PHYTOCHEMISTRY OF JAMUN (SYZYGIUM CUMINI, MYRTACEAE) AND MEDICINAL PROPERTIES

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Contents

Summary

This chapter introduces to the reader traditional uses of Jamun in the treatment of various human ailments. The emphasis of the chapter is on taxonomic position, distribution, scientific and colloquial nomenclature, phytochemistry, traditional medicinal uses, and recent developments in various preclinical and clinical research of different parts of Jamun. At the end of the chapter, the conclusions give the whole summary of the chapter's contents. Jamun or *Syzygium cumini* (family Myrtaceae) is valued for its sweet fruits and medicinal properties. Jamun is native of India, Bangladesh Ceylon, Pakistan, and Myanmar. Traditionally, Jamun is considered sweet, sour, astringent, acrid, refrigerant, carminative, diuretic, and digestive. Ayurveda prescribes Jamun in the treatment of arthritis, obesity, asthma, bowel spasm, stomach pain, flatulence, diabetes, and dysentery. Jamun is effective in treating fever, leucorrhea, piles, wounds, stomachache, and gastric, dental, skin, and urinary disorders. Several scientific studies have demonstrated that Jamun acts as an antioxidant, antidiabetic, antiallergic, antiretinitis, antipyretic, antidiarrheal, antinociceptive, anticancer, antiobese, antihyperlipidemic, anti-inflammatory, antimicrobial, cardioprotective, gastroprotective, immunomodulant, hepatoprotective, wound healing, diuretic, anthelmintic and radioprotective agent. These medicinal properties of Jamun are due to the presence of alkaloids, anthraquinones, catechins, cardiac glycosides, flavonoids, glycosides, steroids, phenols, tannins, and saponins and numerous bioactive phytochemicals synthesized by its roots, stems, leaves flowers, fruits, and seeds. The beneficial effect of Jamun on various important organs and tissues is due to its ability to increase glutathione, glutathione peroxidase, catalase, and superoxide dismutase and reduce lipid peroxidation and DNA damage triggered by different toxicants, and ionizing radiations. At the molecular level, Jamun activates PPARα, PPARγ, fatty acid, and glucose metabolism and suppresses NF-κB, IL-6, COX-1, COX-2, ICAM-1, CXCL2, iNOS, TNF-α, and Bax. Despite several salubrious effects, Jamun induces adverse effects in certain conditions, which can be neutralized by consuming common salt and *Piper nigram*.

1. General Introduction

Plants have been used to treat different human ailments since the advent of human civilization. In India, the history of the use of plants and natural products for the treatment of different diseases is more than 5000 years old. The Atharva Veda mentions

the use of 50 plants and the Ayurveda is considered an offshoot of Atharva Veda. Ayurveda gives a detailed description of the medicinal uses of several plants/natural products. Plants are a rich source of medicines and the medicinal properties of plants are due to their ability to synthesize numerous secondary metabolites. The number of phytochemicals synthesized by plants is approximately 326,000 out of which 195,000 are pharmacologically active and have great potential as a future medicine. Seventy-five percent of modern medicines have been derived either directly from plants/natural sources or have contributed immensely to their chemical synthesis.

Plants/natural product-derived molecules have been instrumental in the treatment of cancer, infectious, psychiatric, tropical, immune, kidney, and inflammatory diseases. Synthetic chemical drugs, including antibiotics and cancer chemotherapeutics, are associated with the development of therapeutic resistance. The plant/natural products may be helpful in this regard. The interest in natural products has seen a resurgence due to economical reasons and lesser toxic implications when compared to synthetic drugs. There are a vast number of plant/natural products that remain unexplored for therapeutic purposes. The importance of natural products in drug discovery becomes evident from the fact that the FDA approved 547 drugs derived from natural products or their derivatives in the year 2013. Therefore, natural products will continue to play a crucial role in the discovery of newer medicines in the future.

2. Profile of Jamun

To facilitate understanding in different circles, scientific and common, the scientific names and common names are listed in Table 1.

Scientific names	Common names
Syzygium cumini (L.) Skeels,	Indian blackberry,
Syzygium jambolana (Lam.) DC.,	Black plum, jambolan,
Syzygium jambolanum DC.,	java plum, purple plum,
Syzygium caryophyllifolium (Lam.) DC.,	Malabar plum,
Calyptranthes oneillii Lundell,	Jambul, jamblang,
Calyptranthes jambolana Willd.	Damson plum,
Eugenia cumini Druce,	Duhat plum,
Eugenia caryophyllifolia Lam.,	Jambolan plum,
Eugenia jambolana Lam.,	Rose-apple or Portuguese plum (in English)
Eugenia djouat Perr. and	
Myrtus cumini L.	

Table 1. Names of Jamun- scientific and common

Likewise, the names of Jamun in different Indian languages are given in Table 2.

Names in different languages of India	
Language	**Name(s)**
Assamese	Jamu or kala jamu
Bengali	Kala jam
Gujrati	Jambu, and jaambu
Hindi	Jamun, jaman duhat or jam
Kannada	Nerale hannu, jambunerale, jumnerale, nainerale, jambuva, naayinaerale and neeram
Malayalam	Gnaval, naga, naivil, palamper, perinnaralnjara, njaval, perin-njara, and naval-pazham
Manipuri	Gulamchat or jam
Marathi	Jam, jaman, jambul, rajale, rajjambula and thorajambula
Mizo	Hmuipui or Lenhmui
Oriya	Jamkoli
Pali	
Prakrit	Jambulo, and jammulo
Punjabi	Jaman
Sanskrit	Jambu, jambuphalam, phalendra, raja-jambuh, mahaskandha, or meghamodini
Tamil	Areconitamaram, arugadam, arukatam, caccanam, cattuvalam, nampu, neretu, kavarkalimaram, turavam, and turkolum
Tangkhul	Chomshathei
Telugu	Goyya-pandu, jam-pandu, jamba, jambu, naredu and raacahnaeredu
Urdu	Jaman, jamun and poast jamun

Table 2. Names of Jamun in Different Indian Languages

Furthermore, the names in other countries are listed in Table 3.

