Review on Star Fruit

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ABSTRACT
The Oxalidaceae family's adaptable, Averrhoa carambola, commonly referred to as "kamrakh," is a drought-resistant evergreen tree that is becoming more and more well-liked because of potential medical benefits. Traditional folk medicine has made use of several tree parts. Averrhoa carambola is also a decent source of copper, folate, pantothenic acid, and potassium. The star fruit's ascorbic acid content is thought to be the cause of its tart or sweet flavor.
For every 100 milliliters of juice, a sweet fruit contains around 10.40 milligrams of ascorbic acid. The ascorbic acid lever for a sour fruit is roughly 15.4 mg/100 mL of juice.
Understanding a plant's biology, chemistry, and other elements in-depth is necessary before utilizing it for medical purposes. This publication discusses the taxonomy, botanical description, distribution, and ecological requirements of the plant. A summary of the plant's potential for a range of pharmacological activities has been provided. This study provides a review of the numerous commercial and medicinal applications, as well as the biology and chemistry involved.

Keywords :- *Averrhoa Carbmbola ,Karmal, , Hemodialysis Allopathic,*

INTRODUCTION

The oldest known type of healthcare is herbal medicine. Many of the medicines that are currently on the market have their direct or indirect origins in plants, which have long been a model source of pharmaceuticals [1]. Herbal remedies are mostly used to cure moderate and chronic illnesses, and they have frequently maintained their appeal due to historical and cultural components. India has a long history of using traditional medicines; the Materia Medica of India contains a wealth of knowledge on the customs and folklore around therapeutically significant natural items [2]. Approximately 2000 natural medicines are included in the Indian material medica; nearly all of these are derived from various ancient systems and folklore customs. Of the medications that come from the conventional system, 400 are he remaining ones are of vegetable origin, with others having mineral and animal origins [3]. Historically, natural products—particularly those originating from higher plants have been essential in the development of novel medications [4]. In India, traditional medicine has a lengthy history.and it has been thriving in many other nations as well. For their fundamental medical requirements, the population of emerging nations primarily turns on traditional medicine practiced by their own people. The popularity of herbal remedies around the globe in recent years has given India a great chance to search for medicinal lead compounds from the age-old Ayurvedic medical system that may be used to build new drugs. More than half of all contemporary medications

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come from natural products. and they are crucial to the pharmaceutical industry's drug development initiatives [4].According to estimates from the World Health Organization (WHO), approximately 80% of people in developing nations get their primary care almost solely from traditional medicine [5]. More than 21,000 plant species are used medicinally worldwide, according to the WHO. In India, traditional medical systems make use of about 2500 plant species from over 100 genera [6]. In terms of the quantity and price of medicinal plant exports, India comes in second [7]. One of the world's 12 mega biodiversity hotspots is India, which has 16 agro-climatic zones [8, 9] It has about 45000 plant species of which 7000 species identified as medicinal plants [1]. There are over 400 families of flowering plants in the globe, and India is home to at least 315 of them [9]. An estimated 25,000 potent plant-based remedies are utilized in folk medicine and are well-known to rural Indian populations. [1 Despite significant advancements, unsafe medications, chronic illnesses, resistant infections, autoimmune diseases, and degenerative aging disorders plague modern conventional healthcare at this time [10].The modern allopathic system has produced a number of intricate and expensive diagnostic techniques that, at times, have rendered it extremely expensive and out of the reach of the average person. Due to their serious side effects, many modern synthetic drugs may cause more harm than good in the treatment of diseases.

In contrast, plant-based traditional medicines are highly valued for their safety, lack of side effects, and relative affordability when compared to many allopathic medicines [11].

TAXINOMICAL CLASSIFICATION [13]

Scientific Name:	Averrhoa carambola
Kingdom: Plantae	Plants :
Subkingdom:	Tracheobionta - -Vascular plants
Superdivision:	Spermatophyta
Division:	Magnoliophyta|-Flowering plant
Class:	Magnoliopsida-Dicotyledons
Subclass:	Rosidae
Order:	Graniales
Family:	Oxalidaceae-Wood-Sorrel family
Genus:	Averrhoa Adans-averrhoa
Species:	Averrhoa carambola L.-carambola

VERNACULAR NAMES [14,15]

Sanskrit: :	Karmaranga
English :	Starfruit,Chinese gooseberry
Hindi :	Kamrakh,Karmal
Bengali :	Kamranga
Assamese :	Kordoi /rohdoi
Gujarati :	Kamrskh
Marathi :	Karambal
Telugu ;	Ambanamkaya

BOTANICAL CLASSIFICATION

Fig No -1 Tree

Averrhoa carambola is a small, pretty, multi-stemmed, slowly growing evergreen tree that spreads 20–25 feet in circumference and has a fast trunk or shrub that grows to a height of 5-7 meters, with the occasional peak of 10 meters. Its shape is bushy, with many branches that come together to form a large, rounded crown.
t the base, the trunk reaches a Diameter of 15cm [18, 19]



