CARAMBOLA:THE FORBIDDEN FRUIT FORPATIENTS WITHRENAL DISORDERS

ABSTRACT

Five-Finger is very popular across the ten administrative regions, but especially on the Coastal Plains of Guyana. Never was taught that it is forbidden to those with renal diseases. Thus, it has been discovered that this favorite and versatile fruit to many has its darker side, especially for people with renal disorders or poor kidney functions. The focal area of interest in this study. Carambola is also credited with similar characteristics to watermelon and

papaya fruits, due to similar characteristics in nutrients, and health benefits. Therefore, Carambola, star fruit /five-finger has been scientifically proven to have negative effects on health if taken while experiencing the presence of chronic kidney disease, gastroenteropathies, chronic pancreatitis, and dehydration. Consequently, it is recommended that thefruit be taken in moderation by persons who are not predisposed to the caramboxin and oxalate substances in the fruit, and anyone who is diagnosed with renal issues or kidney disease is advised to avoid the consumption of carambola in any form.

Keywords: gut health, Carambola, kidney disease, gastroenteropathies, caramboxin, oxalic acid

INTRODUCTION

Carambola, (*Averrhoa carambola L*) is derived from a woody plant of the wood sorrel family (Oxalidaceae) and is visible in tropical countries around the world. As a ripe fruit, it can be described with similar flavors such as gooseberry, pear, melon, and a cool characteristicto watermelon and papaw. The fruit can be consumed raw or cooked and has been used in the gastronomy of savory and sweet dishes,

which include winemaking, juices, pastries, preservatives, chutneys, jams, and jellies (McNamee and Tan Yu Wei, 2024).

The carambola five-finger tree grows several years before bearing fruit. It produces several overlaying branches on its rough woody bark. During the year the tree may produce fruits for one to two months for the two or three times per year that it flourishes, this is dependent on the soil and the weather (L. P. Philadelphia, personal communication, January 15, 2024). The fruit produced has several stages of ripening to the maturity stage. These varying stages depend on the geographical location, and place of production to harvesting, ripening, and mature stages. In most instances, they are generally characterized as green, light green, green-yellow, yellow-green, yellow, and orange. The correct ripeness of the fruit determines its taste, nutritional content, and other variability of chemical substance. The Ministry of Fisheries, Crops, and Livestock; The National Agricultural and Research Institute, and the New Guyana Marketing Cooperation in their Postharvest Handling Technical Bulletin for Carambola (2014), have outlined similar MaturityIndices to the one in the photo. The main stages range from green to yellow to orange.

The process generally takes approximately 2 months while the appearance is indicated by the change in color of its ripeness on the tree. Thus, the level of ripeness and maturity gives a clear indication of the potency of the substance and its effect on health. Here is an arrangement based on the ripening of the fruit on a tree in the family yard (Ministry of Fisheries, et al. 2014).

Figure 1. Stages of Ripening and Maturity of the Carambola. Green, green-yellow, yellow-green, yellow, and orange (Mr. Lloyd Philadelphia Photo).

(Averrhoa Carambola L), also known as Five-finger in Guyana grows in the tropical areas of the coastland. The natives also used the fruit in food preparation and for medicinal purposes. The woody genera produce tubers that are described as sweet fruit when eaten fresh or raw, or as an acidic fruit used in the country's cuisines. Some local dishes include the Five-Finger Drink, Preserved Fruit used for the Guyanese Black Cake, Chutney, Achar, and Marmalades. The fruit is common to the natives and can be found in almost all the courtyards of residents on the coastline. As such, it is used freely without the knowledge of the side effects of the substances found in the fruit. The Kidney Foundation (2024) coupled with numerous scientific evidence has hypothesized that Carambola or Five-finger contains chemical substances such as Caramboxin, and Oxalic Acid that can be fatal to persons resulting in neurological and renal effects in those with renal diseases. Henceforth, the mission of this study is to inform the natives that Five-finger is a forbidden fruit to those with renal diseases.

