



STAR FRUIT'S MEDICINAL SECRETS: AN ETHANOMEDICAL EXPLORATION

Akila M

*PG Scholar, Department of Fruit Science,
Horticultural College and Research Institute, TNAU, Periyakulam, Theni*

**Corresponding Author Mail ID: akilamuthukrish2003@gmail.com*

Abstract

Star fruit, also known as *Averrhoa carambola* L., is more than just a pretty face in the produce aisle. This vibrant fruit, extensively grown in places like Southern China, Southeast Asia, India, and northern South America, has been a quiet hero in traditional medicine for centuries. Imagine your great-grandparents, or even their great-grandparents, reaching for star fruit to soothe their aches and pains. For ages, it's been the go-to natural remedy for a whole host of common ailments. Feeling those nagging joint pains, star fruit was there.

Battling nausea and vomiting, it offered relief. Dealing with the discomfort of kidney stones or that dreaded hangover after a festive night, people turned to star fruit. It even helped with persistent coughs, troublesome headaches, and, importantly, was a trusted ally in managing diabetes and its impact on the kidneys. Fast forward to today, and science is catching up to what traditional healers knew all along. Researchers have discovered that star fruit is packed with powerful natural compounds like flavonoids and benzoquinone.

These aren't just fancy words; they're the active ingredients giving star fruit its remarkable abilities. In fact, modern studies show that star fruit is a true multi-tasker when it comes to health.

It's a natural anti-inflammatory, helps protect your liver and heart, can lower blood pressure, and acts as a strong antioxidant,

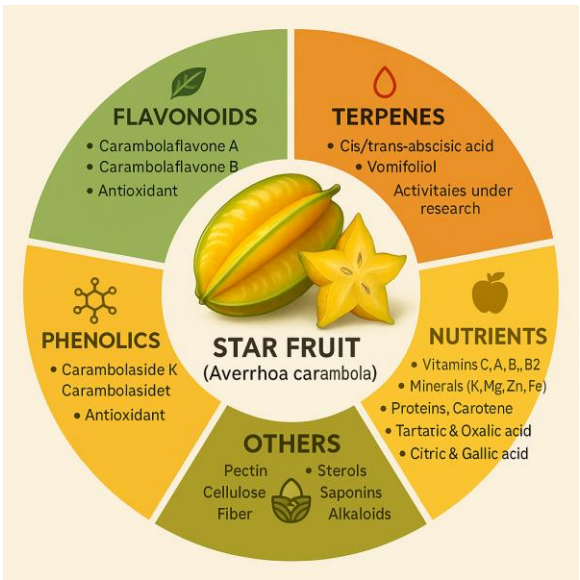
fighting off cellular damage. It's also been found to help manage blood sugar, combat obesity, lower bad cholesterol, and even offer protection for your brain. No wonder it holds such a respected place in traditional Chinese medicine, particularly for its potential in tackling diabetes-related health issues. It seems the star fruit truly is a gift from nature, offering a blend of ancient wisdom and promising modern therapeutic potential.

Keywords: Star fruit, Cardioprotective, Anti-hyperglycemic, Neuroprotective

Introduction

Averrhoa carambola L., a perennial tree in the Oxalidaceae family, also referred to as star fruit or carambola. It is mainly cultivated in tropical and warm subtropical regions. Fruit is described as having a meaty, crunchy, juicy, slightly tart, acidic, and sweet texture and flavor. In terms of look and colour, the fruit is star-shaped and golden-yellow.

A great source of proteins, vitamins, and minerals is star fruit. Flavonoids, terpenes, saponins, alkaloids, proanthocyanidins, vitamin C, tartaric acid, oxalic acid, α -ketoglutaric acid, citric acid, vitamin B1 and B2, carotene, pectin, cellulose, gallic acid, epicatechin, fatty acids, volatile flavors, fibers, hemicellulose, polysaccharides, and sterols are rich natural phytochemicals.



Nutritional and Phytochemical Composition

Flavonoids

The number of discovered and isolated flavonoid compounds is around 51. Plant flavonoids, which have potent antioxidant and radical scavenging properties, can help prevent and treat cardiovascular and chronic diseases. The chemical that has the ability to scavenge radicals is dihydrochalcone C-glycosides. Both carambolaflavones A and B exhibit outstanding antihyperglycemic properties.

Terpenes

There are roughly 29 terpene chemicals that have been identified. These include 3.5 mg of trans-abscisic acid, 12 mg of cis-abscisic acid, 12 mg of trans-abscisic alcohol, 8.5 mg of vomifoliol, 12 mg of trans-abscisic alcohol β-D-glucopyranoside, 19 mg of cis-abscisic acid β-D-glucopyranosyl ester, 12 mg of roseoside, and 113 mg of cis-abscisic alcohol β-D-glucopyranoside. It's yet unclear what the main terpenes do.

