



THE ETHNOBOTANICAL AND PHARMACOLOGICAL EFFICACY OF *ANNONA MURICATA* EXTRACTS, DECOCTIONS

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Abstract

Annona muricata (*A. muricata* Linn.) is an evergreen tree that grows luxuriantly in tropical and sub-tropical regions of the world, the plant also known as guanabana, soursop, or graviola is from the Annonaceae family, valued for both its edible fruit and traditional medicinal uses across Africa and South America. Each portion of this tree from roots to leaves has been used in folk remedies to cure health related issues such as cancer, ulcers, diabetes, infections, inflammation, and hypertension. Traditional use of this plant has motivated researchers to evaluate its pharmacological efficiency which lead to the validation of its potential. Extensive research has revealed that *A. muricata* have wide range of pharmacological activities and can be used against inflammation, microbial infection, oxidative stress, cancer and diabetes. Apart from this it can be also used in skin related issues, gastrointestinal complication, hepatic complication, hepatic-protection, wound healing, as analgesic and antipyretic agent.

The credit for the medicinal effects of *A. muricata* goes to its rich phytochemical profile, especially acetogenins, alkaloids, phenols, and flavonoids, with over 200 compounds identified. *A. muricata* shows particular promise in cancer and diabetes treatment, with mechanisms such as enzyme inhibition (α -glucosidase, α -amylase), insulin stimulation, and glucose uptake enhancement contributing to its hypoglycemic effects. The leaves of the plant is of particular interest and have been analyzed extensively, it has anti-inflammatory potential and can be a good source for developing an anticancer agent due to presence of wide range of bioactive compounds. However, despite these benefits, some compounds mainly acetogenins and certain alkaloids have shown neurotoxic effects in laboratory models, underscoring the need for careful dosage evaluation and safety assessment. This article elaborates the ethnobotanical and pharmacological importance of the plant.

Keywords: *Annona muricata*, Ethnobotanical, Pharmacology, Plant extracts.

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Introduction

A. muricata L., also referred to as soursop or graviola in some parts of the world, is a tropical, evergreen, fruit-

Bearing Annonaceae family tree commonly found throughout Southeast Asia, South America, and rainforests in Africa. Preferring temperature and humid conditions, the plant grows well below 1200 meters above sea level under the best conditions of 25-28 °C temperature and 60–80% relative humidity¹. Historically esteemed in different cultures, practically all components of the plant its fruit, leaves, bark, seeds, and roots have been utilized in ethnomedicine to cure conditions as diverse as skin diseases, abscesses, external as well as internal parasitic infections to gastrointestinal disorders,

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diabetes, hypertension and cancer². Various studies have confirmed utilization of soursop in different conditions such as antidiabetic, anti-inflammatory, antiulcer, antiprotozoal, and antimicrobial action. These pharmacological characteristics of plant are directly attributable to bioactive compounds such as acetogenins, flavonoids, alkaloids, and phenolic compounds contained within it. In addition, contemporary researchers have well documented the pharmacological potential by strict experimentation³. During the past several decades, several studies (in vivo and in vitro) have widely documented the pharmacological potential of the plant. It shows high antioxidant activity in tackling oxidative stress and strengthening the body's endogenous antioxidant defense systems. Its antidiabetic activity is witnessed through modulation of carbohydrate-metabolizing enzymes and oxidative stress mechanisms. Scientific evidence and traditional knowledge also attest to its antidiarrheal and antiulcer uses, presumably because of its gastroprotective and motility-controlling constituents^{1,2}.

The antimicrobial activity of *A. muricata* covers bacteria, fungi, protozoa, and viruses, thus being a powerful resource for alternative therapeutic agents, particularly in the event of increased antimicrobial resistance^{3,4}. Its anticancer activity is another extensively researched field, and investigations have indicated selective cytotoxicity against different cancer cell lines through apoptosis induction, mitochondrial dysfunction, and inhibition of metastasis and proliferation. In addition, the plant has anti-inflammatory, antihypertensive, and healing properties, all of which are in consensus with its traditional uses in pain management, hypertension, and skin wounds^{1,3,5,6,7}. Considering the range of pharmacological activities seen in various studies, *A. muricata* possesses potential opportunities for the creation of multi-targeted natural drugs. This section investigates and discusses the pharmacological features of *A. muricata* focusing on recent scientific achievements that justify its traditional uses and provide the gateway towards future drug development.

1. Botanical distribution and Phytochemistry

A. muricata is member of annonaceae family, the genus *Annona* which have around species itself is a very frequently used in traditional medicine all around the world. *A. muricata*

is member of annonaceae family, it is a tropical, evergreen fruit-bearing tree native to Southeast Asia, South America, and African rainforests. It thrives in warm, humid climates below 1200 meters altitude, with 60-80% relative humidity, 25-28°C temperature, and over 1500 mm annual rainfall. The tree flowers and fruits almost year-round. With obovate shape, leaves of *A. muricata* are glossy, thick and dark green in colour. Flowers are thick and yellow in color with outer petals meeting the edge-to-edge and heart shaped bases; inner petals overlap and are oval-shaped. Fruit is heart-shaped, green, with soft prickles and have acidic pulp with specific aroma^{1,2}.

Plant contains range of phytochemical and bioactive compounds, and around 212 phytochemicals have been reported, Leaves being the most studied part of plant (Table 1). Acetogenins are the dominant bioactive compound, apart from these different alkaloids and phenolics are also reported in different part of plants.

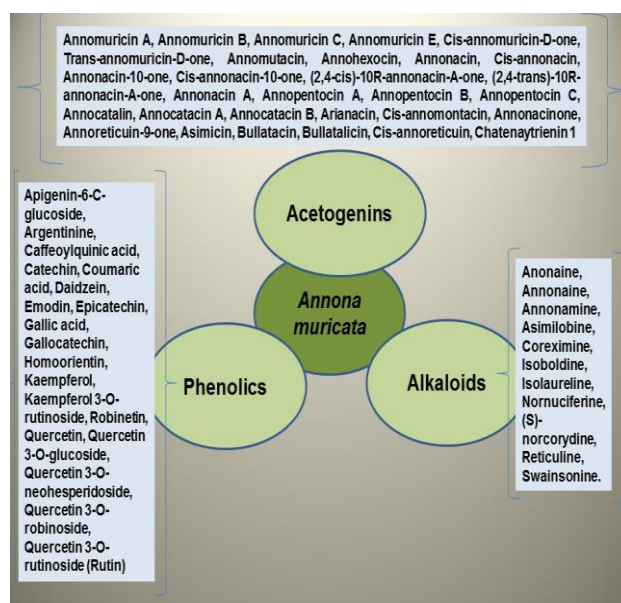


Figure 1: Dominant Bioactive compounds present in *A. muricata*.

Leaves of the plant contains compounds like Annonacin, annonamine, Quercetin, kaempferol, rutin and gallic acid, gallo catechin, while compounds in fruit and pulp are Muricatocin, Coumaric acid, Asimilobine, Caffeoylquinic acid. Pericarp of *A. muricata* fruit is rich in Annomuricin A–C, Annonacin, seeds have compounds like Annonacin-10-one, Annonacin, Bullatacin, Annocatacin A Arianacin, Cis-annomontacin; stems contain swainsonine and coreximine and roots of the plant are rich in solaminmuricadienin and reticuline^{3,6,8,9}.

UFLC-QTOF-MS of ethanolic extract of leaves revealed presence of phytochemicals like Rutin, loliolide, annopentocin, annomuricin, caffeic acid, asimilobine, kaempferol-3O-rutinoside, xylopin, annohexocin and xi-anomuricine¹⁰. 17 phytochemicals in leaves of methanolic extract of the plant were identified by Mishra et al (2025) including flavonoids like kaempferol-3-o-rutinoside, quercetin-3-O-D-glucuronide, rutin, apigenin 6,8-di-C-glucoside, eriocitrin, alkaloids like swainsonine, (+)-4'-O-methylcochlorine, xylopin, and asimilobine along with acetogenins likemontanacin B/C, Annomuricin A and annonisin¹¹.

2. Traditional uses

Ethnobotanical research highlights the wide-ranging use of *Annona muricata* in traditional medicine across tropical regions. The plant of soursop is known for its antibacterial, antifungal, anthelmintic, antihypertensive, anti-inflammatory, and anticancer properties. Traditionally, soursop is also used as an analgesic, antipyretic, and to manage respiratory infections, skin disorders, diabetes, and parasitic diseases³.

Parts of plant are used in preparing decoction, juice or can be applied topically or can be taken orally. People from countries of south pacific and Indonesia uses leaves of the plant are used in skin ailments while in Mexico, Martinique, Nicaragua and Brazil, it is used for flu, asthma, cold (Figure 2, Table 1). Topical application of the leaves is used for relieving pain in Malaysia, it is also used in treating insomnia, diabetes, headaches, and cystitis, diabetes, while decoctions are used as anti-rheumatic neuralgic^{1,2}. It is reported that patients also combine the decoction can be taken directly or with warm water, tea, cereals. Fruit juice of the plant is known to be galactagogue and utilized in treating diarrhoea, liver disease, heart related complications and intestinal parasites. Seeds of the plant are reported as effective treatment against parasitic skin disorder and as laxative. Bark of the *A. muricata* is used for diabetes, inflammation, parasite infection, anti-hypertensive, muscle relaxant³.

People from different region of Africa use parts of *A. muricata* for treating parasite infections, cancer, malaria, stomach related complication and diabetes. People from sub-Saharan Africa utilize the plant in treatment of stomach disorders, diabetes, malaria, cancer and parasitic infection¹². Seeds are used as

anthelmintic and antiparasitic agents while leaves, bark and roots are used for anti-inflammatory, antihypertensive, sedative, antidiabetic, and antispasmodic effects. Leaves are used in conditions such as cystitis, hypertension, headaches, insomnia, liver ailments, and are also used topically for abscesses and skin conditions¹. In South America, people use soursop fruit juice to manage cardiac and hepatic related problems, and also used as an effective remedy for diarrhea and parasites. The fruit pulp is traditionally consumed to promote lactation, Treat rheumatism, arthritis, fever, neuralgia, dysentery, skin rashes, Serve as an antimalarial, antiparasitic, and anthelmintic agent².

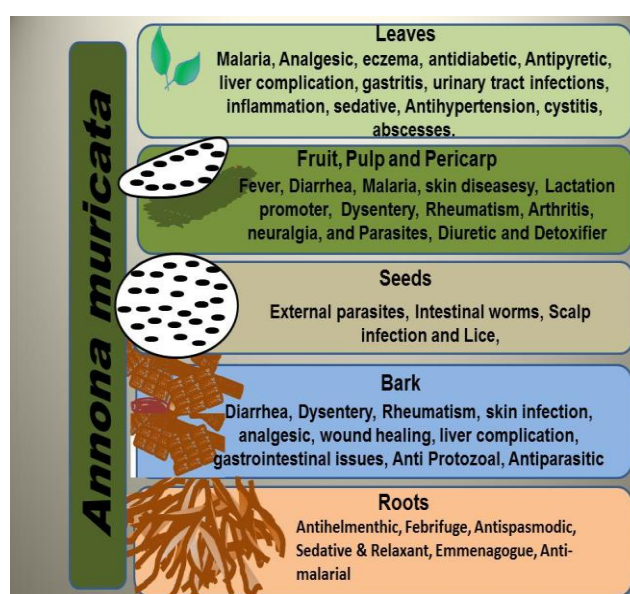


Figure 2: Traditional use of leaves, fruits, pulp, pericarp, seeds, Bark and roots of *A. muricata*.

Table 1. Major compounds present in different parts of *A. muricata* and use of these parts in traditional medicine.

S.No.	Part of plant	Reported phytochemicals	Traditional uses	References
1.	Leaves	Annomuricin (annomuricin A, B, C) Annomuricin E, Cis-annomuricin-D-one, Trans-annomuricin-D-one, Anonainesolamin, Solamin, Muricapentocin ,Annomutacin, Annonacin(2,4-cis)-10R-annonacin-A-one, (2,4-trans)-10R-annonacin-A-one, Annopentocin A, B, C, Annocatalin, Annocatacin B, Annonacinone, Asimicin, Annohexocin, Muricatocin A, B, C ,Muricoreacin, Murihexocin B, C, Annonamine, Asimilobine, Coreximine, Isoboldine, Isolaureline, Nornuciferine, Reticuline, Apigenin-6-C-glucoside, Argentinine, Caffeoylquinic acid Catechin, Annomutacin, Annohexocin, Annonacin, (2,4-cis)-10R-annonacin-A-one, (2,4-trans)-10R-annonacin-A-one, Daidzein, Emodin, Epicatechin, Gallic acid, Gallocatechin, Homoorientin, Kaempferol, Kaempferol 3-O-rutinoside, Robinetin, Quercetin 3-O-glucoside, Quercetin 3-O- neohesperidoside, Quercetin 3-O-robinoside, Quercetin 3-O-rutinoside (Rutin)	Fever, sedative, anti-anxiety, antihypertensive, antispasmodic, wound healing, parasitic infections, liver related complications, gastrointestinal complication, ulcer.	2,3,11.
2.	Fruits and pulp	Cis-annoreticuin, Muricin J, K, LAnonaine, Annonaine, Nornuciferine, tocotrienols, tocopherol, Coumaric acid Asimilobine, Caffeoylquinic acid, Murihexocin, murihexocin B, C Kaempferol, Kaempferol 3- O-rutinoside	Constipation, dysentery, helminthic infections, ntipyretic, nutritional tonic, skin issues, Digestive disorders ant inflammatory, anticancer, antidiabetic, antioxidant.	3,13,14
3.	Pericarp	Annomuricin (annomuricin A, B, C) Annonacin Annonacin A	Antimicrobial, antiparasitic, insect repellent, dysentery, diarrhea, skin ailments	2,3

4.	Seeds	Annonacin, Annocatacin A Arianacin, Cis-annomontacin, Annonacinone Annoreticuin-9-one, AnnomuricatinA,B,C, Bullatacin, Bullatalicin, Cis-annonacin, Annonacin-10-one, Cis-annonacin-10-one, Cohibin A, B, Cohibin C, D, Corossolone, Muricatacin, Muricatetrocin A, B, Muricenin, Murihexol, MurisolinRolliniastatin 1, Solamin, Squamocin, Cis-squamostatin A, squamostatin D, Xylomaticin	Fumigation, insecticide, Abortifacient, antihelmenthic	15,16
5.	Bark , Stem	Coreximine, Coreximine, reticuline, Swainsonine, Atherosperminine, Anomuricine, Anomurine	Antidiabetic, pain releiver, antiparasitic, antihelmenthic, anticancer, antimalarial, arthritis, inflammation,	2,17
6.	Root	Reticuline, Coreximine, Solamin, Cis- reticulatacin, Muridienin 3, 4, Muricadienin, Cohibin A, B, (Sabadelin) chatenaytrienin 1, 2, 3	Antidiabetic, febrifuge, abortefacient, uterotonic, antihelmenthic, antispasmodic.	1,2,3

3. Pharmacological properties

Antioxidant activity

Leaves, fruits and bark of *A. muricata* is used to boost general health, aging and against inflammation and fatigue³. Richness of plant in bioactive compounds like kaempferol, Quercetin, annonacin, gallic acid, contributes to its antioxidant potential⁹). Methanolic leaf extract of the plant had IC₅₀ of 34.8 µg/mL against 2,2-Diphenyl-1-picrylhydrazyl⁹. Aqueous and 80% methanolic extract of leaves, roots and twigs of the plant had significant antioxidant activity, with leaves having highest against 2,2-Diphenyl-1-picrylhydrazyl¹⁸. According to some reports methanol and aqueous extracts of root, twigs, fruit pulp

and leaf extract of *A. muricata* had reported to have significant antioxidant potential in ABTS and FRAP assays^{18,19}. Leaf extract of the plant was able to reduce lipid peroxidation via MDA, while increasing SPD, catalase, GSH and improving pancreatic antioxidant defense²⁰. Ethyl acetate extract of the leaves were showing increased levels of antioxidant enzyme in in vivo model²¹.

Antidiarrheal Activity

Traditional medicine in countries of West Africa, tropical Asia, Latin American region have utilized fruit pulp and juice of *A. muricata* for gastrointestinal complication including diarrhea. Intestinal complication is treated bark

and fruit^{3, 22}. Castor oil induced diarrhea in mice was treated using fruit extract of the plant at 400mg/kg, and it

has been reported to reduce diarrheal frequency and delayed onset of diarrhea⁶. Castor oil induced diarrhea mice when treated with hydroalcoholic extract of *A. muricata* was reported to show good results as standard drug²².

Antidiabetic Activity

Soursop fruits and all other parts of *A. muricata* have been used for medicinal purpose across the world and reported to possess significant antidiabetic potential. Leaves bark, and roots of the plant is used to prepare decoction and tea. People from Nigeria and Ghana use infusion of leaves to treat diabetes; while in Cameroon and Uganda use various plant parts to manage diabetes and its other symptoms³. Several study both invitro and in vivo have been performed to evaluate its antidiabetic potential. Extracts of leaf, pericarp, pulp of the plant was tested against major enzymes in carbohydrate metabolism (alpha amylase and alpha glucosidase); inhibition of both enzyme was observed with IC50 value of 22.3 ± 1.8 µg/mL against alpha glucosidase in case of leaf extract and 35.5 ± 2.4 µg/mL against alpha amylase in case of fruit pericarp extract²³. Artificially diabetes induced rats with streptozotocin when treated *A. muricata* leaf extract at 100mg/kg dose was able to reduce blood glucose levels, while lowering oxidative stress and increasing body weight²⁰. Ethanolic extract of the plant was able to delay glucose peak and enhance glucose clearance⁶.

Antimicrobial Activity

Bacteria

A. muricata is reported to be effective against different bacterial strains (Gram positive and Gram negative).. The alkaloids present in the plant can disrupt bacterial membranes. It is reported to have enhanced efficacy against Multidrug resistant strains of *Staphylococcus aureus*, and *Escherichia coli* when combined with antibiotics. The in vitro analysis of leaves has shown significant activity against *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *E. coli*, *Helicobacter pylori*^{3,4}. While methanolic fruit extract of the plant has been reported to reduce effects of diarrhoea in mice (*E. coli* induced)²².

Fungi

Although there are not many reports on antifungal properties of *A. muricata*, *Candida albicans* is known to inhibit by its extract. In a study ethanolic extract of leaves of the plant were able to reduce fungal growth by 58% and cell density by 65% of MDR *C. albicans*¹⁰.. Methanolic extract of leaves were also found effective against *C. albicans*¹¹. Acetogenins isolated from seeds of the plant were able to inhibit growth *Candida* spp like *C. tropicalis*, *C. albicans*, *C. glabrata* and *C. krusei*²⁴. Apart from this soursop is also tested against *Colletotrichum gloeosporioides*, *Rhizopus stolonifer*, *Alternaria* and *Cercospora malayensis*^{25,26,27}.

Protozoa

Traditionally all over the world people have used *A. muricata* for treating protozoal infection, including as an antimalarial medicine. The plant shows broad antiprotozoal efficacy, including against toxoplasmosis, leishmaniasis, malaria, and trypanosomiasis Reports have shown that *A. muricata* indeed have antiprotozoal activity- according to one study the ethanol extract of plant had shown IC50 at concentration of 46.1 µg/ml against *Plasmodium falciparum*²⁸. Silver nano particle of *A. muricata* was able to counter Dengue, Malaria, and filarial vector²⁹. While in case of toxoplasmosis rat model ethanolic leaf extract has reduced parasite load and improved survival³⁰.

Viruses

Apart from this *A. muricata* also have antiviral properties and the extracts have been reported to be effective against viruses like Herpes simplex virus, SARS-CoV-2, and HIV in different In-vitro, In-vivo and In-silico studies³¹. Acetogenins from the plant like cisannonacin, and muricatocin have been reported to be interacting strongly with corona virus (SARS-CoV-2) protein present in its spike³², while acidified ethanolic extract of *A. muricata* can decrease viral replication of HSV in a hour³. In an In vivo analysis topical application of stem bark extract in HSV infected mice had reduced lesion size and viral titre⁷.

Antihypertensive Activity

Different reports have suggested that *A. muricata* contributes to reduce the blood pressure by hindering angiotensin-converting enzyme (ACE) and blocking calcium ion channels, leading to decreased vascular resistance³³. *A. muricata* with *Persea Americana* was able to reduce blood pressure synergistically³⁴. The anti-hypertensive property of the plant is attributed to alkaloids like reticuline and ananamide present in it^{4,33}.

Wound Healing

Ethyl acetate extract of the leaf of the plant in 5% and 10% ointment formulations when given to excision wounds in rats was able to increase the wound contraction rate, and was able to reduce levels of malondialdehyde (MDA), which is an indicator of oxidative damage. Apart from this it was able to enhance re-epithelialization and elevate antioxidant enzymes like catalase, SOD and GSH³⁴. According to another study methanolic extracts of bark and leaves can

enhance epithelial regeneration, shorten epithelialization period, and increase tensile strength of wound tissue³⁵.

Antiulcer Activity

The bioactive compound present in *A. muricata* like phenolics, alkaloids, tannins have potent gastroprotective activity⁹. Traditionally medicinal system of Africa, Caribbean and South American region utilize decoction and tea made with leaves and bark is used for treating ulcers, gastritis, and indigestion³. Hydroalcoholic leaf extract of *A. muricata* was able to reduce ethanol, methanol, or indomethacin induced gastric ulcers at dose of 100-400mg/kg body weight³⁶. Ethyl extract of the plant was able to reduce lesion index, MDA, Bax while increasing catalase, SOD, GSH and Hsp 70 expression³⁷. *Helicobacter pylori* is an ulcer causing bacteria, methanolic and ethyl acetate leaf extract of the plant has shown strong antibacterial activity against this bacteria with MIC value of 20mg/ml³⁸.

Anticancer Activity

Table 2: Anticancer activity of extracts/compounds isolated from *A. muricata*

S.no.	Cancer type	Extract/isolated compound	In vitro /In vivo		Mechanism	Reference
			cell line /Model	IC50 (µg/ml)/Dosage (mg/kg)		
1.	Breast cancer	<ul style="list-style-type: none"> Ethanolic leaf extract Aqueous leaf extract Ethanolic leaf extract Fruit pulp extract 	<ul style="list-style-type: none"> MCF-7 MDA-MB-231 Ehrlich ascites carcinoma (EAC) mice DMBA-induced breast cancer (rats) 	<ul style="list-style-type: none"> 14.7 µg/mL 12.1 µg/mL 100 mg/kg 200 mg/kg 	Mitochondrial apoptosis, ROS, caspase activation Apoptosis via Bax upregulation and Bcl-2 downregulation. ↓ Tumor size, ↑ life span, ↑ caspase-3 activity ↑ antioxidant enzymes, ↓ lipid peroxidation	3,6,7,41

2.	Prostate cancer	<ul style="list-style-type: none"> • Aqueous leaf extract • AnnopentocinA,B, C,D 	PC-3	<ul style="list-style-type: none"> • 6.6 µg/mL • 1.14, 0.21, 0.02, 1.32. 	Inhibits EGFR/ERK signaling; induces apoptosis	3,39
3.	Pancreatic cancer	Annomuricin E	CD18/HPAF	1.8 µg/mL	Mitochondrial complex I inhibition	3,43, 44 45
4.	Colon cancer	<ul style="list-style-type: none"> • Methanolic fruit extract • Ethyl acetate seed extract 	<ul style="list-style-type: none"> • HT-29 • Colon cancer xenograft (mice) 	<ul style="list-style-type: none"> • 20.6 µg/MI • 50 mg/kg 	DNA fragmentation, caspase-3 activation	3,43, 44 46,47
5.	Lung cancer	Ethanollic leaf extract	A549	18.6 µg/mL	ROS induction, apoptosis	3,43, 44 48
6.	Liver cancer	Methanol bark extract	HepG2	27.1 µg/mL	Antiproliferative, DNA fragmentation	3,43, 44 49
7.	Lymphoma	Methanolic leaf extract	Dalton's lymphoma (mice)	250 mg/kg	↓ Tumor weight, ↑ survival rate	3,45, 46

As elaborated in (Table 2), several studies (*In vitro* and *In vivo*) on *A. muricata* has shown its potential as an excellent anticancer agent. Ethanolic and ethyl acetate extract of the leaf of the plant can control cell proliferation and was able to induce apoptosis in cell lines (MCF-7 and MDA-MB-231) with IC₅₀ value of leaf extract of the plant were able to inhibit proliferation and metastasis in PC-3 and LNCaP cell line of prostate cancer. In HT-29 cell lines methanolic extract of the plant was able to induce apoptosis and cell cycle arrest by activating caspase 3 and DNA fragmentation. Acetogenins are dominant bioactive compounds of *A. muricata*, acetogenins isolated from the plant were able induce cell death while suppressing metastasis by disrupting mitochondrial disruption and affecting cellular ATP production in FG/COLO357 and CD18/HPAF cell lines of pancreatic cancer.

Anti-inflammatory

Potential of soursop as an anti-inflammatory agent have been validated both by its usage in traditional medicine in addition to via different experiments performed *in vitro* and *in vivo* which is directly linked to presence of alkaloids, flavonoids,

phenolics and acetogenins present in it. Roots, Leaves and the bark of the plant have been used traditionally for treating fever, swelling, rashes and other skin inflammation along with this it is also used to relieve pain associated with arthritis, muscle inflammation and joints³. Nitric oxide (NO) is one of the source of oxidative stress, methanolic extract of leaves were reported to inhibit NO and PGE2 production significantly in LPS-induced RAW 264.7 macrophages having IC₅₀ value of 26.1 µg/mL³. According to Gavamukulya et al the plant is able to downregulate pro-inflammatory cytokines (e.g. TNF-alpha, IL6, IL-1Beta)⁵. According to another study aqueous and ethanolic extract of leaves of *A. muricata* at dose of 100-400 mg/kg was able to reduce carrageenan-induced paw edema in dose dependent manner in rats²³. The plant is also reported to reduce granuloma tissue formation, suppress fibroblast proliferation and exudate its formation^{2,3}.

Toxicology

A. muricata have been used in curing various diseases traditionally for centuries and its toxicological profile is still needed to be critically investigated. Although it has been scientifically proven that phyto-constituent of the plant and plant extracts do have significant pharmacological potential, still there safety issues using plant as such³. The root extracts of the *A. muricata* contain cytotoxins and have neurotoxic effects². The aqueous extract of *A. muricata* at high doses can cause hypoglycemia, hyperlipidemia and kidney damage^{46, 47}. Thus, use of the extract is recommended in controlled manner and with proper guidance only. The toxic effects of the plant come from the phytochemical compounds present in it, like acetogenins specifically annonacin is a neurotoxin. High consumption of soursop can cause atypical Parkinsons, causing degeneration of dopaminergic neurons⁸. Seeds of the plant have been reported to have high levels of acetogenins, causing hepatotoxic and neurotoxic effects in rats⁴⁹. Although cytotoxicity of compounds or extracts are important for their anticancerous effect higher doses of *A. muricata* can lead to non-specific cell killing². Long-term use of seeds, fruit pulp, and root extracts have been recommended to be avoided due to its adverse effects³.

Conclusion

A. muricata is a valuable and renowned medicinal plant and used widely in traditional medicines around the world for centuries. Tropical and subtropical regions of Africa and Southern America use different parts of plant including leaves, bark, seed, fruits and roots for treating ailments ranging from skin infection, joint pain, rheumatism, and rashes to diabetes, arthritic pain and so on. The pharmacological effects of the plant are dependent on range of bioactive compounds present in it such as acetogenins, flavonoids, Phenolics, alkaloids. The plant of *A. muricata* tackles wide range of diseases, that includes inflammation, cancer, diabetes, rheumatism, joint pain, gastrointestinal issues, skin problems. Anti-cancerous property of *A. muricata* is particularly noteworthy, the isolated compounds of the plant have displayed low IC₅₀ values against cancer cells both in in vivo and in vitro circumstances, supporting their apoptotic and cytotoxic mechanisms. Apart from this the antidiabetic, antiulcer and antimicrobial activities of the plant have also been validated by various studies. Probably these pharmacological effects were somehow involved inflammatory cytokines, molecular signaling

pathways, oxidative stress markers. Although, beyond these therapeutic benefits there are also have negative impacts of extract that is related to presence of some acetogenins (Annonacin). Annonacin is reported to be a neurotoxin that can cause atypical parkinsonism when consumed for prolonged duration.

If we somehow lower the toxicological concern of the plant, while enhancing the potency of the formulation (either extract or isolated compound), it can help in developing a safe and effective therapy against several disease. To do so there is still need of rigorous experimentation and research on the medicinal value, toxicological assessment and standardization around this plant.

Conflict of Interest: None

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