioxidants. Analysis of polyphenolic antioxidants in

megastar fruit used to be additionally accomplished the usage of liquid chromatography and mass spectroscopy.[6]

Hypoglycaemic activity

- Study it has been stated that insoluble fibre-rich fractions which have been remoted from the pomace of carambola, includes attainable hypoglycaemic results as tested by means of a learn about on numerous in vitro methods. The fibre additionally efficaciously absorbs glucose, retard glucose diffusion, delay the launch of glucose from starch, and inhibit amylase recreation to a positive extent.[7] Each star fruit has a high amount of fibre, and this contributes to the beneficial effects on glucose homeostasis. The insoluble fibres inhibit the activity of α-amylase and delays the release of glucose from starch (Chau et al., 2004).[13]
- Potent hypoglycaemic activity has been demonstrated in vitro. In 2007, a study performed on male Wister rats found a decrease in blood sugar level when they were fed with hydroalcoholic extract of leaves of *Averrhoa carambola*. (HELAC) (Ferreira et al., 2008).[13]
- In 2016, an in vitro study on cultured pancreatic beta-cells found the compound 2-dodecyl-6-methoxycyclohexa-2,5-diene-1, 4-dione (DMDD) extracted from star fruit to attenuate inflammation and cell apoptosis. Furthermore, the same compound increased glucose-stimulated insulin secretion (Xie et al., 2016).[13]
- Using DMDD, Zheng et al. showed this compound to be effective in reducing blood sugar levels in diabetes-induced mouse models (Zheng et al., 2013).[13]
- In 2019, a study on diabetic mice found DMDD treatment to attenuate diabetic nephropathy. There was a decline in blood glucose, serum creatinine, and blood urea nitrogen levels and an increase in the quantity and density of podocytes (Lu et al., 2019). In another study from 2020, the administration of benzoquinone isolated from the roots of *Averrhoa carambola* to male Kunming mice with induced diabetes found a reduction in the blood glucose levels when compared with a control group (Qin et al., 2020).[13]
- Zhang et al. showed that the beneficial effects of *Averrhoa carambola* extracts in mice with induced diabetes were probably due to inhibition of the TLR4/TGF-β signalling pathway by active compounds like DMDD (Zhang et al., 2020).[13]

Anti-ulcerogenic effects

It has been pronounced that the anti-ulcerogenic achievable of an extract of leaves of *Averrhoa carambola* administered by way of oral gavage in the following ulcer fashions in rats: lesions precipitated via acidified ethanol, indomethacin, and acute stress. ACE, at doses of 800 and 1200 mg/Kg, p.o., solely confirmed giant anti-ulcer undertaking in the acidified-ethanol-induced ulcer mannequin in rats.[8]

Anthelmintic activity

Shah N.A., et al. (2011), stated the anthelmintic assay with the aqueous extract of *Averrhoa carambola* leaves at a range of concentrations (10, 50 and100mg/ml the usage of albendazole as reference preferred at the equal attention as that of the extract. It was once located that the leaves of the *Averrhoa carambola* displayed a massive anthelmintic pastime in a dose-dependent manner.[9]

Hypocholesterolaemia and Hypolipidemic activity

Chau CF., et al. (2004) suggested that the remoted water-insoluble fibre-rich fraction (WIFF) from the fruit, confirmed hypo-cholesterolemic and hypo-lipidemic activity. Investigation in hamsters confirmed said ldl cholesterol and lipid-lowering consequences of WIFF.[10]

Antimicrobial activity

It was once suggested that *Averrhoa carambola* stem extracts exhibited antibacterial exercise with the aid of inhibiting Staphylococcus aureus and Klebsiella sp. As indicated through a minimal bactericidal attention (MBC) of 15.62 mg/ml and a 125 mg/ml respectively. Again, Mia Masum Md., et al. (2007) investigated the anti-microbial exercise of *Averrhoa carambola* through disc diffusion approach and mentioned that the methanolic extract and its petroleum ether, carbon tetrachloride, chloroform, and aqueous soluble fractions of *Averrhoa carambola* bark inhibited the increase of a number Gram +ve microorganism and Gram –ve microorganism.[11,12]

CONCLUSION

Averrhoa carambola L have a greater pharmacological activity. It is widely distributed throughout Kerala. It contains larger number of flavonoids, alkaloids, saponins and tannins. Star fruit has anti-microbial, anti-inflammatory, hypotensive, hepatoprotective, anti-oxidant, hypoglycaemic, anti -ulcerogenic, anti -helminthic and hypolipidemic effects.

ACKNOWLEDGEMENT

We express our thanks to the chairman Adv.Dr. P. Krishnadas Nehru College of Pharmacy for providing facilities and encouragement.

REFERENCES

1. DANIELA A C., et al. "Analysis of the Potential Topical Anti-inflammatory Activity of Averrhoa carambola L. in Mice". Evidence- Based Complementary and Alternative Medicine Advance, 2010; 1093: 1-7.
2. SONCINI R., et al. "Hypotensive effect of aqueous extract of Averrhoa carambola L. (Oxalidaceae) in rats: An in vivo and in vitro approach". Journal of Ethnopharmacology, 2011; 133: 353-357.
3. AZEEM AK., et al. "Hepatoprotective effect of Averrhoa carambola fruit extract on carbon tetrachloride induced hepatotoxicity in mice". Asian Pacific Journal of Tropical Medicine, 2010; 3, 8: 610-613.
4. GUANGHOU Shui and Leong P L. "Residue from star fruit as valuable source for functional food ingredients and antioxidant nutraceuticals". Food Chemistry, 2006; 97, 2: 277-284.
5. GUANGHOU Shui and Leong P. "Analysis of polyphenolic antioxidants in star fruit using liquid chromatography and mass spectrometry". Journal of Chromatography A, 2004; 1022: 67- 75.
6. Chau CF., et al. "Insoluble fiber rich fraction derived from A. carambola: hypoglycemic effect determined by in vitro methods". Lebensm-Wiss U technology, 2004; 37: 331-335.
7. SHAH NA., et al. "In-vitro Anthelmintic activity of leaf extract of Averrhoa carambola against Pheretima posthuman". Pharmacogyonline, 2011; 1: 524-527.
8. GONCALVES ST., et al. "Preliminary studies on gastric anti- ulcerogenic effects of Averrhoa carambola in rats". Acta Farm Bonaerense, 2006; 25, 2: 245-247.
9. CHAU CF., et al. "Effect of novel pomace fiber on lipid and cholesterol metabolism in the hamster". Lebensm-Wiss U Technology, 2004; 37: 331-335.
10. SRIPANIDKULCHAI B., et al. "Anti-inflammatory and Bactericidal Properties of elected Indigenous Medicinal Plants Used for Dysuria". Thai Journal of Pharmaceutical Sciences, 2002; 26: 33-38.
11. MIA M Md., et al. "Phytochemical and Biological studies of Averrhoa carambola". Journal of Pharmaceutical Sciences, 2007; 6, 2: 125-128.

12. TADROS SH., et al. “Pharmacognostical and biological study of the stem and leaf of Averrhoa carambola L”. Bulletin of Faculty of Pharmacy, 2004; 42: 225-236.
13. Kasun Lakmal et.al.”Nutritional and medicinal properties of Star fruit (Averrhoa carambola) :A review”.Food Science and Nutrition, 2021.