Phenolics

At present, 16 phenolic compounds are reported through various research. Phenolic compounds Carambolaside K and Caramboilaside L extracted from fruits and leaves of star fruit majorly exhibited antioxidant properties.

Table.1: List of compounds and parts used.

Compounds	Chemical constituents	Parts Used
Flavonoids	Carambolaflavone A	Leaves
	Carambolaflavone B	Leaves
Terpenes	cis-abscisic acid	Fruits
	trans-abscisic acid	Fruits
	Vomifoliol	Fruits
	trans-abscisic alcohol β-D-glucopyranoside	Fruits

	<i>cis</i> -abscisic acid β -D-glucopyranosyl ester	Fruits
	<i>cis</i> -abscisic alcohol β -D-glucopyranoside	Fruits
Phenolics	Carambolaside K	Roots
	Carambolaside L	Roots

Pharmacological activities

Antioxidant activity

The antioxidant qualities are readily demonstrated by the flavonoids and phenolics found in star fruit leaves. At 10 microgrammes, the chemical norathyriol demonstrates potent antioxidant properties.

Anti-hyperglycemic activity

When 50 mg of carambolaflavone A and B are administered to glycaemic rats, the results show that glucose levels drop and that the compounds may have anti-hyperglycemic effects.

Anti-obesity activity

Chronic diseases are a result of obesity-related ailments, which have grown to be significant health and societal problems. The mRNA expressions of two master adipogenic transcription factors, PPAR- γ and C/EBP α , are reduced in the crude extracted from star fruit peels. This actually increases the production of adipose tissues and increases the PPAR- α receptor, which decreases the molecular accumulation of adipose tissues.

Antitumor activity

Averrhoa carambola isolated component ACE exhibits a strong anti-tumor activity inhibitory effect and reduces cancer growth. By preventing cell division and triggering apoptosis, anti-tumor action is achieved.

Anti-inflammatory activity

Myeloperoxidase (MPO) activity is subsequently reduced and oedema is lessened by the ethyl acetate portions of ethanol extracts from star fruit. MPO activity and oedema development were inhibited at rates of 54% and 75%, respectively.

Cardioprotective activity

A. carambola cardioprotective properties decreased cardiac tissue fibrosis, necrosis, apoptosis, and inflammatory infiltration. It may lessen the alterations in myocardial fibrosis, cardiomyocyte hypertrophy, and endothelial dysfunction.

Anti-hypertensive activity

The active component of the flavonoids found in *A. carambola* aqueous extracts lowers blood pressure. By lowering the mean, diastolic, and systolic blood pressure, the extracted flavonoids help to maintain normal blood pressure.

Neuroprotective activity

Alzheimer's disease (AD), the most prevalent, progressive, and irreversible neurodegenerative illness, is typified by a progressive loss of cognition, memory, and learning. The chemical derived from ethanol primarily improves memory and spatial learning while decreasing apoptosis and neuron loss.

Antimicrobial activity

Fruits, leaves, and bark can be used to extract star fruits, which have antibacterial and antifungal properties. These extracts mostly inhibit the growth of *Pseudomonas* species and *Streptococcus agalactiae*.

Conclusion

The star fruit (*Averrhoa carambola* L.) is a nutritional and therapeutic powerhouse in addition to being a tropical treat. Despite being prized for its flavor and appearance, its health

advantages are frequently disregarded. Packed with minerals (potassium, magnesium, iron, and zinc), fiber, vitamins (C and A), and phytochemicals (such as flavonoids), star fruit has anti-inflammatory, hepatoprotective, cardioprotective, antioxidant, and anti-diabetic qualities. Star fruit stands out as a natural ally in illness prevention in a society where chronic diseases like diabetes and heart problems are being fought. Public awareness of it is still minimal, despite its potential. Promoting its advantages could lower the risk of disease and promote healthier diets, making this common fruit an important public health tool.

References

1. Koch, Michael, Dickson Andrew Kehop, Boniface Kinminja, Malcolm Sabak, Graham Wavimbukie, Katherine M. Barrows, Teatulohi K. Matainaho, Louis R. Barrows, and Prem P. Rai. "An ethnobotanical survey of medicinal plants used in the East Sepik province of Papua New Guinea." *Journal of Ethnobiology and Ethnomedicine* 11 (2015).
2. Luan, Fei, Lixia Peng, Ziqin Lei, Xiyu Jia, Junbo Zou, Yan Yang, Xirui He, and Nan Zeng. "Traditional uses, phytochemical constituents and pharmacological properties of *Averrhoa carambola* L.: a review." *Frontiers in Pharmacology* 12 (2021).