BACKGROUND

Averrhoa Carambola L also known as Five-finger is a tropical fruit known to many around the world for its versatility. In Guyana five-fingers as commonly known to natives are generally used in food preparation and for medicinal purposes. The name Five-Finger is given to the fruit in Guyana because of the corrugated features and the five points that are visible when it is sliced. Five-Finger is very popular across the ten administrative regions, but especially on the Coastal

Plains of Guyana. Nakasone and Paul, (1998) postulated that carambola is described as shrubs and woody genera of which there are two woody species due to the fruit they produce, namely, *Averrhoa carambola L. and Averrhoa bilimbi L.* They added that it is native to southeast Asia and popular in its chutneys, curries, and pickles due to the acidity of the fruits (Nakasone & Paul, 1998).

The woody genera produce tubers that are described as sweet fruit, when eaten fresh or raw, or as an acidic fruit popularly used in the country's cuisines. When the fruit is processed, many delicious cuisines are created and eaten freely for the known benefits of Guyana. Conversely, the negative effects of the five-finger were never taught because it was not known by the populace of Guyana. Thus, the recent discovery has initiated thetitle of this article, "Carambola: The Forbidden Fruit for Patients with Renal Disorders." The conclusion was made on the discovery that this favorite and versatile fruit to many has its harmful side, especially for people with renal disorders or poor kidney functions, which is the focal area of interest in this article.

The American Kidney Foundation (2024) proposes that a toxic substance (neurotoxin) found in carambola can affect the brain and cause neurological disorders in persons with kidney disease, who are unable to process and pass out the toxins. Yasawardene, et al. (2020) concur and theorize that Carambola, Star fruit, or Five-finger contains oxalic acid and caramboxin, and leads to nephrotoxicity and neurotoxicity after the fruit is ingested. They explained that the nephrotoxic effect is due to oxalate deposition in renal tubules resulting in acute tubular necrosis and interstitial nephritis. Consequently, this information needs to be shared for the edification of all who consume Carambola, Five-finger.

IMPORTANT FACTS ABOUT AVERRHOA CARAMBOLA/ STAR FRUIT/ FIVE FINGER

As established the tropical fruit *Averrhoa carambola L.* (Five-finger)is an evergreen tree, growing along the coastal belt in Guyana, South America. It was first discovered in the late 18th century and used for its versatility in Guyanese cuisine of both savory and sweet dishes. In rural areas, the natives share the fruit's nutritional values, especially vitamin C.

Averrhoa carambola L. and *Averrhoa bilimbi L*. are the two main groups of the Averrhoa L fruit in Guyana. Five-Fingers/carambola is described as a sweet fruit that is eaten fresh, and the One-Finger Surry-Bilimbi is also eaten fresh but known for its acidity, and it is not as popular as five-finger, but both are used in the country's cuisines. These two fruits are used in gastronomyincluding pastries, beverages, jams, jellies, and marmalades (Ministry of Agriculture, 1982). Similarly, in the United States, star fruit is used for its health benefits but is also very popular in gastronomies such as wine-making, beverages, cakes, and pastries.

In addition to the gastronomies of Carambola, it is extensively cultivated globally and is used around the world for its medicinal properties. In Asian countries, carambola is used for medicinal remedies for hemorrhages, reduction of fevers, lowering blood pressure, therapy for coughs and sore throat, relieving hangovers, and soothing headaches (Muthu, Lee, Phua, Bhore, 2016; Gunnars, 2023); Lakmal, K., Yasawardene, P., Javarajah, U., and Seneviratne, S. L. (2021)

Carambola is also credited with similar characteristics to watermelon and papaya fruits, due to similar characteristics in taste, flavor, and nutritional content (McNamee&Tan Yu Wei, 2024). However, this favorite tropical fruit which is known for its potent tart flavor, medicinal properties, and culinary cuisines, has been scientifically proven to have negative effects on people with Renal Disorders and Diseases. Thus, people who are predisposed to chemical substances such as Caramboxin (CBX) and oxalate, which are present in the fruit can have serious medical challenges and possible death upon consumption. Caramboxin is a non-proteinogenic amino acid that has a similar chemical makeup to phenylalanine and is responsible for the glutamate receptors in neurons. Stumpf, Schuinski, Baroni, and Ramthun (2019) This chemical is an agonist of both NMDA and AMPA. A glutamatergic ionotropic receptor with

potent excitatory, convulsing, and neurodegenerative properties. Conversely, Oxalic acid is a colorless, crystalline powder that is a strong organic acid. Oxalic acid was first discovered in the extract from the wood sorrel plant. It also occurs naturally in leafy vegetables such as rhubarb, spinach, beet leaves, Swiss chard, cabbage, and sweet potatoes, and fruits such as peanuts, cranberries, strawberries, cocoa/chocolate, and bell peppers. Oxalate/Oxalic acid is also known as an organic compound produced naturally by the body during metabolism or can be obtained from certain foods as indicated. These are sometimes bound to certain minerals to form compounds such as iron or calcium oxalate.Ding, Y., Ting. J.P., Liu, J., Al-Azzam, S., Pandya, P., and Afshar, S. (2020).(Leelarungrayub, Yankai, Pinkaew, Puntumetakul, Laskin, Bloomer, 2016).

In high amounts, oxalates usually bind with calcium and increase the risk of kidney stones when excreted.

EVIDENCE-BASED DATA TO SUPPORT THE HEALTH RISKS AND SIDE-EFFECTS OF CARAMBOLA/FIVE-FINGER

There is a plethora of evidence to support the notion that carambola or five-ginger has negative and detrimental effects upon consumption by persons with renal disorders and or kidney diseases. Those with kidney diseases, or renal disorders are admonished to avoid the use of this fruit. The National Kidney Foundation (2023) indicated that star fruit has toxins that are harmful

to the body. Levine and Caroline (2018) claimed that a toxic substance (neurotoxin) found in carambola can affect the brain and cause neurological disorders in persons with kidney disease, who are unable to process and pass out the toxins.

It is also explained that people with healthy, normal kidneys are better able to process and excrete these toxins from their bodies. They conclude that the consumption of carambola while experiencing kidney disease may lead to poisoning and display of signs and symptoms such as hiccups, mental confusion, seizures, and death in severe cases.

Muthu, Lee, Phua, and Bhore (2016) support this notion and statethat persons with renal challenges who consume the fruit, may experience a dry cough, hiccups, mental confusion, become comatose, and sometimes die. They also recommend that persons with renal diseases avoid the consumption of carambola to prevent the fatal consequences of eating this fruit. Despite these discoveries and recommendations, some scientists and researchers agree that there is a need for more investigation and research to make a sound conclusive statement on the fruit. Abeysekera, et al. (2015) concur and hypothesize in their recommendation that there is insufficient evidence of the effects of star fruit on individuals with renal impairment. Additionally, they proposed supplementary investigation must be implemented as described in their findings in the oxalate nephrotoxicity study. Muthu et al. (2016) in their study also argued in a statement that resembles the one above and suggested that this controversial fruit has more benefits than negative effects.

They submitted that the Ayurvedic and Traditional Chinese Medicines (TCM) in India, China, and Brazil used carambola to relieve many ailments in health concerns for a great deal of the world population who are diagnosed or predisposed to renal diseases,(Muthu, Lee, Phua, & Bhore, 2016).

Stumpf, Schuinski, Baroni, and Ramthun (2019) also suggest that the fruit contains a high amount of oxalate and caramboxin (CBX) which is neurotoxic and hazardous for uremic patients or persons with

kidney or renal disease. This is especially precarious since it is damaging to the nervous system. They also admonish individuals suffering from kidney failure, kidney stones, or those undergoing dialysis to avoid the consumption of carambola.

Miller (2022) supports the body of information that Carambola/five-finger contains high amounts of oxalic acid when taken in concentrated forms, and has proven to have serious health risks. Thus, care should be taken to prevent the challenges it brings.

Hariadi (2020) provided current evidence-based data and buttressed the notion that carambola has been proven to have negative effects on health if taken while experiencing the presence of chronic kidney disease, gastroenteropathies, chronic pancreatitis, and dehydration. Findings also revealed that the consumption of the fruit on an empty stomach, due to the high concentrations of oxalate in the fruit and or its juice makes people predisposed to toxicity (Hariadi, 2020)

Abeysekera et al. (2015)Also posited thatstar fruit commonly consumed as part of the diet has proven to be dangerous and caused nephrotoxicity in patients who consumed the fruit as a treatment for diabetes.

Oliveira and Aguiar (2015) concur that previous findings suggest that the presence of neurotoxicity in patients tested, was due to the presence of oxalate in star fruit. They further explained that the neurotoxic effect is due to caramboxin, which appears to inhibit the GABAergic system, which is the major inhibitory system in the central nervous system (CNS). This is also proven to be responsible for sudden cries, confusion, seizures, and death. Therefore, it is recommended that Physicians should be alert when screening their patients, and ask about carambola ingestion history, especially when presented with unexplained acute kidney injury with or without neurological features. This is imperative since taking carambola in a large amount, on an empty stomach, and or in a dehydrated state, increases the risk for neurotoxicity in the patient. Stumpf, Schuinski, Baroni,

and Ramthun (2019) postulated in their study that a 51-year-old male developed acute kidney failure and was subjected to four dialysis sessions after he ingested over 50-star fruits before the acute neurologic deficits. In his history, he presented with paresis and altered mental status. He was tested negative for all other neurological diseases. He later recovered renal function (Stumpf et al., 2019)

Aranguren, Vergara, and Rosselli (2017) in a systematic review examined 123 patients from eight countries who were presented with chronic kidney disease (CKD) and undiagnosed kidney diseases and had consumed low dosages of carambola over time. Of these, 47 were from Brazil, Taiwan (36), Bangladesh (20), China (8), France (8) Sri Lanka (2), Thailand (1), and Colombia (1). The findings revealed that 28 (22%) of the patients died.

In another clinical study, 32 uraemic patients who ingested carambola were examined at various stages before the intoxication episodes, twenty patients were on regular haemodialysis eight were on peritoneal dialysis and four were not on dialysis. The patients were analyzed as follows: two were chosen from their charts, 17 were directly monitored by the clinic and 13 were referred by physicians throughout the country. Findings reveal persistent and intractable hiccups in 30 patients (93.75%), vomiting in 22 (68.7%), variable degrees of mental confusion, and psychomotor agitation in 21 (65.6%). There were decreased muscle power, limb numbness, paresis, insomnia, and paresthesias in 13 (40.6%) and seizures in seven (21.8%). Further, it was noted that patients who were severely intoxicated and promptly treated with haemodialysis, recovered without sequelae, and those who were severely intoxicated and were not treated or treated with peritoneal dialysis did not survive. It is recommended that a daily haemodialysis approach is ideal for carambola intoxication, (Netoet al.,2003).

Though there are numerous of documentation on the dangerous effects of carambola on individuals with impaired renal functions, there are equal benefits to patients with healthy kidney functions. These include

vitamins, flavonoids, antioxidants, fibrous properties, and other nutritional benefits. Nonetheless, care MUST be taken to avoid or to prevent detrimental effects on the person with renal disorders.

Vulnerability of the People Who Consume Carambola

Averrhoa Carambola or five-finger is a versatile fruit used in cookery, medicine, winery, garnishes, and decoration in cuisine. It can be found globally and is identified by common names in the countries. See Table 1: Carambola with their common names in the following countries.

Countries and native names of carambola used in various parts of the world

Name of Countries of Carambola	Native Names of Carambola
Australia	five corner
Brazil	camerunga, caramboleiro, limas de Cayena
Cambodia	spo, spu
Costa Rica	tiriguro
Dominican Republic	vinagrillo
El Salvador	pepino de la India
Finland	karambola
French West Indies	cornichon
Germany	Karambolabaum, karambole, Sternfrucht
Guam	bilimbin, bilimbines
Guyana	five-finger
Haiti	bimblin longue, blinblin longue, carambolier,
	onichon, du pays, zibeline, zibeline longue,
zibline,zimbline	
India	kamaranga, kamrakh, kamruk
Indonesia	belimbing manis
Laos	fuang, nak fuang
Malaysia	belimbing batu, belimbing besi, belimbing, manis
belimbing pessegi, belimbing saji,	belimbing sayur
blinbing manis, caramba,	carambola tree, kambola
Mexico	árbol de pepino, caramboler, carambolera
Myanmar	mak-hpung, zaung-yar
Nicaragua	melocotón
Pakistan	kamrak, kamranga
Palau	kemim, oudertеboteb
Panama	mamoncillo chino,
Philippines	balimbin, balimbing, balingbing, daligan,
	dalihan, alangan, Galuran, garahan, garulan,

malimbin, sirinate	
Puerto Rico	carambold, jalea, star pickle
Sri Lanka	kamaranga, kamruk
Suriname	blimbing legi, fransman-birambi,
Sweden	karambola
Thailand	ma fu'ang, ma fueang
Tonga	tapanima
Trinidad and Tobago	coolie tamarind
Venezuela	tamarindo chino, tamarindo dulce
Vietnam	khe, khe ta

Table 1: Most popular countries that grow carambola and their common or native names. *Source: Datiles, M.J. (March 2015).*

The commonality of the fruit around the world can make the populations vulnerable to the signs, symptoms, and possible outcomes of the toxicity from the fruit. Further, a large consumption of carambola in countries such as India and East and South Asia, including the Philippines, Malaysia, Bangladesh, southern China, Taiwan, Hawaii, Florida, and tropical countries around the world. Carambola is also grown in Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Peru, Brazil, Jamaica, Haiti, the Dominican Republic, Puerto Rico, Trinidad, Guyana, and parts of Africa. (Rymbai, et al., nd). This great availability and large consumption of carambola can place the predisposed in a vulnerable position to the negative effects of the fruit. For example,a carambola has an average consumption of 2.6 million tons per yearin China (Nowak, et al. 2023). Conversely, it is said that "Guyana is one of the world's leading producers of carambola(*Averrhoa* Carambola).The fruit is locally known as five fingers and is also called starfruit. It is available year-round as the trees bear several crops per year." P. 9 (Ministry of Fisheries, et al. 2004). This easily accessible fruit is used and consumed by the general populace, many of whom are unaware of the negative effects of the fruit and are predisposed to the chemicals in the fruit.

DEFINITION OF TERMS

Antioxidant: Antioxidants are man-made or natural substances that may prevent or delay some types of cell damage. These are especially found in fruits and vegetables. They may be obtained as dietary supplements. An example is Beta-carotene (Medline Plus, 2024).

Arnarson, 2023, also states that"Antioxidants are molecules that can help your body fight off harmful free radicals, which have been linked to health conditions like diabetes and cancer. They're found in many plant-based foods. Vitamin E and C are examples."

Averrhoa Carambola L: The Star-fruit or five-finger plant is of the (family: Oxalidaceae; species: Averrhoa carambola L.) and is widely distributed around the world, especially in tropical countries such as India, Malaysia, Indonesia, the Caribbean, and South America, including Guyana, and the Philippines. This Carambola or five-finger plant belongs to the genus, Averrhoa, which contains 5 species, namely A. bilimbi, A. dolichocarpa, A. leucopetala, A. microphylla, and A. carambola. However, A. carambola, star fruit, or five-finger is the most popular and is widely cultivated on a commercial scale. Averrhoa carambola is considered the most important species and is cultivated extensively in Southeast Asia and Malaysia, (Muthu, Lee, Phua, & Bhore, 2016).

Bilimbi/Belimbling: is an extremely sour, yellow-green fruit with a thin, soft skin and crunchy, juicy flesh. The oblong-shaped fruit has five discernible ribs. A cross-section of the fruit reveals a five-point star within, accentuating the pentagonal shape of the fruit. The fruit resembles smooth-skinned gherkins. They grow in clusters on bushy trees with green leaves and attractive red-purple flowers. They contain several pale, small, flat seeds embedded in each fruit. Bilimbi fruit is also referred to as Tree Cucumbers and Belimbing, known for its tart-tangy flesh (Produce Market, n.d).

Caramboxin (CBX) is a toxin found in (*Averrhoa carambola*) Star fruit or Five-finger.

"Carboxin is an anilide obtained by formal condensation of the amino group of aniline with the carboxy group of 2-methyl-5,6-dihydro-1,4-oxathiine-3-carboxylic acid. A fungicide for control of bunts and smuts that is normally used as a seed treatment. It has a role as an EC 1.3.5.1

[succinate dehydrogenase (quinone)] inhibitor and an antifungal agrochemical. It is an anilide, an enamide, an oxacycle, an organosulfur heterocyclic compound, an anilide fungicide, and a secondary carboxamide" (National Center for Biotechnology Information, 2024).

Convulsions: also refers to "seizure" is often used interchangeably to describe people who have uncontrollable shaking that is rapid and rhythmic, with the muscles contracting and relaxing repeatedly. There are many different types of convulsions or seizures, some have mild symptoms without shaking (Medline Plus, n.d.)

Dermatitis:is a common condition that causes swelling and irritation of the skin. There are many causes and forms signaled by itchy, dry skin or a rash, which may result in a blister, ooze, crust, or flakes of the skin. Three common types of this condition are atopic dermatitis, contact dermatitis, and seborrheic dermatitis. Atopic dermatitis is also known as eczema (Mayoclinic, 2023).

Glutamate Receptors are the primary mediators of excitatory transmission in the central nervous system and are mostly located on the dendrites of postsynaptic neuronal and **glial cells**, such as astrocytes and oligodendrocytes (Moore, 2024).

Neurotoxin: "the substance that alters the structure or function of the nervous system. More than 1,000 chemicals are known to have neurotoxic effects in animals. The substances include a wide range of natural and human-made chemical compounds, from
snake venom and pesticides to ethyl alcohol, heroin, and cocaine" (Levine, 2018).

Non-proteinogenic Amino Acids (NPAAs) are not naturally encoded in the human genetic code or found in the polypeptide chains. On the other hand, in organisms such as bacteria, fungi, plants, and marines, NPAAs are essential building blocks of polypeptide chains (Ding, Ting. Liu, Al-Azzam, Pandya, & Afshar, 2020).

Oxalidaceae:a wood sorrel family, is a small family of dicotyledonous flowering plants, consisting of about 5 genera with approximately, 570 species, mostly in tropic, subtropic, or temperate zones. Plants are usually herbaceous, sometimes shrubs or small trees. (Xu and Deng, 2017).

Oxalic acids: also known as Oxalates are naturally occurring compounds in plants. These may be obtained from foods or are made in the body. Examples of foods high in oxalic acid include dark green leafy greens, legumes, and some grains (Khatri, 2022).

"Pharmacognosy is the study of morphological, chemical, and biological properties as well as history, cultivation, collection, extraction, isolation, bioassay, quality control, and preparation of crude drugs of natural origin" (Badal, & Smith, Pharmacognosy, 2017).

Phytochemicals: are plant-based bioactive compounds produced by plants for their protection. There are more than a thousand phytochemicals discovered to date. They can be derived from various sources such as whole grains, fruits, vegetables, nuts, and herbs. Some of the significant phytochemicals are carotenoids, polyphenols, isoprenoids, phytosterols, saponins, dietary fibers, and certain polysaccharides. These phytochemicals possess strong antioxidant activities and exhibit antimicrobial, antidiarrheal, anthelmintic, antiallergic, antispasmodic, and antiviral activities (Kumar, Nirmal, Kumar, Jose, Tomer, Oz., et al., 2023).

CONCLUSION AND RECOMMENDATION

Averrhoa Carambola, a versatile fruit has many names, uses, and benefits, dependent on the country of origin. In China, the fruit is identified as star fruit and carambola. It is believed that the average consumption of carambola in China is 2.6 million tons per year, though the average production is 2 million tons. It is used in Indian cuisine, also the trees are used on the sidewalk as decorative plants.

In Guyana, the fruit is known as carambola and five-finger; it is seasonal but very prevalent and widely used by most of the populace. The natives used the fruit frequently for juices, drinks, cakes, and pasties in the fresh or preserved state. Despite its versatility and popularity, the fruit has been discovered to be harmful to persons with renal illnesses.

Carambola, star fruit /five-finger has been scientifically proven to have negative effects on health if taken while experiencing the presence of chronic kidney disease, gastroenteropathies, chronic pancreatitis, and dehydration. It was also discovered that the consumption of five-finger on an empty stomach, in higher concentration makes persons predisposed to toxicity, due to the presence of caramboxin and oxalic acid in the fruit/juice.

In addition, other scientific evidence has validated that five fingers, also contain toxic substances called neurotoxins, which affect the brain and can lead to neurological disorders. People with healthy kidneys are usually able to process these toxins, but those with kidney diseases are not so fortunate, and this leads to related illnesses. These may be signaled by hiccups, mental confusion, seizures, and death in severe cases. The level of ingestion at which the beneficial effects transition to nephrotoxicity and neurotoxicity is still to be accurately ascertained based on consumption. Consequently, people with kidney diseases should talk with their healthcare provider before consuming five fingers.

Individuals must receive annual check-ups to monitor their health status. When dining out, avoid beverages and desserts, especially if you are unsure of the level of ripeness and possible potency of the active ingredients that may lead to toxicity.

Thus, the fruit may be taken in moderation by everyone. However, anyone who is diagnosed with renal issues or kidney disease is advised to avoid the consumption of carambola in any form.

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