Country	Name(s)
Brazil	Azeitona, jambol, jambulao, jamelao and jalao
Cambodia	Pring bai
Cook Islands	Ka'ika and pistati
Cook Islands (Aitutaki)	Paramu
Fiji	Kavika ni India and jammun
France	Jamélongue, jambolanier, jamelongier, faux-pistachier and jamelon-guier
Germany	Jambolanapflaume, rosenapfel and wachsjambuse
Guam	Duhat

Indonesia	Duwet and jamblang
Italy	Pomo della malesia
Jamaica	Damson plum
Jamaica	Indian blackberry
Japan	Madan
Kenya	Msambarau and mzambarau
Madagascar	Rotra
Malaysia	Jambolan, jambulana, jiwat and obah
Myanmar	Thabyay-hypyoo
Nepal	Jaamun, kaalo jaamun, phanir, jaambu and jamunaa
New Caledonia	Jamelonguier
Palau	Mesekerrak and mesigerak
Philippines	Duhat and lomboi
Portugal	Jamboleiro and jambolão
Spain (Spanish)	Sitsigiui dzhamboza in Russia, Guayabo pesgua and yambolana
Sri Lanka	Jambu, jambul, madan and naval
Surinam	Koeli, jamoen and druif
Sweden	Jambolanäpplein
Tanzania	Msambarau and mzambarau
Thailand	Lukwa, ma-ha, hakhiphae, and wa
Tibet	Dza mbu, dzam-bu, and ka ka dz mbu
Uganda	Msambarau and mzambarau
Venezuela	Guayabo pesjua and pesjua extranjera
Vietnam	Va in Laos; Trâm môc, and voi rung
West Indies	Jambol

Table 3. Names of Jamun in different other countries

3. Botanical Description

Jamun has been classified scientifically (Taxonomy) into

Kingdom: Plantae;
Division: Magnoliophyta;
Class: Magnoliopsida;
Order: Myrtales;
Family: Myrtaceae;
Genus: *Syzygium*; and
Species: *cumini*.

Jamun abundantly grows in the Indian subcontinent including India, Pakistan, Bangladesh, Myanmar, Ceylon and Madagascar. It grows well in loamy, deep and well-drained soils. Jamun has been introduced into different parts of the world including the United States of America for its fruits and timber. It is also grown in Algeria, California, Israel and West Indies.

Figure 1. The whole tree of Jamun, *Syzygium cumini* in its natural habitat.

Jamun is a fast-growing tree, which becomes fully grown in 40 years and reaches up to a height of 100 feet (30 m). It may spread up to 36 feet (11 m) with a trunk diameter of 2-3 feet (0.6-0.9 m) (Figure 1). It forks into multiple branches at a short distance from the ground and its stem bark is rough, cracked, flaking, and discolored at the lower end and becomes smooth and light gray at higher levels (Figure 2). The leaves are opposite, 2 to 10 inches (5-25 cm) long, 1 to 4 in (2.5-10 cm) wide, oblong-oval or elliptical in shape, blunt or tapering to a point at the apex (Figure 3). The young leaves are pink colored and become leathery, glossy, dark green above, lighter beneath, with yellowish midrib when fully matured having a turpentine smell (Figure 3). Jamun flowers during March-April, which are scented, 1 to 4 inches long (2.5-10 cm) in clusters of a few or 10 to 40 round to oblong in shape, 1/2 inch (12-.7 mm) wide with funnel-shaped 0.16 inch (4 mm) long and toothed calyx. The petals are 4 to 5 united as a small disk (Figure 4). The flowers are greenish-white at first and become rose pink later. The Jamun bears fruits in clusters during summer and ripens in June-July. The cluster may contain a few fruits to as many as 10 or even 40 in number. The fruits are round to oblong in shape and the size varies between 1/2 to 2 inches (1.2 to 5 cm). The fruits are initially green-colored and turn from light to dark purple or even black-colored once fully ripened (Figure 5). The fruits of Jamun taste sweetish sour and eating Jamun fruits tends to color the tongue purple. Jamun seeds are oblong, whitish purple that turns brown after drying (Figure 6).

The Jamun tree is considered holy by Hindus and Buddhists and is commonly planted in the compounds of Hindu temples. Jamun is dear to Lord Krishna and the leaves and fruits of Jamun are offered to Lord Ganesha (Elephant God) during worship; in addressing this diety a Sanskrit Shloka even refers to Him as a lover of Jamun fruit essence (*Jamboo phala saara bhakshitam*).

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Bibliography

Abdalla FH, Belle LP, Bitencourt PER, De Bona KS, Zanette RA, Boligon AA, Athayde ML, Pigatto AS, Moretto MB (2011) Protective effects of *Syzygium cumini* seed extract against methylmercury-induced sistemic toxicity in neonatal rats. *BioMetals* 24:349–356. https://doi.org/10.1007/s10534-010-9402-5. [This article reports the protective effect of Jamun seeds against mercury-induced toxicity]

Abedin F, Hussain MS, Islam A, Das A ,Kar A,Hossain MM,Millat MS, Islam MS (2018) Thrombolytic, CNS depressant and anti-diarrhoeal activities of ethanolic extract of bark of *Syzygium cumini* L. Skeels: An in-vivo and in-vitro study. *J Pharm Nutr Sci* 8:129–136. https://doi.org/10.6000/1927-5951.2018.08.03.7. [This article reports the protective effect of Jamun stem bark against the overactive central nervous system and treatment of diarrhea]

Afify AE-MR, Fayed SA, Shalaby EA, El-Shemy HA (2011) *Syzygium cumini* (pomposia) active principles exhibit potent anticancer and antioxidant activities. *African J Pharm Pharmacol* 5:948–956.

https://doi.org/10.5897/AJPP10.420. [This article reports the anticancer activity of Jamun fruits against AML cells extracted from patients]

Alikatte KL, Akondi BR, Yerragunta VG, Veerareddy PR, Palle S (2012) Antiamnesic activity of *Syzygium cumini* against scopolamine induced spatial memory impairments in rats. *Brain Dev* 34:844–851. https://doi.org/10.1016/j.braindev.2012.02.008. [This article describes the protective effect of Jamun fruits against Alzheimer's disease]

Alyas S, Zahra N, Zahid N, Rafique A, Hayat S, Yasin I, Shahbaz M, Zahid A, Ilyas, A, Ahmad S, Khan, R (2020) Anti-inflammatory, antipyretic and analgesic activities of ethanol extract of *Eugenia jambolana* Lam. *Int J Biosci* 16:506–511. http://dx.doi.org/10.12692/ijb/16.3.493-498. [The authors report the antipyretic, anti-inflammatory and analgesic activities of Jamun leaves]

Aqil F, Gupta A, Munagala R, Jeyabalan J, Kausar H, Sharma RJ, Singh IP, Gupta RC (2012) Antioxidant and antiproliferative activities of anthocyanin/ellagitannin- enriched extracts from *Syzygium cumini* L. (Jamun, the Indian Blackberry). *Nutr Cancer* 64:428–438. https://doi.org/10.1080/01635581.2012.657766. [The article describes the antioxidant and anticancer activities of Jamun fruit pulp and seeds]

Aqil F, Jeyabalan J, Munagala R, Singh IP, Gupta RC (2016) Prevention of hormonal breast cancer by dietary jamun. *Mol Nutr Food Res* 60:1470–1481. https://doi.org/10.1002/mnfr.201600013. [This article reports the chemopreventive effect of Jamun fruit against estradiol-induced mammary tumors]

Archana N, Ramasamy M, David Raj C (2012) Pharmacological screening of ethanolic extract of *Syzygium cumini* seed on isolated smooth muscle strip and heart. *Int J Pharm Pharm Sci* 4:108–110. [This article gives an account of the antispasmodic effect of Jamun seeds]