Category EdibleFruitsandNutsTropicals and Tender Perennials
Height:30-40 ft. (9-12 m)
Spacing: Category
15-20 ft. (4.7-6 m)
Sun Exposure:
Full Sun
Danger:
N/A
BloomColor:
Pink
Bloom Time:Blooms repeatedly
Foliage:Evergreen
Other details: Requires consistently moist soil; do not let dry out between waterings
SoilpHrequirements:
6.1 to 6.5 (mildly acidic)
6.6 to 7.5 (neutral)
7.6 to 7.8 (mildly alkaline)
Patent Information:
Non-patented
Propagation Methods:
From seed; direct sow outdoors in fall By grafting
Seed Collecting:
Seed does not store well; sow as soon as possible

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Fig No – 2 *Leaves Leaves*

Leaves are 15-25cm long, alternate, spirally Arranged, ovate to ovate-oblong in shape, Impropriate, rapidly petiolate with 5-11 Green pedant leaflets of 2-9cm actually long and 1- 4.5cm basically wide. The compound for the most part leaves particularly are soft, pubescent, medium-green, pretty easy on the Upper floor and whitish on the underside. The leaflets for the most part are reactive to light and for the most part have a tendency to fold collectively at night; they kind of are also sensitive to abrupt shock, or so they definitely thought.



Fig No – 3 *Flower Flower*

Purple to fairly vivid pink simply colored flowers are produced in the axils of the especially leaves in a simply foremost way. The flowers are arranged in small clusters and each cluster is attached to the tree with surely purple stalks, or so they form of thought. The plant life truly are small, about 6mm wide, pediculate with five petals (having curve ends) and sepals in a certainly huge way.

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Fig No :– 4 *Fruit Fruit*

The fruits surely are inexperienced when small and unripe But type of flip to type of yellow or kind of orange when matured And ripe. Most of the fruits are juicy and oblong in shape, measuring up to 9 cm in width, 5 to 6 angles longitudinally, and 5 to 15 cm in length., which truly is pretty significant. The fruits Are crunchy, having a type of crisp texture and When decrease in cross-section form of are megastar shaped, Hence its name. The scent of the fruits Resembles oxalic acid and their style varies From very bitter to mildly sweetish or Sweetish, which for all intents and functions is fairly significant. The flesh typically is mild sort of yellow to yellow, Translucent and very juicy except fiber, rather contrary to famous belief.

Seeds

There can also be up to 12 flat, thin, five mm lengthy seeds or none at all, which essentially is fairly significant. The particularly brown sort of colored seeds actually are enclosed through a gelatinous aril and really lose viability in a fairly few days after elimination from the fruit, or so they particularly thought. Star fruit basically is besides troubles propagated from completely developed seeds [18- 21].



Fig No :– 5 *Seeds*

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Microscopic study

The outline of transverse part suggests for all intents and purposes famous person shape in a particularly major way. The Pericarp indicates following two wonderful Regions;

Exocarp- It is outermost layer of the fruit Made up of skinny rectangular cells with, which is fairly significant simple & glandular trichomes in young fruits & simple trichrome in mature fruits & 3-4 layers of sub epidermal collenchyma's.

Endocarp- In young fruit, it is made of many layer of skinny compactly organized parenchymatous cells,in ripe fruit, massive longevously shaped cavities are present in parenchyma, sick developed vascular tissue is additionally located in parenchyma region. The powdered fruit of A.carambola confirmed the presence of easy trichomes, parenchymatous cells, tannin crammed cells collenchyma Tous cells, schlerenchuymatous fibers [21].

Geographical distribution [11,12]



Fig No - 6

Though it has been grown for many years in Malaysia and Southeast Asia, the carambola is thought to have originated in Ceylon and the Moluccas. It is widely grown in Taiwan, India, and the southern Chinese provinces of Fukien, Kuangtung, and Kuangsi.

It is rather popular in the Philippines and Queensland, Australia, and slightly so in some of the south Pacific islands, mainly Tahiti, New Caledonia and Netherlands New Guinea, and In Guam and Hawaii.



Fia No: - 7

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There are some specimens of the tree in different collections in the Caribbean islands, Central America, tropical South America, and additionally in West Tropical Africa and Zanzibar. Since 1935, a number of trees at the Israeli Rehovoth Research Station have grown. It is cultivated more for decoration than for its fruits in many places. It was introduced to southern Florida before 1887 and was largely dismissed as a curiosity until recently, when a few small groves were established and the fruits were used as "conversation pieces" to spruce up current shipments of citrus fruits. In addition, the fruits started to show up in some supermarket produce sections in clear plastic-wrapped trays.

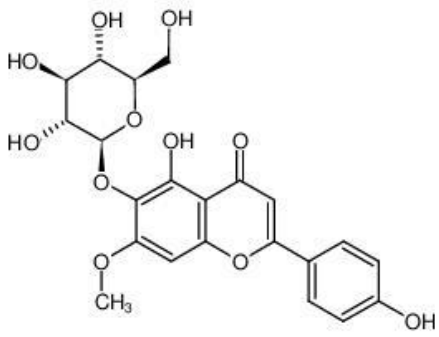
Although he already has 50 acres (20 ha) planted, one fruit grower and shipper advises other potential growers to exercise caution as the market may continue to be small. The main destinations for shipments are Disneyworld, Cleveland, Quebec, and Vancouver. Locally, little amounts are available.

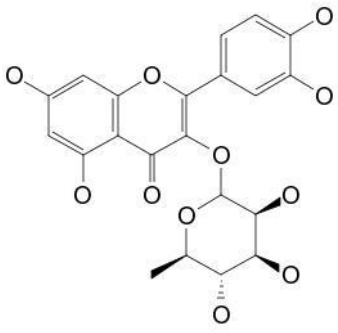
Soil not too specific as to soil, the carambola does properly on sand, heavy clay or limestone, however will grow quicker and bear more closely in prosperous loam. It is regularly chlorotic on limestone. It needs proper drainage; cannot stand flooding.

CHEMICAL CONSTITUENT

Carambola fruit preliminary phytochemical analysis revealed the presence of tannins, flavonoids, alkaloids, and saponins. 21]. The fruit was also discovered to include epicatechin, proanthocyanidins, and gallic acid as L-ascorbic acid and gallotannin form 22]. According to reports, the main sterols Carambola fruits contain lupeol, campesterol, sitosterol, and isofucosterol, and it included the four other primary plant fatty acids: oleic, palimitic, and the acids linoleic and linolenic [23]. Mambola discovered the o-glycosyl flavonoid ingredient like quercetin-3-o-ɾ-d as well as rutin. The edible part of the Fruit is an excellent source of volatile nutrients, minerals, reducing and nonreducing sugars, and cellulose, tannins, pectin, and dietary fibers hemicelluloses, calcium, iron, and phosphorus and compositions of carotenoids [24]Amirin [25], cyaniding 3-o-Ȼ-dglucoside, cyaniding-3-5-o-ž-ddiglucoside, and C glycoside flavones, such as apigeni-6-C-Ȼ-Lfucopyranoside and apigenin-6-C-Ȼ-1-fucopyranoside, have also been identified as additional components.These latter substances are called a carambolaflavone as well [26]. Accompanying p-Anisaldehydegallic acid, hydroxymethyl-2-furfur-al, and Alcohol dihydroabscissic in the stem bark of Rambola A. [27].Additionally, fifteen compounds that comprised nine chiral lignans and six The phenolic glycosides were isolated. The percentage of butanol in Averrhoa carambola L. root was recognized. Every single one of the substances, specifically

-β-Lfucopyranoside



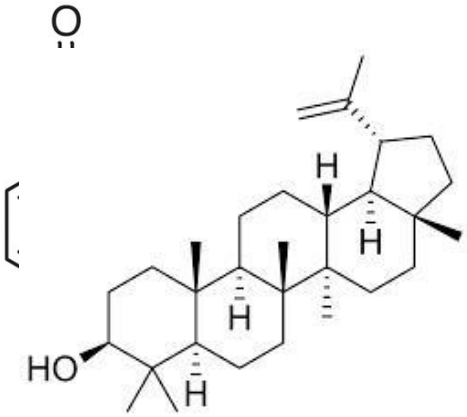


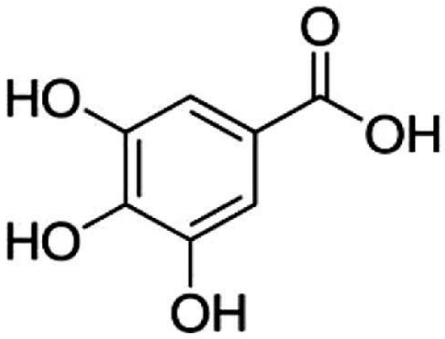
Gallic acid

P-Anisaldehyde.

Quercetin-3-O- rhamonoside

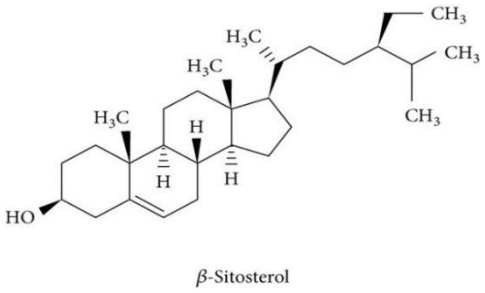
Lupeol





Beta sitosterol.

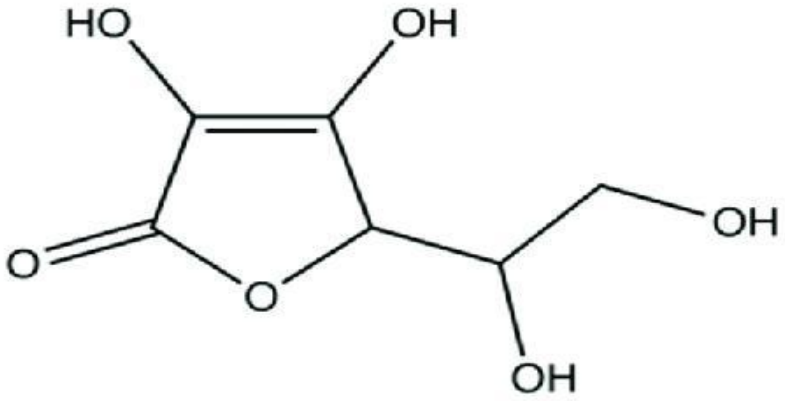
Cyanidin 3_glucoside



β-Sitosterol



Vitamin C



TRADITIONAL USES

Fruits: Ripe fruits and their juice are used in India as laxatives, appetite stimulants, sialogogues, astringents, antipyretics, and counter-scorbutic. Brazil is where the fruit is advised as a kidney diuretic and issues relating to the bladder. For Chinese Materia Medica: a remedy for thirst and to enhance salivary secretion. Within According to Ayurveda, ripe fruit is regarded as digestive, tonic, and bilious in nature. Additionally, The fruits are used to treat cough food, asthma, toothaches, mouth ulcers, and throat inflammation.

poisoning, diarrhea, colic, jaundice, malarial splenomegaly, hemorrhoids, rashes on the skin, pruritis, sunburn as well as a few eye-related issues.Both men and women use them as an aphrodisiac. and females. The fruits in women can be utilized in large amounts to enhance lactation quantity, they may function as an emmenagogue.

Leaves: Crushed leaves or shoots are applied topically to treat ringworm, chicken pox, and headaches. An Boiling leaf decoction is used to alleviate angina and aphathous stomatitis. In addition, It has been discovered that the leaves can help treat postpartum oliguria, boils and pyodermas gastroenteritis, traumatic injury, and edema.

Blooms: The cooked blooms are utilized as vermifuge in malaria and fever. Within The flowers are used in Southeast Asia dermatis.

Roots: Averrhoa carambola's rootsare utilized to treat persistent arthralgia, headache, spermatorrhea, and epitaxis. The Sugar-infused roots are regarded as an poison's counter-action

Seeds: A mixture made from ground seeds has galactagogue and emmenagogue properties. Asthma patients use the powdered seeds. plus colic. Bark: An inner bark preparation using Alyxia sp. and sandalwood are applied to scorching heat

PHARMALOGICAL ACTIVITY

ANTI-INFLAMMATORY

Sripanidkulchai B. et al. (2002) reported that Averrhoa carambola inhibited carrageenan-induced inflammation in rats' paws irritation. In an analysis to assess the anti-bacterial and anti-inflammatory characteristics of the stem's aqueous e.xtract Averrhoa carambola was utilized to treat dysuria. noted that, within the period of time, the Stem extract from Averrhoa carambola revealed similar anti-inflammatory properties to that of 300 mg of acetyl salicylic acid mg/kg in the initial hour and demonstrated increased activity for a longer period of time period [33] efficiently. An ethanolic extract from Averrhoa carambola applied topically (0.03–1.0 mg/ear) decreased ear edema. reliant fashion, with an ID50 of a maximum of 0.05 (0.02-0.13) mg/ear 78 ± 5% inhibition (at 0.6 mg/ear). The activity of myeloperoxidase (MPO) was also inhibited by the extract of ethanol, leading to at 0.6, in a maximum inhibition of 61 ± 16% The ID50 value was 0.22 (0.08 – mg/ear) and 0.60 mg per ear. Every fraction underwent testing. produced edema formation inhibition and MPO activity in which ethyl acetate is involved fraction was the most successful, producing Levels of inhibition of 54 ± 8% and 75 ± 5% for formation of edema and MPO activity correspondingly, which were similar to that of the drug Dexamethasone, the standard (DE) at 0.1 milligrams per ear produced an inhibitionaAnalgesic: Ahmed M. et al (2012) studied

ANALGESIC

The analgesic activity of Averrhoa carambola fruit extract by writhing test and radiant heat-tail flick test. In an acetic acid-induced writhing experiment in Swiss-Albino mice, it was discovered that Averrhoa carambola fruit demonstrated strong central and peripheral analgesic effects at doses of 200 and 400 mg/kg, respectively, showing 37.13% and 42.76%

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suppression of writhing. Following oral dosages of 200 and 400 mg/kg body weight, the crude extract product elongated the fail flicking time by 33.65% and 40.88% in the radiant heat-tail flick test 60 minutes later respectively [35].Averrhoa carambola ripe fruit pulp's hypoglycemic effect was investigated by Genasekara L.C.A. et al. in 2011. sharply lowered blood glucose levels amounts (mean 131.0 + 10.2 mg/dl) following a eight weeks of treatment for a healthy male Sprague-Dawley rats in contrast to typical rats' blood sugar levels average 153.4 + _ 11.2 mg/md) [37]. Chau & Co.2004 stated that a number of insoluble fiber rich fractions, or FRFs, which contain insoluble food fibers, solid alcohol insoluble, and Insoluble in water solid (46.0-58.2g/100g) separated from the pomace of panace Averrhoa carambola had the capacity to grow. effects of hypoglycemia as revealed by a research on common in vitro techniques.

HYPOGLYCEMIA

The hypoglycaemic impact of Averrhoa carambola ripe fruit pulp was investigated by Gunasekera L.C.A et al in 2011. considerably lowered the blood glucose levels (mean 131.0 + 10.2 mg/dl) subsequent to a eight weeks of treatment for a fit male patient compared to that of Sprague Dawley rats blood glucose level in normal rats mean (153.4 + 1.1 mg/md) [37]. Chau in association with(2004) revealed a number of insoluble Fiber rich fractions (FRFs), such as insoluble ones dietary fibers, insoluble solid alcohol, and solid insoluble in water (46.0–58.2g/100g of 1) separated from the pomace of Potential existed in Averrhoa Carambola. impacts of hypoglycemia as shown by a examination of common in vitro techniques. As theThe FRFs' apparent capacities to take in P In IJPRR 2013, Dasgupta et al., 2(7) 59 glucose, delay the diffusion of glucose, and glucose released from starch and lower the activity of amylase suggested that they could potentially aid in managing postprandial level of serum glucose [37].

ANTIOXIDANT CAPACITY

Luximon-Ramma et al, (2003) examined the Antioxidant capacity, whole phenolics, Proanthocyanidins, flavonoids and diet C contents Of 17 regularly bump off unusual fruits from Mauritius including A. Carambola . It was established that A. Carambola's antioxidant activities ranged For acidic fruits, the range is 11–17 μmol Trolox equivalent antioxidant capacity (TEAC)/g clean weight, while for sweet fruits, it is nine–22 μmol Ferric decreasing antioxidant power (FRAP)/g clean weight. Proanthocyanidins were 896 and 1321 μg/g fresh weight, total flavonoids were 103 and 148 μg/g sparkling weight, and total phenolics were 1429 and 2099 μg/g sparkling weight. Additionally, the vitamin C concentration of the candies and acidic fruits was previously 190 and 144 μg/g, respectively, of sparkling weight.

Strong relationships existed between total phenolic and proanthocyanidin concentrations and antioxidant activity (measured by TEAC and FRAP). While there used to be very little evidence of a correlation between ascorbate level and antioxidant activity, flavonoids appeared to contribute far less to the fruit's practical antioxidant content. A. Carambola was found to have one of the highest levels of antioxidant capacity among the study team, and the investigation came to that conclusion.

Carambola to be a huge Source of phenolic antioxidants, accordingly it may also show off Potent fitness advantagesShui and Leong, (2006) confirmed that the Residue of A. Carambola fruit, which is generally Discarded at some point of juice drink processing, incorporates Much higher antioxidant pastime than the extracted Juice the use of various methods for assessing antioxidant Activity.

L-residue provided just 15% of the fruit's total weight, but under ideal extraction circumstances, it accounted for over 70% of the fruit's total antioxidant activity and polyphenolic contents. A full polyphenolic content of 33.2 ± 3.6 mg gallic acid equivalent was found in freeze-dried residual powder, which made up approximately 5% of the total weight.
(GAE)/g sample, total antioxidant activity of 3490 ± 310 and 3412 ± 290 mg L-ascorbic acid equivalent antioxidant capability or 5270 ± 468 and 5152 ± 706 mg Trolox equal antioxidant capacity per 100 g sample bought through 2,2′-azino-bis-(3- Ethylbenzthiazoline-6-sulfonic acid) free radical and 1,1-diphenyl-2-picryl-hydrazyl scavenging assays, respectively It was additionally determined to have 510.3 ± 68.1 Mol ferric reducing/antioxidant energy per gram Sample. The residue-extract also suggests strong Antioxidant recreation in delaying oxidative rancidity of Soya bean oil at 110 °C. Antioxidant endeavor and Polyphenolic profile of residue extracts were Compared with extracts of standardized pyconogenol. High overall performance liquid chromatography coupled with mass spectrometry revealed that foremost proanthocyanidins in A. Carambola fruit were extraordinary from their isomers in the standardised extracts of pyconogenol. The residue powder may provide health benefits when utilized in functional food products because of its high phenolic content and potent antioxidant activity. Residue extract should also be taken into consideration as a potential source of nutrients in the future.

ANTI-ULCER ACTIVITY

In 2006, Goncalves et al. investigated the water-alcohol extract of A Carambola for its antiulcerogenic potential. The ethanolic extract at doses of 800 and 1200 mg/kg p.o., solely confirmed extensive anti-ulcer pastime in the acidified-ethanol-induced ulcer model in rats. However, the extract did now not show any undertaking in the indomethacin and acute stress ulcerogenic models. Thus, the find out about concluded ethanolic extract of A. Carambola as having low antiulcer activity.

HYPOTENSIVE ACTIVITY

Soncini et al., (2011) investigated the effect of A's aqueous extract on hypotension.
Carambola and its underlying mechanisms the usage of remoted rat aorta. In vitro, the aqueous extract precipitated a discount in the emax response to phenylephrine barring a alternate in sensibility. Furthermore, in a depolarized Ca2 -free medium, the aqueous extract inhibited CaCl2-induced contractions and brought about a concentration-dependent rightward shift of the response curves, suggesting that the aqueous extract inhibited the contractile mechanisms involving extracellular Ca2 influx. The study concluded the aqueous extract to be hypotensive in nature and suggested the results to be in part, due to the inhibition of Ca2 , which is in agreement with its uses in common medicine

ANTITUMOR ACTIVITY

Li et al., (2012) used suspension-cultured A. Carambola cells to study the biotransformation of dihydro-epi-deoxyarteannuin B. After adding dihydro-epi-deoxyarteannuin B, two sesquiterpenes were obtained: one considered sesquiterpene, 3-α-hydroxydihydro-epideoxyarteannuin B, and one unique sesquiterpene, 7α-hydroxy-dihydro-epideoxyarteannuin B. According to the study's findings, cultivated A. cambola cells can hydroxylate sesquiterpene molecules in a way that is both stereoselective and region-specific.
The growth of K562 and HeLa cell lines was inhibited by 7α-hydroxydihydro-epideoxyarteannuin B and 3-α-hydroxydihydro-epideoxyarteannuin B,

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with the respective results being (59.29 ± 0.99, 84.04 ± 0.27 µmol/mL) and (40.63 ± 1.45, 41.54 ± 0.82 µmol/mL).

ANTHELMINTIC

Shah N.A. et al (2011) used the averrhoa carambola leaf aqueous extract at a range of concentrations (10, 50, and 100 mg/ml) and the well-known reference drug albendazole at a concentration equal to that of the extract to perform the anthelmintic assay according to Ajaiyeoba et al. Averrhoa carambola leaves were found to have a significant anthelmintic activity in a dose-established way, causing paralysis in 10 minutes and death in 16 minutes at 100 mg/ml attention, while albendazole at the same dosage showed similar effects in 10 minutes.

ANTIMICROBIAL

Averrhoa carambola stem extracts were previously reported by Sripanidkulchai et al. (2002) to demonstrate antibacterial activity by inhibiting staphylococcus aureus and Klebsiella sp., as demonstrated by the use of minimal bactericidal concentrations (MBC) of 15.62 mg/ml and 125 mg/ml, respectively [33]. Once more, Mia Masum Md. Et al. (2007) used the disc diffusion method to investigate the anti-microbial activity of Averrhoa carambola. They found that the growth of several Gram-ve bacteria (Bacillus cereus, B.megaterium, B.subtilis, Staphylococcus aureus, etc.) is inhibited by the methanolic extract and its petroleum ether, carbon tetrachloride, chloroform, and aqueous soluble fractions of Averrhoa carambola bark fungi (Aspergillus, Candida albicans) and microorganisms (Escherichia coli, Pseudomonas Auriginosa, Salmonella typhi, S. Paratyphi, etc.)

HYPOCHOLESTEROLEMIC ACTIVITY

Wu et al., (2009) examined the possible hypocholesterolemic recreation of distinct insoluble fibers organized from A. Carambola with or without Mercerization processing. After mercerization, the cation-exchange and water-holding capacities of the A. Carambola peptic insoluble fibers rich in polysaccharides grown from 8.5 to 22.4 mL/g in an efficient manner. The A Carambola microsized insoluble fibers reduced serum triglyceride and whole cholesterol values by 15.6% and 15.7%, respectively.
respectively by using means of improving the excretion of ldl cholesterol and Bile acids in the feces. The learn about suggests a new approach of mercerization of the fruit which may also assist to enhance physiological features of meals fibers in fiber-rich functional meals application The find out about additionally indicates that the particle dimension is an important issue in affecting the characteristics and physiological Functions of generally insoluble fibers, which particularly is fairly significant.

RISKS

Carambola carries oxalic acid, which can be damaging to people suffering from kidney failure, kidney stones, or those under kidney dialysis treatment. Consumption via these with kidney failure can produce hiccups, vomiting, nausea, and intellectual confusion. Fatal consequences have been documented in some patients.

DRUG TOXICITY

Muir CK. And Lam CK. First reported the toxicity of superstar fruit in 1980. Their learn about confirmed that the fruit extracts in doses exceeding 8g/kg produced convulsions in mice when injected into the peritoneal cavity [50]. martin et al. (1993) reported the first poisonous effect of Averrhoa carambola to human in a case study where an intractable hiccup occurred in eight sufferers with regular haemodialysis software after ingestion of averrhoa carambola fruit [51]. The hiccups occurring in sufferers on

dialysis after ingestion of Averrhoa carambola fruit had not seen a chance till 1998

RESULT

Star-fruit is a good source of nutritionally and medicinally Important natural products beneficial for human health. However, due to the oxalate and caramboxin gratified in the fruits, It is toxic to patients with renal problems. Our understanding of the genes expressed in the star fruit and the finding of new genes will be aided by transcriptomics research could help in designing a novel strategy for genetic engineering of this plant to knock-out the oxalate and caramboxin biosynthesis in fruit-specific manner to improve its nutritional quality

REFERENCE

1. Kamboj VP. Herbal Medicine. CurrentScience. 2000; 78(1):35-9.
2. Kirtikar K.R, Basu B.D. Indian Medicinal Plant. . Dehradun: International Book Distributors; 2005; 1(2):23-25
3. Mukherjee Pulok K. Quality Control of Herbal Drugs. Business Horizons Pharmaceutical; 2002; 2: 39-98.
4. Mukherjee Pulok K. Quality Control of Herbal Drugs. Business Horizons Publication. New Delhi. 2002; 2: 2-24.
5. Chopra RN, Nayar SL, Chopra IC. In Glossary Of Indian medicinal plants, Council of
6. Scientific and Industrial Research, New Delhi.1956; 1:197.
7. Yadav JP, Kumar S, Siwach P. Folk medicines Used in gynecological and other related Problems by rural population of Haryana, Indian J. Trad. Knowledge. 2006; 5(3):323-326.
8. Gupta M, Biswas TK, Saha S, Debnath PK. Therapeutic utilization of secretory Products of some Indian medicinal plants: A Review. Indian J Trad Knowledge. 2006; 5(4):569-575.
9. Setia G, Luthra P, Sharma PC. Siddha system: An ancient heritage of India, In: Proceedings Of National seminar on Role of Medicinal And Aromatic plants in Ayurvedic, Unani And Siddha Systems of medicine, Hissar, 2005; 11-14.
10. Jain JB, Kumane SC, Bhattacharya S., Medicinal flora of Madhya Pradesh and Chhattisgarh – A review. Indian J Trad Knowlede. 2006; 5(2):237-242.
11. Thomas Paul A Devasagyam. Recent Advances in Indian Herbal Drug Research. J Clin Biochem Nutr. 2007 March; 40(2): 73.
12. Rangari VD. Pharmacognosy and Phytochemistry, 2nd ed. Nashik: Career Publications. 2008; 7.
13. Evance WC. Saunders. Text book of Pharmacognosy. 14th ed. Singapore: Harcourt Brace Asia. 1997; 298-9.
14. http:/www.ntbg.org / plants / index.php.
15. Orwa et al. Agroforestree Database: a tree Reference and selection guide version 4.0. 2009. (http:/ www.worldagroforestry.org /af/treedbl/).
16. Dr. Nandkarni KM. Indian Materia Medica. Mumbai: Bombay Popular Prakashan. 1976; 1: 165-6.
17. Morton JF. Fruits of Warm Climates. FlairBooks, Miami FL. 1987; 125–128.
18. Ghani A. Medicinal Plants of Bangladesh With Chemical Constituents and Uses. 2nd Ed. Dhaka, Asiatic Society of Bangladesh, 2003; 10.
19. Morton JF. Fruits of Warm Climates. FlairBooks, Miami, FL. 1987; 125–128.
20. Kapoor LD. CRC handbook of ayurvedicMedicinal plants. Boca Raton Fla. CRC Press. 1990; 58. ISBN 0-8493-0559-4.
21. Warrier PK, Nair RV. Indian Medicinal Plants: A compendium of

500 species, Madras: Orient Longman. 2002; 224
22. Thomas S, Patil DA, Patil A .Gand Narseh Chandra. Pharmacognostic evalution & physiochemical analysis of A.C L. fruit. Journal of Herbal medicine & Toxicology. 2008; 2(2): 51-54]
23. Guanghou S, Leong LP. Analysis of Polyphenolic antioxidant in star fruit using liquid chromatography and mass spectrometry. Journal of Chromatography. 2004; 1022 (12):67-75.
24. Nordby HE, Hall TN. Lipid markers in chemotaxonomy of tropical fruits: Preliminary Studies with carambola and loquat. Proc. Fla. State Hort. Soc.1979; 92:298-300.
25. Tiwari KP, Masood M, Minocha PK.DzChemical constituents of Gemlina phillipinensis, Adenocalymna nitida, Allamanda cathartica, Averrhoa carambola and Maba buxifolia,dz Journal of the Indian Chemical Society. 1979; 56: 944.
26. R. Gunasegaran. DzFlavonoids and anthocyanins of three oxalidaceae.dz Fitoterapia. 1992; 63(1): 89–90.26. Araho D, Miyakoshi M, Chou WH, Kambara
27. T, Mizutani K, T. Ikeda T. DzA new flavone Cglycoside from the leaves of Avehrroa
28. carambola,dz Natural Medicines. 2005; 59(3):113–116.
29. Raganyaki S, Singh R, Singh AK.`The chemical examination of the bark of A.C,`proceedings of the national academy of science section A. 1980; 50:61-63.
30. Wen Qingwei, Lin Xing, Liu Yeqi, Xu Xiaohui, Liang Tao, Zheng Ni, et al. Phenolic and Lignan Glycosides from the Butanol Extract of Averrhoa carambola L. Root. Molecules 2012; 17: 12330-12340.
31. Chang CT, Chen YC, Fang JT, Huang CC. "Star fruit (Averrhoa carambola) intoxication: an important cause of consciousness disturbance in patients with renal failure". Ren Fail. 2002; 24 (3): 379–82. (Doi: 10.1081/JDI-120005373. PMID 12166706)
32. Luximon-Ramma A, Bahorun T, Crozier A. 2003. Antioxidant actions and phenolic and vitamin C contents of common Mauritian exotic fruits. J Sci Food Agric 83: 496 – 502.
33. 31.Ali MA, Nayan V, Chanu KV, Ralte L, Devi LI. 2011. Antioxidant activity of fruits available in Aizawal Market of Mizoram India. World JAgric Sci 7: 327 – 332.
34. Cabrini DA, Moresco HH, Imazu P, Silva CD, Pietrovski EF, Mendes DAGB, Prudente AdS, Pizzolatti MG, Brighente I, Costa sM, Otuki MF. 2011. Analysis of the Potential Topical Anti-Inflammatory Activity of Averrhoa Carambola L. In Mice. Evid-Based Compl Alt Med Doi: 10.1093/ecam/neq026 Article ID908059
35. Soncini R, Santiago MB, Orlandi L, Moraes GOI, Peloso ALM, dos Santos MH, Alves-da-Silva G, Paffaro Jr VA, Bento AC, Giusti-Paiva A. 2011. Hypotensive effect of aqueous extract of Averrhoa carambola L. (Oxalidaceae) in rats: an in vivo and in vitro approach. J ethnopharmacol 133: 353 – 357.
36. Carolino ROG, Beleboni RO, Pizzo AB, Vecchio FD, Garcia-Cairasco N, Moyses-Neto M, Santos WFd, Coutinho-Netto J. 2005. Convulsant activity and neurochemical alterations induced By a fraction obtained from fruit Averrhoa carambola(Oxalidaceae: Geraniales). neurochemistry International 46: 523 – 531
37. Li X, Yang L, Yu R, Zhu J, Tian T, Song G, Song L. 2012. Biotransformation of dihydro-

epideoxyarteannuin B by suspension-cultured cells of Averrhoa carambola. Afr J biotechnol 11: 1724 – 1728.
38. Sripanidkulchai B, Tattawasart U, Laupattarakasem P, Wongpanich V. Antiinflammatory and Bactericidal Properties of Elected Indigenous Medicinal Plants Used For Dysuria. Thai J. Pharm. Sci. 2002; 26(1-2):33-38.
39. Shah NA, Raut BA, Baheti A, Kuchekar BS. In-vitro Anthelmintic activity of leaf extract of Averrhoa carambola against Pheretima posthuma. Pharmacogyonline 2011; 1: 524-527
40. Mia Masum Md, Rahman S. Md, Begum K, Begum B, Rashid A. Md. Phytochemical and Biological studies of Averrhoa carambola. J.Pharm. Sci. 2007; 6(2): 125-128
41. Murtha, N., Lee, S. Y., Phua, K. K., & Bhore, S. J. (2016). Nutritional, Medicinal and toxicological attributes of star-fruits (Averrhoa carambola L.): A review. Bio information, 12, 420–424. https://doi Org/10.6026/97320630012420
42. Chau, C. F., Chen, C. H., & Lee, M. H. (2004). Characterization and physicochemical properties of some potential fibres derived from Averrhoa Carambola. Nahrung/Food, 48, 43–46. https://doi.org/10.1002/Food.200300354
43. Wu, S. C., Wu, S. H., & Chau, C. F. (2009). Improvement of the hypocholesterolemic activities of two common fruit fibers by micronization Processing. Journal of Agriculture and Food Chemistry, 57, 5610–5614.
44. Morton,J.F.1987.Carambola.Averrhoa Carambola.<URL:http://www.hort.purdue.edu/New crop/morton/carambola.html#DescriptionAccessed1April2012.43. NationalTropicalBotanicalGardenURL:http://www.ntbg.org/plants/index.php.AcceSeed 28 April 2012.44.. PhylumTracheophyta.<URL:http://www.alientravelguide.com/science/biology/life/pla Nts/trachea/>. Accessed 27 March 2012.45 RotylenchulusreniformisLinford&Oliveira.<URL:http://entnemdept.ufl.edu/creatures/ Nematode/r_reniformis.htm>. Accessed29April2012.
45. TreeofLifeWebProject.URL:http://tolweb.org/Life_on_Earth/1. Accessed 5 April 2012