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### A review on bio-active compounds and medicinal strength of Jamun (*Syzygium cumini* Skeels)

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#### Abstract

Jamun (*Syzygium cumini* Skeels) which is nature indigenous to India has been used as medicine for last hundred years in Unani and Ayurveda health system. Jamun is very effectively used long a traditional as a preventive measure in the treatment of diabetes mellitus, inflammation, ulcers and diarrhea and preclinical studies have also shown it to keep chemopreventive, Radioprotective and antineoplastic properties. The tree is a potential source of compounds comprising anthocyanins, glucoside, Ellagic acid, isoquercetin, Kaempferol and myrecetin. The presence of bioactive compounds comprising alkaloids, tannins, phenols, lipids, flavonoids in jamun leaves, barks, fruits, stems, and roots contribute to immense potential source of health beneficial nutrition and medicine. The active presence of these compounds sustains pharmacological effects with antioxidant, antimicrobial, antidiabetic, central nervous system activity (CNS), chemo preventive, anti-inflammatory, antiallergic and hepatoprotective properties strong upon intake of jamun in human health and metabolism. The seeds are claimed to comprise alkaloid, Jambosine and glycoside Jambolin or antimellin, which halts the diastatic conversion of starch into sugar. Jamun is also profoundly known for its antidiabetic activity as it has been demonstrated to be the most promising nutraceutical value as reported by several research workers. Bioactive compounds are the result of involuntary developmental mechanism which may be due to specific requirement thus facilitating beneficial physiological processes there by promoting preventive mechanism for mitigating various disease and disorders of plant by mutualistic or antagonistic interaction with another organism.

**Keywords:** Jamun, antidiabetic, phenolic, flavonoids anthocyanins, antioxidant and nutraceutical value

#### Introduction

Jamun (*Syzygium cumini* Skeels) belongs to the family of Myrtaceae. It is also known as *Syzygium jamunum* and *Eugenia cumini*. Jamun is known by several vernacular names likes Indian blackberry, Jambu, Mahaphala, javaplum, Malabar plum, duhat, jambolana, mesegerak, Jamelonguier, Jamblang, jambolana, and Kavika as revealed by Mukhopadhyay *et al.*, (2012) [25]. Jamun is reported to be originating to be in Asian subcontinent, adjoining regions of Southeast Asia, China, and Queensland and today is found prevalently growing worldwide throughout Eastern Africa, South America, and Madagascar region as demonstrated by Warriar *et al.*, (1996) [48]. The plant bearing of fruits in jamun occurs one time in a year and the fruits are sweetish sour in taste with varied pulse content and edible biomass The mature fruits of jamun are being efficiently are utilized for health drinks, preparing preserves, squashes, jellies and wine as revealed by Warriar *et al.*, (1996) [48]. In association to its dietary usage as table fruits, all portions of the tree and more significantly the seeds are being utilized to treat a range of illnesses, the most significant being diabetes mellitus as reported by Sagrawat *et al.*, (2006) [38]. Various parts of the jamun plants were also proved for possessing antioxidant, anti-inflammatory, Neuropsychopharmacological, anti-microbial, anti-bacterial, anti-HIV, Antileishmanial, antifungal, nitric oxide scavenging, free radical scavenging, anti-diarrheal, antifertility, gastroprotective and anti-ulcerogenic and radio-protective activities as also described by Ramteke *et al.*, (2015) [32]. The most important bioactive compounds are secondary metabolites, natural products that originate from jamun plant. Initially the plant extracts have been utilized for the treatment of different diseases and disorders. The extracts of Jamun parts have been in usage for the inhibiting and curing of several diseases and nowadays it is normally recognized for its antidiabetic property. Essential oils like lauric acid, phytochemicals, lipids, phenols with their antioxidant property, presence in Jamun, have medicinal effects as also described by Shalini *et al.*, (2018) [39]. Besides it is the secondary metabolites of plants that keep pharmacological and toxicological properties in animal and human being.

Secondary metabolites are obtained in the active phase subsequent to plant growth and development as well primary biosynthesis. They are not required for daily functioning of plant and hence forth are regarded as side tracks. Several of them are originate to hold several kinds of significant functions in the living plants such as defense, tenseness, or signaling. Production of secondary metabolites by plants is a result of evolution of mutualistic (volatiles, pigments and floral scent for attracting pollinators) or antagonistic (synthesis of toxic compounds as a function of protection against pathogens and herbivores) interaction as revealed by Pichersky *et al.*, (2000). Bioactive compounds in plants advantage humans and animals. Jamun is plum fruit with sour-sweet taste, dark purple in color and round-oval shape having achieved bio compounds of significant medicinal and nutritive values. The dark purple in color is due to the presence of anthocyanins and astringency taste due to tannins. The complete nutritive, medicinal and mineral nutrient composition of jamun is given in table 1 as envisaged by Baliga *et al.*, (2011)<sup>[4]</sup>.

**Table 1:** Composition of Jamun Fruit

The fruit contain	Per 100 g of edible portion
Moisture (g)	83.70 - 85.80
Protein (g)	0.70 - 0.13
Fat (g)	0.15 - 0.30
Crude fibre (g)	0.30 - 0.90
Carbohydrate (g)	14.0
Ash (h)	0.32 - 0.40
Calcium (mg)	8.30 - 15.00
Magnesium (mg)	35.00
Phosphorus (mg)	15.00 - 16.20
Iron (mg)	1.20 - 1.62
Sodium (mg)	26.20
Potassium	55.00
Copper	0.23
Sulfur (mg)	13.00
Vitamin A (I.U.)	8.00
Thiamine (mg)	0.01 - 0.03
Riboflavin (mg)	0.009 - 0.01
Niacin (mg)	0.20 - 0.29
ascorbic acid (mg)	5.70 - 18.00
Chlorine (mg)	7.00
Folic acid	3.00

**Source:** (Baliga *et al.*, 2011)<sup>[4]</sup>.

The multifaceted utility for different valuable products and raw fruit consumption as revealed by several workers is given as under

#### Food uses

- The better quality of jamun juice is good for sherbet, syrup and “squash”. In India the conversion into squash for final preservation as a bottled drink made by cooking the crushed fruits for 5 to 10 minutes at 140°F, pressing out the juice, mixing it with sugar and water and addition of citric acid and sodium benzoate as a preparation therapy as revealed by Lai *et al.*, (1960)<sup>[19]</sup>.
- Jamun having good size and better quality with sweet or sub acid flavor and a less of astringency are enjoyable raw and may be prepared into tarts sauces and jam.
- Removal of astringency in the fruits can be facilitated by soaking them in salt water or pricking them, rubbing them with a little salt and letting them stand for an hour.
- All but decidedly inferior fruits can be utilized for juice which is often comparable to grape juice.

- When extracting juice from cooked jamun, it is recommended that it needs to be permitted to drain out without squeezing the fruit and it will be a smaller amount of astringent.
- The white-fleshed jamun has sufficient pectin and makes a very stiff jelly cooking till is brief as reported by Miller *et al.*, (1955)<sup>[23]</sup>.
- The more common purple fleshed yields richly colored jelly but are deficient in pectin and require the addition of a commercial jelling agent or must be combined with pectin rich fruits such as unripe or sour guavas.
- In Goa jamun are an important source of wine, resembling Port.
- Brandy and distilled liquor called “jambava” have also been made from the fermented fruit.
- Jamun vinegar, extensively made throughout India, is an attractive, clear purple, with a pleasant aroma and mild flavour.

#### Uses in traditional medicine

1. Conventionally the all parts of the plant including jamun fruits, leaves, seeds, and bark are being utilized in ayurvedic medicine.
2. The bark comprises tannins and carbohydrates, accounting for its long-term usage and astringent to combat illnesses like dysentery as reported by Namasivayam *et al.*, (2008)<sup>[26]</sup>.
3. The glycoside presence in the jamun fruit seed is considered to keep antidiabetic properties. Jamun fruit seeds and pulp have been recorded to serve several purposes in diabetic patients, such as controlling blood glucose levels and decelerating diabetic complications including neuropathy and cataracts. Jamun fruit decreases the sugar in the blood of the human body and is very decent in the preventing of diabetes. Its seeds comprise Glucoside, Jamboline and Ellagic acid, which are revealed to keep the capability to inhibit the conversion of starch into sugar in case of additional production of glucose as reported by Giri *et al.*, (1985)<sup>[13]</sup>. Jamun is furthermost often known as an adjuvant therapy in type-2 diabetes.
4. The seeds keep also shown anti-inflammatory effects in rats and antioxidant properties in diabetes as revealed by Chaudhary *et al.*, (1990)<sup>[7]</sup>.
5. Thus all parts of the Indian black berry can be utilized medicinally and it has a long tradition of its use in alternative medicine. The plant has been noticed as an antidiabetic plant since it became naturally available several decades ago. Ayurvedic texts recommend that 1-3 g of seed powder per day is an average dose beneficial for all diabetic patients. Furthermore, juice of ripe fruits in the quantity of 0.5-2 tsp (2.5-10 ml) at least three times daily has been suggested for as effective remedy the treatment of diabetes.

#### Medicinal properties

The jamun has conventionally recognized in folk medicine and in the pharmaceutical trade than in any other field. Medicinally, the fruit is stated to be astringent, stomachic, carminative, antiscorbutic and diuretic as revealed by Srivastava *et al.*, (1983)<sup>[45]</sup>. Moreover, a fruit extract showed antimicrobial and cytotoxic activities and may potentially be utilized on typical antimicrobial products. In comparison to other non-traditional fruits jamun showed considerable high antioxidant activity, with pro-active components such as

anthocyanins, tannins and flavonols. Fruits comprise several different types of anti-oxidant compounds, including flavonoids, phenolics, carotenoids and vitamins, which are all considered useful to human health, for reducing the risk of degenerative diseases by decrease of oxidative stress, and for the inhibition of macro molecular oxidation as reported by Kubola *et al.*, (2011) [15].

### Phytochemistry of Jamun

Jamun is a potential source of phytochemicals in its various parts: leaves, fruit, seed, and bark. The different investigations have showed the presence of phenols, flavonoids, alkaloids, glycosides, steroids, cardiac glycosides, saponins, terpenoid, and tannins in the Jamun leaves extract as demonstrated by Shyamala *et al.*, (2010) [41] and Reddy *et al.*, (2013) [34]. The plentiful abundant constituents of the oils in the Jamun leaves are:  $\alpha$ -pinene (32.32%),  $\beta$ -pinene (12.44%), trans-caryophyllene (11.19%), 1, 3, 6-octatriene (8.41%), delta-3-carene (5.55%),  $\alpha$ -caryophyllene (4.36%) and  $\alpha$ -limonene (3.42%) as reported by Mohamed *et al.*, (2013) [24]. Jamun seed oil was reported to comprise lauric (2-8%), myristic

(31.7%), palmitic (4-7%), stearic (6.5%), oleic (32.2%), linoleic (16.1%), malvalic (1.2%), sterculic (1.8%) and vernolic (3.0%) acids as revealed by Mahmood *et al.*, (1988) [21]. The probable food application of jamun and its health benefits that originate from seed and pulp consumption which inculcates antidiabetic, antimicrobial and antioxidant effects, leaf buds keep purgative effects and bark have wound healing effects as reported by Swami *et al.*, (2012) [46] and Sonawane *et al.*, (2013). They also advised that these useful contributions of jamun parts are due to the phytochemicals existing in them. There are different types of compounds present in the all parts of the jamun likes phenolic, flavonoids and anthocyanins have antioxidant activity that involves prevention of  $\alpha$ -glucosidase which is vital in controlling of diabetes mellitus and inhibition of oxidative cell damage as reported by Sonawane *et al.*, (2013) [43] and Vasi *et al.*, (2009) [47].

**Phytochemicals present in the jamun plant:** The numerous chemical present in plethora in different structural parts of jamun plant are given as under in table-2

**Table 2:** List of Phytochemicals Present in Jamun Plant Parts

Sr. No	Plant part	Chemicals present
I.	Leaves	$\beta$ -sitosterol, Betulinic acid, Mycaminose, crategolic (Maslinic) acid, heptacosane, n-nonacosane, n-hentriacontane, n octacosanol, ntriacontanol, n-dotricontanol, quercetin, myricetin, myricitrin and the flavonols glycosides myricetin 3-O-(400-acetyl)- $\alpha$ L-rhamnopyranosides
II.	Flowers	Oleanolic acid, Ellagic acids, isoquercetin, quercetin, Kaempferol, and myricetin
III.	Stem	Fried Elin, friedelan-3- $\alpha$ -ol, Betulinic acid, $\beta$ -sitosterol, Kaempferol, $\beta$ -sitosterol-D-glucoside, gallic acid, ellagic acid, Gallotannin and ellagitannin, and myricetin
IV.	Fruit pulp	Anthocyanins, delphinidin, petunidin, malvidin-diglucosides
V.	Seeds	Jambosine, gallic acid, ellagic acid, corilagin, 3,6-hexahydroxydiphenoylglucose, 1-galloylglucose, 3-galloylglucose, quercetin, $\beta$ -sitosterol, 4,6 hexahydroxy diphenoy lglucose
VI.	Essential oils	$\alpha$ -Terpineol, myrtenol, eucarvone, muurolol, $\alpha$ -myrtenal, 1, 8-cineole, geranyl acetone, $\alpha$ -cadinol and pinocarvone

### Role of bioactive compounds present in Jamun

#### Terpenes

The terpenes are organic compounds present in the jamun which consists of multiple isoprenes units and have neuroprotective, antitumorogenic, anti-inflammatory, antimicrobial, antifungal, antiviral, antihyperglycemic and antiparasitic activities as revealed by Paduch *et al.*, (2017) [28] and Cho *et al.*, (2017) [8]. They are also keeping pleasurable fragrance and are utilized as flavours in food and pharmaceutical industries.

#### Flavonoids

Flavonoids are known for its antioxidant with anti-inflammatory activity in human being and its bioavailability, metabolism and biological activity of flavonoids depend upon the configuration, total number of hydroxyl groups and substitution of functional groups around their nuclear structure as revealed by Shashank *et al.*, (2013) [40]. There are many flavonoids present in the jamun but anthocyanin is the most imperative one as they are available in bulk and purple color of jamun fruit due to its immense availability. Reginold Jebitta and Jeyanth Allwin (2016) [35] have investigated and studied the phytochemicals content of jamun pulp powder considering various drying methods and found that freeze drying at  $-40$  °C giving high antioxidant property (70.4–75.8%) and total flavonoids (104.8 mg quercetin equivalents (QE)/g), total phenolic (13.99 mg GA equivalents/g) and anthocyanin (7.56 mg/g) content. The yield of five anthocyanins are hydrolysis of anthocyanin (0.08%) as identified by HPLC and confirmed by mass spectral analysis

namely delphinidin (20.3%), cyanidin (6.6%), petunidin (24.6%), peonidin (2.8%) and malvidin (44.2%) as revealed by Aqil *et al.*, (2010) [1]. Kay (2006) [14] and Singh *et al.*, (2006) [42] have described the metabolism of anthocyanin in human by flavonoid metabolism as reference. The flavonoid found in food may be either in glycosylated (e.g., aglycones) or non-glycosylated form or in both forms. Then on glycosylated flavonoids are absorbed through passive diffusion and the glycosylated form may follow either of the two routes: sodium-glucose co-transporter (transport of intact glucoside, e.g., anthocyanin) in the enterocytes or at the brush border via lactate phloridzin hydrolase and the metabolites that are not hydrolyzed by these enzymes are absorbed in the colon but influence the liberated aglycones.

#### Other bioactive compounds in jamun (*Syzygium cumini*):

Other bioactive compounds in jamun are: lipid (lauric acid, linoleic acid, N- hentriacontane, N- nanocosane, stearic acid), alkane (malic acid and citric acid), phenols like ferulic acid and caffeic acid and phenylpropanoid (cinnamaldehyde, cinnamyl acetate, cinnamyl alcohol, coniferyl alcohol).

### Health benefits of jamun

#### Antidiabetic activity

Diabetes is a very serious, chronic disease that arises either when the pancreas does not produce adequate insulin (a hormone that regulates blood sugar or glucose) or when the body cannot efficiently utilize the insulin it produces. Globally, an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in 1980. The

worldwide occurrence (age-standardized) of diabetes has closely doubled since 1980, increasing from 4.7% to 8.5% in the adult population. Due to diabetes 1.5 million were reported deaths in 2012. Higher than optimal blood glucose due to an additional 2.2 million deaths there by increasing the risks of cardiovascular and other diseases. The ethanol extract from the jamun seed presented dose dependent reduction in blood glucose level in streptozotocin-induced diabetes in rats and also reported the anti-ulcer activity of jamun against both physical (4 h pylorus ligation and 2 h cold restraint stress) and chemical (aspirin and alcohol) induced gastric ulcers in rats as revealed by Diamante *et al.*, (2013) <sup>[11]</sup>. Glycemic control is helpful in preventing the incidence and progression of diabetic retinopathy, damage of vision and essential for photocoagulation treatment (Diabetes Control and Complications Trial Research Group, 1993). Treatment with jamun (200 mg/day of lyophilized powder for 8 weeks) restrained the expansion of diabetic cataract even after 4 months of alloxan (120 mg/kg, s.c) administered in rats. Rathi *et al.*, (2002) <sup>[33]</sup> and Kumar *et al.*, (2013) <sup>[17]</sup> were reported antidiabetic activity against streptozotocin-induced diabetes in rats by isolated compound "mycaminose" from *Syzygium cumini* and advised to have same the mechanism of action of glibenclamide. Oral administration of 50 and 100 mg/kg of the aqueous and methanol extracts of roots, leaves, seeds and barks of *Syzygium cumini* in alloxan monohydrate (150 mg/kg i.p.) induced diabetic male Sprague Dawley (SD) rats for 21 days resulted in the important decrease in blood glucose level in the body and biochemical parameters in dose dependent manner as reported by Deb *et al.*, (2013) <sup>[10]</sup>.

#### Cardioprotective effects

The investigators have found that when blood sugars are strangely high (hyperglycemia), this activates a biological pathway that due to irregular heartbeats a condition called cardiac arrhythmia, which is connected to heart failure and accidental cardiac death. According to the World Heart Federation, people who go down with diabetes are two to four times susceptible likely to develop cardiovascular disease when compared with people who do not have diabetes. Diabetic heart disease is caused by combined interactions that result from overlapping mechanisms. The driving forces are associated to the phenotypic alterations related with diabetes in particular hyperglycemia, dyslipidemia, hypertension and perhaps insulin resistance. A vicious circle develops, leading to improved oxidative stress and improved glycosylation of various humoral and vessel wall proteins, which reason endothelial damage and structural changes in coronary arteries. In turn, injured endothelial cells can become a source of ROS and reactive nitrogen species in addition to other factors, sustaining the proatherosclerotic process. Production of reactive oxygen takes place through oxidative and non-oxidative phosphorylation with increase in glucose levels as reported by Leiva *et al.*, (2009) <sup>[20]</sup>. Traditionally, seeds of *Syzygium cumini* have been administered in Ayurveda and Unani to fight against diabetes. Atale *et al.*, (2013) <sup>[2]</sup> have studied the antiglycoxidative possible of *Syzygium cumini* and the effect of *Syzygium cumini* on glucose increased cardiac stress was observed and they found that the methanol seed extract showed maximum possible compared to aqueous and ethanol extract and was significantly in suppressing the glucose induced stress on H9C2 cardiac cell lines by inhibiting glycation event.

#### Anti-inflammatory and wound healing activity

It is found that the formulations (10% ointment) of crude ethanolic extract of jamun (*Syzygium cumini*) bark have accelerated healing effect than the control Nitrofurazone ointment (0.2% w/w, Smithkline -Beecham) in deep burn wound model in Albino rats as revealed by Nandagopal *et al.*, (2011) <sup>[27]</sup>. The ethyl acetate and methanol extracted from Jamun seed which have anti-inflammatory properties as reported by Kumar *et al.*, (2008) <sup>[18]</sup>. The extracts did not exhibit any fatality rate to the dose level of 2000 mg/kg and were found to prominently inhibit the carrageenan-induced rat paw edema, a test which has important approximate value for anti-inflammatory agents acting by preventing the mediators of acute inflammation. The methanol extract at the dose of 400 mg/kg showed high significant anti-inflammatory activity at 4 h, where it caused 62.6% inhibition, as compared to that of 5 mg/kg of diclofenac sodium. The Jamun (*Syzygium cumini*) leaves extract have showed the presence of chemical compounds likes hydroxyl, ester, carbonyl and olefin functionalities, exhibited dose dependent anti-inflammatory activity in acute and chronic models and showed anti-inflammatory activity in huge carrageenan paw edema and chronic granuloma pouch model administration in albino rats as revealed by Pavan *et al.*, (2010) <sup>[29]</sup>. The anthocyanins reduction and cellular lipid peroxidation and oxidative stress are revealed by Donepudi *et al.*, (2012) <sup>[12]</sup>. Hypothesized that jamun fruit extract administration could protection against cholestatic liver damage and inflammation in mice; they found that jamun fruit phytochemicals reduced hepatic inflammation and oxidative stress and defended against hepatocellular damage in mice.

#### Antiviral activity

The leaf extracts of jamun (*Syzygium cumini*) were deliberated for antiviral activity against two emerging and re-emerging infectious diseases: buffalo pox and goat pox. An outbreak of buffalo pox in domestic buffaloes, with high illness and important production loss, was documented in the Aurangabad district of Maharashtra State in India in November 2003 related with several cases of human infection, chiefly in milkers working with the affected herd as reported by Singh *et al.*, (2006) <sup>[42]</sup>. Goat pox (SGPX) is probably the most dangerous infectious disease of small ruminants in several parts of the world. The disease inflicts substantial losses in terms of reduced productivity and lower quality of wool and leather as revealed by Babiuk *et al.*, (2008) <sup>[3]</sup>. Jamun (*Syzygium cumini*) leaves at their maximum nontoxic concentrations 1999.73 - 0.50 µg/ml had prevention 99.92% and 98.52%, in allcytopathic effect (CPE) prevention assays for goat pox and buffalo pox, respectively as revealed by Bhanuprakash *et al.*, (2007) <sup>[6]</sup> and Bhanuprakash *et al.*, (2008) <sup>[5]</sup>. Influenza virus is a major health concern as they are important human respiratory pathogens that cause both seasonal, endemic infections and periodic, unpredictable pandemics as reported by Rock *et al.*, (2008) <sup>[36]</sup>. Annual outbreaks of influenza occur regularly in temperate regions of the world with remarkable seasonality and well defined by peak incidence in the colder months of the year as revealed by Meigs (2010) <sup>[22]</sup>. Avian influenza virus (H5N1) and RNA virus that belongs to the family Orthomyxoviridae emerged in Hong Kong in 1997, causing severe human disease. It is the serotype that causes bird flu in 2004. