Antioxidant & Cellular/Organ Protective Actions of Graviola (*Annona muricata*)

Like many rainforest plants, graviola delivers a significant amount of natural plant chemicals called polyphenols. Many are well studied as proven and effective antioxidants. Antioxidants can reduce the accumulation and damage of free radicals called reactive oxygen species (ROS). ROS is generated in the body through several natural processes (metabolizing food, converting food to energy, etc.). However, many diseases and conditions can also increase ROS levels (diabetes, cancer, chronic inflammatory conditions, obesity, aging, etc.) When ROS levels rise, the damage they cause (called oxidative stress) can affect many different cells and organs. Some rainforest plant-derived antioxidants, including those found in graviola, are capable of protecting cells and organs from oxidative stress and/or repair the damage already caused.

Graviola leaves have been widely studied for their strong antioxidant properties, which help protect the body from damage. Research shows that graviola can safeguard important organs like the heart, liver, kidneys, stomach, nerves, brain, and blood vessels from oxidative stress, which happens when harmful molecules (called ROS) build up in the body. Graviola can also protect against harmful substances or conditions, like diabetes, that increase ROS levels. In diabetes, this oxidative stress can lead to long-term damage to organs such as the kidneys, heart, nerves, and eyes. Oxidative stress is also linked to many age-related diseases, including conditions like dementia, Alzheimer's, and memory loss, as it harms different parts of the brain over time.

Published Research:

Afolabi, F., et al. "Scopolamine-induced memory impairment in mice: Soursop leaf extract and fractions protect the hippocampus and prefrontal cortex." *Iran J. Basic Med. Sci.* 2025; 28(3): 355-365.

Yoo, B., et al. "Polysaccharides from *Annona muricata* leaves protect against H2O2-induced oxidative stress in H9c2 myoblasts." *J. Med. Food.* 2025 Feb; 28(2): 174-181.

Hernandez-Fuentes, G., et. al. "Comparative analysis of infusions and ethanolic extracts of *Annona muricata* leaves from Colima, Mexico: Phytochemical profile and antioxidant activity." *Life* (Basel). 2024 Dec; 14(12): 1702.

Ebenyi, L., et al. "Antioxidative, anti-androgenic, and inhibitory activities of ethanolic extract of *Annona muricata* leaf on sex hormones-induced benign prostate hyperplasia through *in vivo* and *in silico* studies." *Nat. Prod. Res.* 2024 Sep: 1-8.

Hartati, R., et al. “Optimization of antioxidant activity of soursop (*Annona muricata* L.) leaf extract using response surface methodology.” *Biomed. Rep.* 2024 Sep; 21(5): 166.
Ginting, B., et. al. “Antioxidant and cytotoxicity screenings of ethyl acetate extract from *Annona muricata* leaves and its fractions.” *J. Adv. Pharm. Technol. Res.* 2024 Apr-Jun; 15(2): 70-74.
Zeweil, M., et. al. “*Annona Muricata* L. extract restores renal function, oxidative stress, immunohistochemical structure, and gene expression of TNF-α, IL-β1, and CYP2E1 in the kidney of DMBA-intoxicated rats.” *Front. Pharmacol.* 2024 Feb; 15: 1348145.
Olas, B. “The antioxidant potential of graviola and its potential medicinal application.” *Nutrients*. 2023 Jan; 15(2): 402.
Vidová Uğurbas, M., et al. Effect of *Annona muricata* aqueous leaf extract on reactive oxygen and nitrogen species.” *Eur. Rev. Med. Pharmacol. Sci.* 2022 Sep; 26(18): 6497-6504.
Saraiva, A., et al. “Polyphenols-rich fraction from *Annona muricata* Linn. leaves attenuates oxidative and inflammatory responses in neutrophils, macrophages, and experimental lung injury.“ *Pharmaceutics*. 2022 May; 14(6): 1182.
Balderrama-Carmona, A., et al. “Antiviral, antioxidant, and antihemolytic effect of *Annona muricata* L. leaves extracts.” *Plants* (Basel). 2020 Nov; 9(12): 1650.
Pineda-Ramírez, N., et al. “Antioxidant properties and protective effects of some species of the *Annonaceae*, *Lamiaceae*, and *Geraniaceae* families against neuronal damage induced by excitotoxicity and cerebral ischemia.” *Antioxidants* (Basel). 2020 Mar; 9(3): 253.
Kim, W., et al. “Neuroprotective effect of *Annona muricata*-derived polysaccharides in neuronal HT22 cell damage induced by hydrogen peroxide.” *Biosci. Biotechnol. Biochem.* 2020 May; 84(5): 1001-1012.
Alvin, A., et al. "Thermostability and free radical scavenging activity of *Annona muricata* (L.) leaf extract in antiaging cream." *Pharmaciana*. 2019; 9(1): 11-20.
Jimoh, O., et al. "Protective effect of soursop (*Annona muricata* linn.) juice on oxidative stress in heat stressed rabbits." *J. Anim. Sci. Technol.* 2018 Nov; 60: 28.
Acésio, N., et al. "Assessment of the antioxidant, cytotoxic, and genotoxic potential of the *Annona muricata* leaves and their influence on genomic stability." *J. Toxicol. Environ. Health A.* 2017; 80(23-24): 1290-1300.
Adefegha, S., et al. "Distribution of phenolic contents, antidiabetic potentials, antihypertensive properties, and antioxidative effects of soursop (*Annona muricata* L.) fruit parts *in vitro*." *Biochem. Res. Int.* 2015; 2015: 347673.
Agu, K. and Okolie P. "Proximate composition, phytochemical analysis, and *in vitro* antioxidant potentials of extracts of *Annona muricata* (Soursop). *Food Sci. Nutr.* 2017 Jun; 5(5): 1029-1036.
Al-Brakati, A., et al. "The protective efficacy of soursop fruit extract against hepatic injury associated with acetaminophen exposure is mediated through antioxidant, anti-inflammatory, and anti-apoptotic activities." *Environ. Sci. Pollut. Res.* 2019; 26: 13539-13550.
Alitonou, G., et al. "Chemical composition, antiradical and anti-inflammatory activities of four

Annonaceae from Benin." *Int. J. Pharm. Chem. Biol. Sci.* 2013; 3: 914-923.
Almeida, M., et al. "Bioactive compounds and antioxidant activity of fresh exotic fruits from northeastern Brazil." *Food Res. Int*. 2011; 44: 2155-2159.
Alsenosy, A., et al. "Graviola (*Annona muricata*) attenuates behavioural alterations and testicular oxidative stress induced by streptozotocin in diabetic rats." *PLoS One.* 2019 Sep; 14(9): e0222410.
Ashbanu, Y., et al. "Identification of chemical compounds of soursop (*Annona muricata* l.) leaf extract and its antioxidant activity test with DPPH (2, 2-Diphenyl-1-Pikrilhydrasil) method." *Indo. J. Chem. Sci.* 2019; 8(3): 153-160.
Baskar, R., et al. "*In vitro* antioxidant studies in leaves of *Annona* species." *Indian J. Exp. Biol.* 2007 May; 45(5): 480-5.
Bipat, R., et al. "Beneficial effect of medicinal plants on the contractility of post-hypoxic isolated guinea pig atria - Potential implications for the treatment of ischemic-reperfusion injury." *Pharm. Biol.* 2016 Aug; 54(8): 1483-9.
Boakye, A., et al. "Antioxidant activity, total phenols and phytochemical constituents of four underutilised tropical fruits." *Int. Food. Res. J.* 2015; 22 (1): 262-268.
Byun, E., et al. "Cytoprotective effects of crude polysaccharides separated from *Annona muricata* leaf in macrophages." *J. Korean Soc. Food Sci. Nutri.* 2020 Mar; 49(2): 127-133.
Byun, E., et al. "Polysaccharides from *Annona muricata* leaves protect normal human epidermal keratinocytes and mice skin from radiation-induced injuries." *Radiation Phys. Chem.* 2020 May; 170: 108672.
Choi, M., et al. "Effects of time on phenolics and *in vitro* bioactivity in autoclave extraction of graviola (*Annona muricata*) leaf." *Biotech. Bioprocess. Engineer.* 2020; 25: 9-15.
Chukwunonsoa, A., et al. "Protective effect of ethanol extract of soursop (*Annona muricata* Linn) leaves on cycad induced oxidative stress in male albino Wistar rats." *J. Sci. Tech. Res*. 2019; 1(2): 169-177.
Correa-Gordillo, J., et al. "Antioxidant activity of guanabana (*Annona muricata* L.) a bibliographic review." *Bol. Latinoam. Caribe. Plant. Med. Aromather*. 2012; 11: 111-126.
Daud, N., et al. "Optimization of soxhlet extraction parameter of *Annona muricata* leaves using Box-Behnken design (BBD) expert and antioxidant analysis." *J. Teknologi* 2015; 77(3): 27-37.
de Moraes, M., et al. "Phenolic compounds and metals in some edible *Annonaceae* fruits." *Biol. Trace Elem. Res.* 2020 Jan 7: 31907800. (ahead of print)
Ekere, O., et al. "Nutrient, bioactive components and effects of ethanol extracts of *Annona muricata* leaves and *Fagara zanthoxyloide* roots on zidovudine-induced oxidative stress in Wistar rats." *J. Appl. Life. Sci., Int.* 2019; 21(3): 1-11.
Essama, S., et al. "Antibacterial and antioxidant activities of hydro-ethanol extracts of barks, leaves and stems of *Annona muricata*." *Am. J. Pharmacol. Sci*. 2015; 3: 126-131.
Florence, N. et al. "Antidiabetic and antioxidant effects of *Annona muricata* (Annonaceae),

aqueous extract on streptozotocin-induced diabetic rats." *J. Ethnopharmacol.* 2014 Feb; 151(2): 784-90.
Gavamukulya, Y., et al. "Phytochemical screening, anti-oxidant activity and *in vitro* anticancer potential of ethanolic and water leaves extracts of *Annona muricata* (Graviola)." *Asian Pac. J. Trop. Med.* 2014 Sep; 7S1: S355-63.
George, V. et al. "*In vitro* protective potentials of *Annona muricata* leaf extracts against sodium arsenite-induced toxicity." *Curr. Drug Discov. Technol.* 2015; 12(1): 59-63.
George, V., et al. "Antioxidant, DNA protective efficacy and HPLC analysis of *Annona muricata* (soursop) extracts." *J. Food Sci. Technol.* 2015 Apr; 52(4): 2328-35.
Gregoris, E., et al. "Antioxidant properties of Brazilian tropical fruits by correlation between different assays." *Biomed. Res. Int.* 2013; 2013: 132759.
Guevara, M., et al. "Chemical composition and antioxidant activity of the main fruits consumed in the western coastal region of Ecuador as a source of health-promoting compounds." *Antioxidants*. 2019 Sep; 8(9): E387.
Gyesi, J., et al. "Chemical composition, total phenolic content, and antioxidant activities of the essential oils of the leaves and fruit pulp of *Annona muricata* L. (soursop) from Ghana." *Biochem. Res. Int.* 2019 Sep; 2019: 4164576.
Hasmila, I., et al. "Phytochemical analysis and antioxidant activity of soursop leaf extract (*Annona muricata* Linn.)." *J. Phys. Conf. Ser.* 2019; 1341: 032027.
Holanda, C., et al. "Influence of *Annona muricata* (soursop) on biodistribution of radiopharmaceuticals in rats." *Acta Cir. Bras.* 2014 Mar; 29(3): 145-50.
Ibrahim, N., et al. "Cytotoxicity, total phenolic contents and antioxidant activity of the leaves extract of *Annona muricata*." *ChemSearch J.* 2015 Jun; 6(1): 46-51.
Ikenna-Ossai. C., et al. "Effect of *Annona muricata* leaves extract on colon antioxidant status and ketone bodies in blood and urine of cycas-treated rats." *Int. J. Biochem. Res. Rev.* 2019 Sep; 27(2): 1-14.
Iyanda-Joel, W., et al. "Phytochemical, antioxidant and mitochondrial permeability transition studies on fruit-skin ethanol extract of *Annona muricata.*" *J. Toxicol.* 2019 Dec; 2019: 7607031.
Jimenez, V., et al. "Identification of phenolic compounds in soursop (*Annona muricata*) pulp by high-performance liquid chromatography with diode array and electrospray ionization mass spectrometric detection." *Food Res. Int.* 2014; 65: 42-46.
Jimoh, O., et al. "Protective effect of soursop (*Annona muricata* Linn.) juice on oxidative stress in heat stressed rabbits." *J. Anim. Sci. Technol.* 2018 Nov 16; 60: 28.
Joyeux, M., et al. "Screening of antiradical, anti-lipoperoxidant and hepatoprotective effects of nine plant extracts used in Caribbean folk medicine. *Phytother. Res*. 1999; 9: 228-230.
Justino, A., "*Annona muricata* Linn. leaf as a source of antioxidant compounds with *in vitro* antidiabetic and inhibitory potential against -amylase, -glucosidase, lipase, non-enzymatic glycation and lipid peroxidation." *Biomed. Pharmacother.* 2018 Apr; 100: 83-92.

Kamal, M., et al. "Role of *Annona muricata* (L.) in oxidative stress and metabolic variations in diabetic and gamma-irradiated rats." *Egypt. J. Rad. Sci. Applic*. 2017; 30(1): 73-83.
Lee, Y., et al. "An appraisal of eighteen commonly consumed edible plants as functional food based on their antioxidant and starch hydrolase inhibitory activities." *J. Sci. Food Agric*. 2015 Nov; 95(14): 2956-64.
Luzia, D., et al. "Study of antioxidant activity of non-conventional Brazilian fruits." *J. Food Sci. Technol.* 2014 Jun; 51(6): 1167-1172.
Manrique-de-la-Cuba, M., et al. "Theoretical study of the antioxidant capacity of the flavonoids present in the *Annona muricata* (Soursop) leaves." *J. Mol. Model.* 2019 Jun; 25(7): 200.
Moghadamtousi, S., et al. "*Annona muricata* leaves accelerate wound healing in rats via involvement of Hsp70 and antioxidant defense." *Int. J. Surg.* 2015 Jun; 18: 110-7.
Moizes, R., et al. "Effects of *Annona muricata* on the treatment and prevention of chronic degenerative diseases." *Int. J. Devel. Res.* 2019 Jan; 9(1): 25083-25086.
Mostafa I., et al. "Phytonutrients potential properties of graviola leaves extract." *J. Agri. Res.* 2018, 3(5): 000172.
Muchtaromah, B., et al. "Effect of *Annona muricata* leaf extract on antioxidant activity and histology of the mamary tissue in the breast cancer model *in vivo*." *Austral. J. Basic Appl. Sci.* 2015; 9(7): 92-95.
Murillo, E., et al. "Antioxidant activity and polyphenol content in cultivated and wild edible fruits grown in Panama." *J. Pharm. Bioallied. Sci*. 2012 Oct-Dec; 4(4): 313-317.
Naglaa, R., et al. "Effects of *Annona muricata* (Graviola) and Fullerene C60 against toxicity induced by carboplatin in male albino rats." *Egypt. Acad. J. Biolog. Sci.* 2019; 11(3): 149-168.
Nam, J., et al. "Phenolic compounds in different parts of young *Annona muricata* cultivated in Korea and their antioxidant activity." *Appl. Bio. Chem.* 2017; 60: 535-543.
Nawwar, M., et al. "A flavonol triglycoside and investigation of the antioxidant and cell stimulating activities of *Annona muricata* Linn." *Arch. Pharm. Res.* 2012 May; 35(5): 761-7.
Nayak, S., et al. "Protective potentials of *Annona muricata* fruit pulp on etoposide-induced gastrointestinal toxicity in Wistar rats." *J. Carcinog.* 2019 Oct; 18: 4.
Nguyen, M., et al. "Determination of the phytochemical screening, total polyphenols, flavonoids content, and antioxidant activity of soursop leaves (*Annona muricata* Linn.)" *IOP Conf. Ser. Mater. Sci. Eng.* 2020; 736: 1-6.
Oladele, J., et al. "*Annona muricata* attenuates cadmium-induced oxidative stress and renal toxicity in Wistar rats." *J. Biosci. Appl. Res*. 2019; 5(4): 543-550.
Olakunle, S., "Toxicity, anti-lipid peroxidation, *in vitro* and *in vivo* evaluation of antioxidant activity of *Annona muricata* ethanol stem bark extract." *Am. J. Life Sci.* 2014; 2(5): 271-277.
Omale J., et al. "*In vitro* and *in vivo* evaluation of antioxidant activity of *Annona muricata* stem bark extracts in *Rattus norvegicus*." *Plant. Med.* 2015; 81(16).
Padma P, et al. "Effect of alcohol extract of *Annona muricata* on cold immobilization stress

induced tissue lipid peroxidation." *Phytother. Res.* 1997; 11: 326-327.
Park, S., et al. "Antioxidative effects and component analysis of graviola (*Annona muricata*) leaf extract/fractions." *J. Soc. Cosmet. Sci. Korea.* 2017: 43(4): 309-320.
Roduan, M., "*Annona muricata* leaves extracts prevent DMBA/TPA-induced skin tumorigenesis via modulating antioxidants enzymes system in ICR mice." *Biomed. Pharmacother.* 2017 Oct; 94: 481-488.
Sandoval, L., et al. "HPLC determination of flavonoids in fruits of soursop (*Annona muricata* L.) from different plants." *Rev. Fac. Agron*. 2014; 1: 785-800.
Shin, Y., et al. "Antioxidative and cytoprotective effects of *Annona muricata* (graviola) extract for HDF cell damage induced by hydrogen peroxide." *J. Korean. Appl. Sci, Tech.* 2017; 34(3): 568-576.
Simo, M., et al. "Cameroonian medicinal plants belonging to *Annonaceae* family: radical scavenging and antifungal activities." *Nat. Prod. Res.* 2018 Sep; 32(17): 2092-2095.
Son, Y., et al. "Bioefficacy of graviola leaf extracts in scavenging free radicals and upregulating antioxidant genes." *Food Function.* 2016; 7(2): 861-871.
Taiwol, F., et al. "Antimicrobial and antioxidant properties of kaempferol-3-O-glucoside and 1-(4-hydroxyphenyl)-3-phenylpropan-1-one isolated from the leaves of *Annona muricata* (Linn.)." *J. Pharma. Res. Int.* 2019; 26(3): 1-13.
Vit, P., and Santiago, B., "Chemical composition and antioxidant activity of pulp, leaf and seed of Guanabana *Annona muricata* L." *Interciencia* 2014; 39(5): 350-353.
Widyastuti, D., et al. "Antioxidant capacity comparison of ethanolic extract of soursop (*Annona muricata* Linn.) leaves and seeds as cancer prevention candidate." *Bio. Med. Nat. Prod. Chem.* 2017; 6 (1): 1-4.
Zamudio-Cuevas, Y., et al. "The antioxidant activity of soursop decreases the expression of a member of the NADPH oxidase family." *Food Funct.* 2014 Feb; 5(2): 303-9.
Zielinski, A., et al. "The association between chromaticity, phenolics, carotenoids, and *in vitro* antioxidant activity of frozen fruit pulp in Brazil: an application of chemometrics." *J. Food Sci.* 2014 Apr; 79(4): C510-6.

Return to the Rain-Tree Tropical Plant Database File for Graviola