Artanti N, Maryani F, Triana Dewi R, Meilawati L, Filaila E, Udin LZ (2019) In vitro antidiabetic, antioxidant and cytotoxic activities of *Syzygium cumin*i fractions from leaves ethanol extract. *Indones J Cancer Chemoprevent* 10:24–29. https://www.ijcc.chemoprev.org/index.php/ijcc/article/view/262/178 [This article reports the antioxidant, antidiabetic and cytotoxic effects of Jamun leaves]

Arun R, Prakash MVD, Abraham SK, Premkumar K (2011) Role of *Syzygium cumini* seed extract in the chemoprevention of in vivo genomic damage and oxidative stress. *J Ethnopharmacol* 134:329–333. https://doi.org/10.1016/j.jep.2010.12.014. [The article reports the protective effect of Jamun seeds against DMBA-induced chromosome damage]

Assis KS, Araújo IGA, de Azevedo FDLAA, Maciel PMP, Machado Calzerra NT, da Silva TAF, Assis VL, de Vasconcelos AP, Santos CAG, Meireles BRLA, Cordeiro AMTM, Araújo DAM, Ribeiro TP, Medeiros IA (2018) Potassium channel activation is involved in the cardiovascular effects induced by freeze dried *Syzygium jambolanum* (Lam.) DC Fruit Juice. *Biomed Res Int* 2018:4827461. https://doi.org/10.1155/2018/4827461. [The article reports the protective effect of Jamun fruits against cardiac damage]

Atale N, Chakraborty M, Mohanty S, Bhattacharya S, Nigam D, Sharma M, Rani V (2013) Cardioprotective role of *Syzygium cumini* against glucose-induced oxidative stress in H9C2 cardiac myocytes. *Cardiovasc Toxicol* 13:278–289. https://doi.org/10.1007/s12012-013-9207-1. [The article reports the protective effect of Jamun seeds against cardiac damage in vitro]

Ávila-Peña D, Peña N, Quintero L, Suárez-Roca H (2007) Antinociceptive activity of *Syzygium jambos* leaves extract on rats. *J Ethnopharmacol* 112:380–385. https://doi.org/10.1016/j.jep.2007.03.027. [The article reports the pain relieving effect of Jamun leaves]

Ayya N, Nalwade V, Khan TN (2015) Effect of jamun (*Syzygium cumini* L.) seed powder supplementation on blood glucose level of type-II diabetic subject. *Food Sci Res J* 6:353–356. https://doi.org/10.15740/has/fsrj/6.2/353-356. [The article reports the antidiabetic effect of Jamun seed in clinical conditions in humans]

Ayyanna C, Sekar M, Niranjan R, Veera P (2015) Nephrotoxic effect of ethanolic extract of *Syzygium cumini*. Linn leaves on experimental animals. *Int J Biol Pharm Res* 6:678–683. [The article reports the safety of Jamun leaves in rats]

Azam A, Saeed I, Saleem M, Azam T (2020) Evaluation of anthelmintic activity of different fractions of *Syzygium cumini* L. leaves. *Fuuast J Biol* 10:51–55. [This article describes the anthelmintic activity of Jamun leaves]

Balakrishna G, Sowmya K, Bollapalli V, Rao M (2016) Anti-allergic studies of *Albizzia lebbeck* and *Syzygium cumini* (L- *Syzygium gambolana*). *Open Access J Microbiol Biotechnol* 1:000103. https://doi.org/10.23880/oajmb-16000103. [The article reports the antiallergic effect of Jamun root]

Balyan U, Sarkar B (2017) Aqueous extraction kinetics of phenolic compounds from jamun (*Syzygium cumini* L.) seeds. *Int J Food Prop* 20:372–389. https://doi.org/10.1080/10942912.2016.1163266. [This article is about the isolation of chemical molecules from Jamun seeds]

Banerjee J, Narendhirakannan R (2011) Phytochemical analyses, antibacterial, in vitro antioxidant and cytotoxic activities of ethanolic extract of *Syzygium cumini* (L.) seed extract. *Int J Pharmaceut Sci Res* 2:1799–1806. http://dx.doi.org/10.13040/IJPSR.0975-8232.2(7).1799-06 [The article reports the separation of chemical molecules antibacterial and antioxidant activities of Jamun seeds]

Banu H, Jyothi A (2016) Hypoglycemic and hypo-cholesterolemic effect of *Eugenia Jambolana* (Kala Jamun) spicy mix on type II diabetic subjects. *Imp J Interdiscip Res* 2:850–857. [The article reports the antidiabetic effect of Jamun roasted seed in clinical conditions in humans]

Barai M, Ahsan N, Paul N, Hossain K, Abdur Rashid M, Kato M, Ohgami N, Azim Akhand A (2017) Amelioration of arsenic-induced toxic effects in mice by dietary supplementation of *Syzygium cumini* leaf extract. *Nagoya J Med Sci* 79:167–177. https://doi.org/10.18999/nagjms.79.2.167. [The article describes the protective effect of Jamun leaves against arsenic-induced toxicity]

Behera SR, Sekkizhar M, Babu SK (2014) Nephro-protective effect of aqueous extract of *Syzygium cumini* seed on streptozotocin induced diabetes in rats. *Int J Chem Lifesciences* 3:1285–1288. [The article describes the protective effect of Jamun seeds against kidney toxicity]

Borges RM, Bitencourt PER, Stein CS, Bochi GV, Boligon A, Moresco RN, Moretto MB (2017) Leaves and seeds of *Syzygium cumini* extracts produce significant attenuation of 2,2 azobis-2-amidinopropane dihydrochloride-induced toxicity via modulation of ectoenzymes and antioxidant activities. *J Appl Pharm Sci* 7:037–048. https://doi.org/10.7324/JAPS.2017.70606. [The article describes the free radical scavenging activity of Jamun leaves and seeds]

Cargnelutti LO, Bitencourt PER, Bochi G, Duarte T, Boligon A, Pigatto AS, Athayde, ML, Moresco RN, Moretto MB (2015) *Syzygium cumini* leaf extract protects against ethanol-induced acute injury in rats by inhibiting adenosine deaminase activity and proinflammatory cytokine production. *Res J Phytochem* 9:56–67. https://scialert.net/abstract/?doi=rjphyto.2015.56.67 [The article reports the protective effect of Jamun leaves against an overactive central nervous system]

Chandravarkar S, Desai SN (2014) Diuretic activity of different extracts of bark of *Syzygium cumini* (Linn.) Skeels. *Int J Res Ayurveda Pharm* 5:102–104. https://doi.org/10.7897/2277-4343.05121 [This article reports the diuretic activity of Jamun stem bark]

Chanudom L, Tangpong J (2015) Anti-inflammation property of *Syzygium cumini* (L.) Skeels on indomethacin-induced acute gastric ulceration. *Gastroenterol Res Pract* 2015:343642. https://doi.org/10.1155/2015/343642. [The article reports the anti-inflammatory and gastroprotective effects of Jamun leaves]

Charepalli V, Reddivari L, Vadde R, Walia S, Radhakrishnan S, Vanamala JK (2016) *Eugenia jambolana* (Java plum) fruit extract exhibits anti-cancer activity against early stage human HCT-116 colon cancer cells and colon cancer stem cells. *Cancers (Basel)* 8:29. https://doi.org/10.3390/cancers8030029. [The article reports the anticancer effects of Jamun fruits]

Chaudhary A, Bag S, Banerjee P, Chatterjee J (2020) Wound healing efficacy of Jamun honey in diabetic mice model through reepithelialization, collagen deposition and angiogenesis. *J Tradit Complement Med* 10:529–543. https://doi.org/10.1016/j.jtcme.2019.10.002. [The article reports the wound healing effect of Jamun honey]

Das A, Bharath M, Jeevanantham M, Kumar SM (2018) Phytochemical screening and antimicrobial activity of *Syzygium cumini* (Jamun) seed extract. *Res J Pharm Technol* 11:4096–4100.

https://doi.org/10.5958/0974-360X.2018.00752.7. [The article reports the phytochemical screening and antimicrobial effects of Jamun seeds]

Dias CN, Rodrigues KAF, Carvalho FAA, Carneiro SM, Maia JG, Andrade EH, Moraes DF 2013) Molluscicidal and leishmanicidal activity of the leaf essential oil of *Syzygium cumini* (L.) skeels from Brazil. *Chem Biodivers* 10:1133–1141. https://doi.org/10.1002/cbdv.201200292. [The article reports the killing effects of Jamun leaf oil on Leishmania]

Donepudi AC, Aleksunes LM, Driscoll MV, Seeram NP, Slitt AL (2012) The traditional ayurvedic medicine, *Eugenia jambolana* (Jamun fruit), decreases liver inflammation, injury and fibrosis during cholestasis. *Liver Int* 32:560–573. https://doi.org/10.1111/j.1478-3231.2011.02724.x. [The article reports the protective effect of Jamun fruits against liver injury]

Ezekiel U, Heuertz R (2015) Anti-inflammatory effect of *Syzygium cumini* on chemotaxis of human neutrophils. *Int J Pharmacogn Phytochem Res* 7:714–717. [The article reports the anti-inflammatory effect of Jamun seeds]

Ezhilarasan D, Apoorva VS, Ashok Vardhan N (2019) *Syzygium cumini* extract induced reactive oxygen species-mediated apoptosis in human oral squamous carcinoma cells. *J Oral Pathol Med* 48:115–121. https://doi.org/10.1111/jop.12806. [The article reports the anti-inflammatory effect of Jamun seeds]

França LM, Coêlho CFF, Freitas LNC, Souza ILS, Chagas VT, Debbas V, de Lima TM, de Souza HP, Laurindo FRM, Paes AMA (2019) *Syzygium cumini* leaf extract reverts hypertriglyceridemia via downregulation of the hepatic xbp-1s/pdi/mtp axis in monosodium l-glutamate-induced obese rats. *Oxid Med Cell Longev* 2019:9417498. https://doi.org/10.1155/2019/9417498. [The article reports the antiobesity effect of Jamun leaf]

Frauches NS, Montenegro J, Amaral T, Abreu JP, Laiber G, Junior J, Borguini R, Santiago M, Pacheco S, Nakajima VM, Godoy R, Teodoro AJ (2021) Antiproliferative activity on human colon adenocarcinoma cells and in vitro antioxidant effect of anthocyanin-rich extracts from peels of species of the Myrtaceae family. *Molecules* 26:564. https://doi.org/10.3390/molecules26030564. [The article reports the anticancer activity of anthocyanin-rich extracts from Jamun fruit peel]

Gajera HP, Gevariya SN, Hirpara DG, Patel SV, Golakiya BA (2017) Antidiabetic and antioxidant functionality associated with phenolic constituents from fruit parts of indigenous black jamun (*Syzygium cumini* L.) landraces. *J Food Sci Technol* 54:3180–3191. https://doi.org/10.1007/s13197-017-2756-8. [The article reports the antidiabetic and antioxidant effects of Jamun fruits]

Ghareeb MA, Hamed MM, Abdel-Aleem AAH, Saad AM, Abdel-Aziz MS, Hadad A (2017) Extraction, isolation, and characterization of bioactive compounds and essential oil from *Syzygium jambos*. *Asian J Pharm Clin Res* 10:194–200. https://doi.org/10.22159/ajpcr.2017.v10i8.18849. [The article reports the isolation of active chemical molecules and essential oils from Jamun leaves]

Gibbert L, Sereno AB, Andrade MTP de, da Silva MAB, Miguel MD, Montruchhio DB, de Messias-Reason, Dantas AM, Borges G da-SC, Miguel OG, Krueger CCH, Dias Jd-DG (2021) Nutritional composition, antioxidant activity and anticancer potential of *Syzygium cumini* (L.) and *Syzygium malaccense* (L.) fruits. *Res Soc Dev* 10:e5210413743. https://doi.org/10.33448/rsd-v10i4.13743. [The article reports the anticancer activity of effect of Jamun fruits on non-small cell lung cancer cells]

Hanif MU, Hussain AI, Aslam N, Kamal GM, Chatha SAS, Shahida S, Khalid M, Hussain R (2020) Chemical composition and bioactivities of essential oil from leaves of *Syzygium cumini* (L.) Skeels native to Punjab, Pakistan. Chem *Biodivers* 17:e1900733. https://doi.org/10.1002/cbdv.201900733. The article reports the isolation of active chemical molecules and essential oils from Jamun leaves]

Haque R, Sumiya MK, Sakib N, Sarkar OS, Siddique TTI, Hossain S, Islam A, Parvez AK, Talukder AA, Dey SK (2017) Antimicrobial activity of jambul (*Syzygium cumini*) fruit extract on enteric pathogenic bacteria. *Adv Microbiol* 7:195–204. https://doi.org/10.4236/aim.2017.73016. [This article deals with the antimicrobial activity of Jamun fruits]

Helmstädter A (2008) *Syzygium cumini* (L.) Skeels (Myrtaceae) against diabetes - 125 Years of research. *Pharmazie* 63:91–101. https://doi.org/10.1691/ph.2008.7335. [The review article gives an account of antidiabetic effects of Jamun]

Hossain S, Islam J, Bhowmick S, Haque M, Rahaman A (2017) Effects of *Syzygium cumini* seed extract on the memory loss of Alzheimer's disease model rats. *Adv Alzheimer's Dis* 06:53–73. https://doi.org/10.4236/aad.2017.63005. [The article reports the protective effect of Jamun seeds on Alzheimer's disease]

Ima RM, Polonini HC, Brandão MA, Raposo FJ, Raposo NR, Dutra RC (2019) In vitro assessment of anti-aging properties of *Syzygium cumini* (l.) leaves extract. *Biomed J Sci Tech Res* 13:10185–10191. https://doi.org/10.26717/BJSTR.2019.13.002447. [The article reports the antiaging effect of Jamun leaves]

Islam R, Parvin S, Islam E (2011) Antioxidant and hepatoprotective activity of an ethanol extract of *Syzygium jambos* (L.) leaves. *Drug Discov Ther* 6:205–211. https://doi.org/10.5582/ddt.2012.v6.4.205. [The article reports antioxidant and hepatoprotective action of Jamun leaves]

Jagetia GC (2017) Phytochemical Composition and Pleotropic Pharmacological Properties of Jamun, *Syzygium Cumini* Skeels. *J Explor Res Pharmacol* 2:54–66. https://doi.org/10.14218/jerp.2016.00038. [This reviews article gives an account of different activities of Jamun up to 2017]

Jagetia GC (2018) A review on the role of jamun, *Syzygium cumini* skeels in the treatment of diabetes. *Int J Complement Altern Med* 11:91–95. https://doi.org/10.15406/IJCAM.2018.11.00374. [The review article gives an account of antidiabetic effects of Jamun]

Jagetia GC, Baliga MS (2004) The evaluation of nitric oxide scavenging activity of certain Indian medicinal plants in vitro: A preliminary study. *J Med Food* 7(3):343-348. https://doi.org/10.1089/jmf.2004.7.343. [The article reports nitric oxide scavenging action effect of Jamun leaves]

Jagetia GC, Baliga MS (2002) *Syzygium cumini* (Jamun) reduces the radiation-induced DNA damage in the cultured human peripheral blood lymphocytes: A preliminary study. *Toxicol Lett* 132:19–25. https://doi.org/10.1016/S0378-4274(02)00032-2. [The article reports radioprotective effect of Jamun leaves by micronucleus assay in cultured human peripheral blood lymphocytes]

Jagetia GC, Baliga MS (2003) Evaluation of the radioprotective effect of the leaf extract of *Syzygium cumini* (Jamun) in mice exposed to a lethal dose of γ-irradiation. *Nahrung - Food* 47:181–185. https://doi.org/10.1002/food.200390042. [The article reports radioprotective effect of Jamun leaves in mice]

Jagetia GC, Baliga MS, Venkatesh P (2005) Influence of seed extract of *Syzygium cumini* (Jamun) on mice exposed to different doses of γ-radiation. *J Radiat Res* 46:59–65. https://doi.org/10.1269/jrr.46.59. [The article reports radioprotective effect of Jamun seeds in mice]

Jagetia GC, Shetty PC (2016) Augmentation of antioxidant status in the liver of Swiss albino mice treated with Jamun (*Syzygium cumini*, Skeels) extract before whole body exposure to different doses of γ-radiation. *J Adv Res Biotechnol* 1:1–13. https://doi.org/10.15226/2475-4714/1/1/00110. [The article reports an increase in the antioxidant enzymes by Jamun leaves after γ-irradiation]

Jagetia GC, Shetty PC, Vidyasagar MS (2008) Treatment of mice with leaf extract of Jamun (*Syzygium cumini* Linn. Skeels) protects against the radiation-induced damage in the intestinal mucosa of mice exposed to different doses of γ-radiation. *Pharmacologyonline* 1:169–195. https://pharmacologyonline.silae.it/files/archives/2008/vol1/18_Ganesh.pdf. [The article reports the radioprotective effect of Jamun leaves on the small intestine of mice after γ-irradiation]

Jagetia GC, Shetty PC, Vidyasagar MS (2012) Inhibition of radiation-induced DNA damage by jamun, *Syzygium cumini*, in the cultured splenocytes of mice exposed to different doses of γ-radiation. *Integr Cancer Ther* 11:141–153. https://doi.org/10.1177/1534735411413261. [The article reports the radioprotective effect of Jamun leaves by micronucleus assay in cultured splenocytes of mice whole body exposed to γ-radiation]

Kayser MS, Nath R, Khatun H, Rashid MA (2019) Peripheral analgesic and anti-diarrheal activities of leaf of *Syzygium cumini* (L.) Skeel. *Bangladesh Pharm J* 22:13–17. https://doi.org/10.3329/bpj.v22i1.40020. [The article reports the antidiarrheal and pain relieving activities of Jamun leaves]

Kazmi SAJ, Riaz A, Akhter N, Khan RA (2020) Evaluation of wound healing effects of *Syzygium cumini* and laser treatment in diabetic rats. *Pak J Pharm Sci*. 33(2):779–786. https://doi.org/10.36721/PJPS.2020.33.2.SUP.779-786.1. [This article describes wound healing action of Jamun seeds]

Khan MS, Abul Qais F, Ahmad I, Hussain A, Alajmi MF (2018) Genotoxicity inhibition by: *Syzygium cumini* (L.) seed fraction and rutin: Understanding the underlying mechanism of DNA protection. *Toxicol Res (Camb)* 7:156–171. https://doi.org/10.1039/c7tx00269f. [This article describes the antimutagenic and antigenotoxic actions of Jamun seeds]

Khodavirdipour A, Zarean R, Safaralizadeh R (2021) Evaluation of the anti-cancer effect of *Syzygium cumini* ethanolic extract on HT-29 colorectal cell line. *J Gastrointest Cancer* 52:575–581. https://doi.org/10.1007/s12029-020-00439-3. [This article describes the anticancer activity of Jamun fruit on colon cancer cells]

Kumar EK, Mastan SK, Reddy KR, Reddy GA, Raghunandan N, Chaitanya G (2008) Anti-arthritic property of the methanolic extract of *Syzygium cumini* seeds. *Int J Integr Biol* 4:55–62. [This article reports the antiarthritic action of Jamun seeds]

Kumar M, Thakur R, Kumar S (2019) Comparative efficacy of *Syzygium cumini* seed extracts in alleviating arsenic-induced hepatotoxicity and blood cell genotoxicity in Wistar albino rats. *Biomed Pharmacol J* 12:1329–1238. [This article reports the protective effect of Jamun seeds against arsenic-induced liver toxicity and genotoxicity in rat blood lymphocytes]

Lichota A, Gwozdzinski K (2018) Anticancer activity of natural compounds from plant and marine environment. *Int J Mol Sci* 19:3533. https://doi.org/10.3390/ijms19113533. [This article is about natural products and their role in the development of anticancer agents]

Mani A, Chandra B, Viswavidyalaya K (2020) Flowering, Fruiting and Physio-chemical properties of Jamun (*Syzygium cumini* Skeels) grown in Nadia district of West Bengal. *Adv Biores* 11:01–05. https://doi.org/10.15515/abr.0976-4585.11.5.15. [This article gives an account about the flowering and other properties of Jamun]

Mastan S, Saraseeruha A, Gourishankar V, Chaitanya G, Raghunandan N, Reddy GA, Kumar K (2008) Immunomodulatory activity of methanolic extract of *Syzygium cumini* seeds. *Pharmacologyonline* 3:895–903. https://pharmacologyonline.silae.it/files/archives/2008/vol3/093_Mastan.pdf [This article is about the immunomodulatory action of Jamun seeds]

Monteiro F de S, Carvalho AFS, Marques E de C, Ribeiro RM, Borges ACR, Borges MDR (2018) Antidiarrhoeal and antispasmodic activity of leaves of *Syzygium cumini* L. (Myrtaceae) mediated through calcium channel blockage. *African J Pharm Pharmacol* 12:11–18. https://doi.org/10.5897/ajpp2017.4868. [This article reports the antispasmodic effect of Jamun seed on the rat jejunum and uterus]

Monteiro FS, Carvalho AFS, Ribeiro RM, Borges ACR, Borges MOR (2020) Phytochemical profile and investigation of the spasmolytic activity of hydroalcoholic extract of *Syzygium cumini* (L.) Skeels seeds. *European J Med Plants* 31:27–38. https://doi.org/10.9734/ejmp/2020/v31i330220. [This article reports the phytochemical analysis and antispasmodic effect of Jamun seed on the rat jejunum and uterus]

Nawadkar AD, Jain BU (2021) In-vitro anticancer activity of ethanolic extract of *Syzygium cumini* leaves. *World J Pharm Res* 10:1252–1257. [This article describes the anticancer activity of Jamun leaves on colon cancer cells]

Newman DJ, Cragg GM (2020) Natural products as sources of new drugs over the nearly four decades from 01/1981 to 09/2019. *J Nat Prod* 83:770–803. https://doi.org/10.1021/acs.jnatprod.9b01285. [This article is an account of drug development from natural products]

Nikhat F (2020) Total synthetic development and pharmacological screening of bioactive isolated from *Syzygium cuminii* (L) skeel. *Biointerface Res Appl Chem* 10:6550–6564. https://doi.org/10.33263/BRIAC105.65506564. [This article reports the isolation of chemical molecules from Jamun roots]

Nikhat F, Satyanarayana D, Suresh D, Purohit MG, Raza H, Hamza SM (2011) Analgesic activity of the isolated constituent *Syzygium cuminii* (L) skeel. Res J Pharmacogn Phytochem 3:178–179. [This article describes the pain relieving action of Jamun roots]

Nishandhini S, Sudha V, Mallavarapu GR, Murugan R (2015) Chemical compositions, α-amylase inhibitory and antioxidant activities of the essential oils from unripe fruit pulp and leaves of *Syzygium cumini*. *Int J Pharm Pharm Sci* 7:511–514. [This article reports the isolation of chemical molecules from Jamun fruits and their antioxidant and antidiabetic activities]

Oliveira L, Miranda J, Curado G, Neto JPS, Santos BF, Barros EEL, Louvandini H, Melo FR (2012) In vivo anthelmintic activity of *Syzygium cumini* leaves against *Haemonchus contortus* in sheep. *Planta Med* 78:PI413. https://doi.org/10.1055/s-0032-1321100. [This article reports the anthelmintic effect of Jamun leaves in the sheep]

Pandhi S, Poonia A (2019) Phytochemical screening of Jamun seeds using different extraction methods. *Pharma Innov J* 8:226–231. https://www.thepharmajournal.com/archives/?year=2019&vol=8&issue=2&ArticleId=3022 [The article reports the phytochemical analysis of Jamun seed]

Parmar J, Sharma P, Verma P, Goyal PK (2010) Chemopreventive action of *Syzygium cumini* on DMBA-induced skin papillomagenesis in mice. *Asian Pac J Cancer Prev* 11:261–265. [The article describes the chemopreventive action of Jamun seed on DMBA induced skin carcinogenesis]

Parmar J, Verma P, Sharma P, Goyal PK (2011) Elimination of deleterious effects of DMBA-induced skin carcinogenesis in mice by *Syzygium cumini* seed extract. *Integr Cancer Ther* 10:289–297. https://doi.org/10.1177/1534735410385112. [The article describes the chemopreventive action of Jamun fruit pulp on DMBA induced skin carcinogenesis]

Parveen S, Khan AA, Khan QA (2021) Antihyperlipidemic effect of seeds of jamun (*Eugenia jambolana*) in subjects of intermediate hyperglycemia: A pilot study. *Tradit Integr Med* 5:191–197. https://doi.org/10.18502/tim.v5i4.5164. [The article describes the antihyperlipidemic action of Jamun seed]

Patridge E, Gareiss P, Kinch MS, Hoyer D (2016) An analysis of FDA-approved drugs: Natural products and their derivatives. *Drug Discov Today* 21:204–207. https://doi.org/10.1016/j.drudis.2015.01.009. [This article is about the approval of the drugs of natural products]

Prasad M, Venugopal SP, Alagarsamy V, Sridevi C (2016) The preliminary phytochemical analysis and oral acute toxicity study of stem bark of *Syzygium cumini*. *Int J Pharm Pharm Sci* 8:209–213. [The article describes the safety evaluation and phytochemical analysis of Jamun seed]

Priya S, Devi P, Madeswaran A (2013) In silico docking studies of RP2 (X-Linked *retinitis pigmentosa*) protein using anthocyanins as potential inhibitors. *Bangladesh J Pharmacol* 8:292–299. [The article describes the antiretinitis action of Jamun anthocynins]

Qamar M, Akhtar S, Ismail T, Yuan Y, Ahmad N, Tawab A, Ismail A, Barnard RT, Cooper MA, Blaskovich MAT, Ziora ZM (2021) *Syzygium cumini* (L.), Skeels fruit extracts: In vitro and in vivo anti-inflammatory properties. *J Ethnopharmacol* 271:113805. https://doi.org/10.1016/j.jep.2021.113805. [The article describes the antiinflammatory action of Jamun fruits]

Rahaman A, Hossain S, Rahman M, Hossain I, Nahar T, Uddin B, Khalil (2013) *Syzygium cumini* (L.) seed extract improves memory related learning ability of old rats in eight arm radial maze. *J Pharmacogn Phytochem* 1:85–94. [The article reports the memory enhancing ability of Jamun seeds]

Raza A, Butt MS, Iahtisham-Ul-Haq, Suleria HAR (2017) Jamun (*Syzygium cumini*) seed and fruit extract attenuate hyperglycemia in diabetic rats. *Asian Pac J Trop Biomed* 7:750–754. https://doi.org/10.1016/j.apjtb.2017.07.006. [The article reports the antidiabetic action of Jamun seeds and fruits]

Raza A, Usman Ali M, Akram MN, Wazir I, Sharif MN (2015) Antihypercholesterolemic role of ethanolic extract of jamun (*Syzygium cumini*) fruit and seed in hypercholesterolemic rats. *Am J Agric Environ Sci* 15:1012–1018. [The article reports the cholesterol reduction activity of Jamun seeds and fruits]

Rehman AA, Riaz A, Asghar MA, Raza ML, Ahmed S, Khan K (2019) In vivo assessment of anticoagulant and antiplatelet effects of Syzygium cumini leaves extract in rabbits. *BMC Complement Altern* 19(1):236. doi: 10.1186/s12906-019-2661-y. [The article reports the anticoagulating action of Jamun leaves]

Riaz MN, Sajid MI, Jamshaid M, Khan G, Shahzad M, Majeed I, Siddique FA, Alvi N, Bashir I (2014) An in vitro study on *Eugenia jambolana* plant extract in isolated rabbit ilium showing spasmolytic effects. *Can J Appl Sci* 3:01–16. doi.org/10.21065/19257430.4.1. [The article reports the antispasmodic action of Jamun seeds and fruits]

Rodrigues KADF, Amorim LV, Dias CN, Moraes DF, Carneiro SM, Carvalho FA (2015) *Syzygium cumini* (L.) Skeels essential oil and its major constituent α-pinene exhibit anti-Leishmania activity through immunomodulation in vitro. *J Ethnopharmacol* 160:32–40. https://doi.org/10.1016/j.jep.2014.11.024. [The article reports the killing of Leishmania by constituent α-pinene of Jamun seeds and fruits]

Sachdeva C, Mohanakrishnan D, Kumar S, Kaushik NK (2020) Assessment of in vitro and in vivo antimalarial efficacy and GC-fingerprints of selected medicinal plant extracts. *Exp Parasitol* 219:108011. https://doi.org/10.1016/j.exppara.2020.108011. [The article reports the antimalarial activity of Jamun]

Saha S, Subrahmanyam EVS., Kodangala C, Mandal SC, Shastry SC (2013) Evaluation of antinociceptive and anti-inflammatory activities of extract and fractions of *Eugenia jambolana* root bark and isolation of phytoconstituents. *Brazilian J Pharmacogn* 23(:651–661. [The article reports the pain relieving action of Jamun root]

Saleem U, Ahamad B, Shehzad A (2020) Evaluation of mutagenic, acute and sub-acute toxicity potentials of *Syzynium cumini* seeds: A toxicological screening. *J Pharm Res Ther* 1:20–30 [This article is about the safety profiling of Jamun]

Sanwalka N, Sharma M, Jain DK, Bhardwaj G, Kumar R (2019) Study of effect of jamun (*Syzygium cumini*) seed powder on glycemic control and dyslipidemia in type 2 diabetes mellitus a double blind randomized control trial. *J Med Sci Clin Res* 7:409–417. https://doi.org/10.18535/jmscr/v7i9.71. [The article reports the cardioprotective and antidiabetic effect of Jamun seed powder in humans clinically]

Sarma N, Begum T, Pandey SK, Gogoi R, Munda S, Lal M (2020) Chemical composition of *Syzygium cumini* (L.) Skeels leaf essential oil with respect to its uses from North East region of India. *J Essent Oil-Bearing Plants* 23:601–607. https://doi.org/10.1080/0972060X.2020.1796822. [This article describes the isolation of chemical molecules from Jamun leaves]

Sathish Babu P, Krishnan G, Anand Babu K, Chitra K (2017) In silico and in vitro evaluation of anti-urolithiatic activity of ethanolic extract of *Syzygium cumini* stem bark. *Res J Pharm Technol* 10:1317–1321. https://doi.org/10.5958/0974-360X.2017.00233.5. [This article reports the protective effect of Jamun stem bark against oxalate-induced kidney toxicity]

Sen S, Chakraborty R (2017) Revival, modernization and integration of Indian traditional herbal medicine in clinical practice: Importance, challenges and future. *J Tradit Complement Med* 7:234–244. https://doi.org/10.1016/j.jtcme.2016.05.006. [This article is about the importance of traditional and Ayurvedic medicine]

Sharma AK, Bharti S, Kumar R, Krishnamurthy B, Bhatia J, Kumari S, Arya DS (2012) *Syzygium cumini* ameliorates insulin resistance and β-cell dysfunction via modulation of PPARγ, dyslipidemia, oxidative stress, and TNF-α in type 2 diabetic rats. *J Pharmacol Sci* 119:203–213. doi.org/10.1254/jphs.11184FP. [This article describes the antidiabetic effect and molecular mechanism of action of Jamun seeds]

Sharma VK, Chitra D, Charumathy M, Gangadhar L, Anooj ES (2020) Studies on antimicrobial activity of *Syzygium cumini* and *Syzygium alternifolium*. *Ann Trop Med Public Heal* 23:1168–1173. https://doi.org/10.36295/ASRO.2020.23742. [This article reports the antimicrobial activity of action of Jamun fruits]

Shukla SK, Sharma SB, Singh UR, Ahmad S, Maheshwari A, Misro M, Dwivedi S (2014) *Eugenia jambolana* pretreatment prevents isoproterenol-induced myocardial damage in rats: Evidence from biochemical, molecular, and histopathological studies. *J Med Food* 17:244–253. https://doi.org/10.1089/jmf.2013.2795. [This article describes the cardioprotective effect and molecular mechanism of action of Jamun fruit pulp]

Siani AC, Souza MC, Henriques MGMO, Ramos MFS (2013) Anti-inflammatory activity of essential oils from *Syzygium cumini* and *Psidium guajava*. *Pharm Biol* 51:881–887.

https://doi.org/10.3109/13880209.2013.768675. [This article describes the anti-inflammatory action of Jamun leaf oils]

Sidana S, Singh V, Meena B, Beniwal S, Singh K, Kumar D, Singla R (2016) Effect of *Syzygium cumini* (jamun) seed powder on dyslipidemia: a double blind randomized control trial. *Int J Res Med Sci* 4:2603–2610. https://doi.org/10.18203/2320-6012.ijrms20161917. [This article reports the antidiabetic action of Jamun seeds clinically]

Siddika A, Das PK, Asha SY, Aktar S, Tareq ARM, Siddika A, Rakib A, Islam F, Khanam JA (2020) Antiproliferative activity and apoptotic efficiency of *Syzygium cumini* bark methanolic extract against EAC cells *in vivo*. *Anticancer Agents Med Chem* 21:782–792. https://doi.org/10.2174/1871520620666200811122137. [This article reports the anticancer activity of Jamun stem bark on Ehrlich ascites carcinoma bearing mice]

Silva S do N, Abreu IC, Silva GFC, Ribeiro RM, Lopes AS, Cartágenes MSS, Freire SMF, Borges ACR, Borges MOR (2011) The toxicity evaluation of *Syzygium cumini* leaves in rodents. *Rev Bras Farmacogn* 22:102–108. https://doi.org/10.1590/S0102-695X2011005000181. [This article describes the safety evaluation of Jamun leaf]

Singh H, Sharma A, Bhardwaj A, Kaur B, Badial K, Kaur S, Singh B (2019) Evaluation of antinociceptive effect of seed extracts of *Eugenia jambolana* Linn. *Plant Arch* 19:3355–3361. [This article describes the pain relieving action of Jamun seeds]

Singh J, Sharma K, Walia S, Saha S (2017) Anthocyanin profiling method based on isocratic elution for comparable speed, reproducibility, and quantitation with gradient elution. *Food Anal Methods* 10:118–128. https://doi.org/10.1007/s12161-016-0561-z. [This article reports the isolation of chemical molecules from Jamun fruits]

Sobeh M, Esmat A, Petruk G, Abdelfattah MAO, Dmirieh M, Monti DM, Naim ABA, Wink M (2018) Phenolic compounds from *Syzygium jambos* (Myrtaceae) exhibit distinct antioxidant and hepatoprotective activities in vivo. *J Funct Foods* 41:223–231. https://doi.org/10.1016/j.jff.2017.12.055. [This article reports the hepatoprotective activity of Jamun leaves]

Srivastava BD, Srivastava M, Srivastav SK, Suzuki N, Srivastav AK (2018) Cypermethrin-induced liver histopathology in rat: Protective role of jamun seed and orange peel extracts. *Iran J Toxicol* 12:25–30. https://doi.org/10.32598/ijt.12.4.74.7. [This article reports the hepatoprotective activity of Jamun seeds]

Sutariya B, Taneja N, Saraf M (2017) Betulinic acid, isolated from the leaves of *Syzygium cumini* (L.) Skeels, ameliorates the proteinuria in experimental membranous nephropathy through regulating Nrf2/NF-κB pathways. *Chem Biol Interact* 274:124–137. https://doi.org/10.1016/j.cbi.2017.07.011. [This article reports the renoprotective activity of betulinic acid from Jamun leaves]

Swami SB, Thakor NSJ, Patil MM, Haldankar PM (2012) Jamun (*Syzygium cumini* (L)): A review of its food and medicinal uses. *Food Nutr Sci* 3:Hal: 1100-1117. doi.org/10.4236/fns.2012.38146.[This article gives an account of various effects of Jamun]

Tripathi B (ed) (2002) *Acharya Charaka, Charaka Samhita Sutrasthana 27th Chapter, Shloka No-140, Charaka Chandrika Hindi commentary of Agnivesha*. Chaukhamha Surabharati Prakashana, Varanasi. [This book gives an account of characteristic features and uses of Jamun to treat diabetes in Ayurveda]

Ulla A, Alam MA, Sikder B Sumi FA, Rahman MM, Habib ZF, Mohammed MK, Subhan N, Hossain H, Reza HM (2017) Supplementation of *Syzygium cumini* seed powder prevented obesity, glucose intolerance, hyperlipidemia and oxidative stress in high carbohydrate high fat diet induced obese rats. *BMC Complement Altern Med* 17:289. https://doi.org/10.1186/s12906-017-1799-8. [This article reports the effect of Jamun seeds on obesity]

Venkataramanan R V., Raju CD, Sumithra M, Prakash MP, Goswami H (2016) Evaluation of antirheumatic activity of petroleum ether extract of *Syzygium cumini* stem bark in rats. *Artic Biomed Pharmacol J* 9:639–642. https://doi.org/10.13005/bpj/984. [This article reports the hepatoprotective activity of Jamun stem bark on rheumatoid arthritis]

Venkateshwarlu E, Bhava BSS, Kumar RS, Venkateshwar RJ, Gouthami E, Umasankar K (2015) Evaluation of diuretic activity of *Syzygium cumini* and its effect on prostaglandin system. *Orient Pharm*

Exp Med 15:45–51. https://doi.org/10.1007/s13596-015-0179-5. [This article reports the diuretic action of Jamun seeds]

Xu J, Liu T, Li Y, Yuan C, Ma H, Seeram NP, Liu F, Mu Y, Huang X, Li L (2018) Hypoglycemic and hypolipidemic effects of triterpenoid-enriched Jamun (*Eugenia jambolana* Lam.) fruit extract in streptozotocin-induced type 1 diabetic mice. *Food Funct* 9:3330–3337. https://doi.org/10.1039/c8fo00095f. [This article reports the antidiabetic and hypolipidemic effects of Jamun fruits]

Xu J, Liu T, Li Y, Liu W, Ding Z, Ma H, Seeram NP, Mu Y, Huang X, Li L (2019) Jamun (*Eugenia jambolana* Lam.) fruit extract prevents obesity by modulating the gut microbiome in high-fat-diet-fed mice. *Mol Nutr Food Res* 63:e1801307. https://doi.org/10.1002/mnfr.201801307. [This article reports the effect of Jamun fruits on obesity and molecular mechanisms]

Yadav N, Pal A, Sihag S, Nagesh CR (2020) Antioxidant activity profiling of acetonic extract of jamun (*Syzygium cumini* L.) seeds in different in-vitro models. *Open Food Sci J* 12:3–8. https://doi.org/10.2174/1874256402012010003. [This article reports the antioxidant effects of Jamun seeds]

Biographical Sketch

Ganesh Chandra Jagetia finished his Ph.D. in 1980 and was awarded Research Associateship by the Indian Council of Medical Research, New Delhi, India. He joined Kasturba Medical College, Manipal University, Manipal, India as an Assistant Professor to set up the Department of Radiobiology in the year 1982 and served in different capacities and became Professor in the year 1991 and a Departmental Chair in the year 2001. Prof. Jagetia moved to Mizoram University, Aizawl, India in Feb. 2007 to set up the Department of Zoology and served in various capacities as Departmental Chair and Dean of the School of Life Sciences. During is Academic career prof. Jagetia worked as a postdoctoral researcher at Stanford University, USA and the Universitäts Klinikum Essen, Germany. He was twice visiting professor at the MD Anderson Cancer Center, USA. Prof. Jagetia received visiting Scientist Award from Gesselschaft für Forschung, Munich, Germany, Marie Curie fellowship from the Commission of European Communities, Belgium and Visiting Professorship from the Japan Society for Promotion of Science, Tokyo, Japan. He served as the Academic Editor of PLoSOne, and Associate Editor for ISRN Toxicology, and the International Journal of Complementary and Alternative Medicine, USA. His main focus of research has been translation research on radioprotection, cancer treatment and wound healing using natural products. Prof. Jagetia Mentored numerous postgraduate students and also trained 25 Ph.D. students for their Doctoral degrees. He has published more than 250 research articles in various national and international journals and 35 book chapters. Prof. Jagetia has reviewed more than 100 research articles for various national and international journals and chaired sessions and delivered invited talks at several national and international conferences. He served as president of the Mizoram University Teacher's Association (MIZUTA) and is a life member of several scientific bodies.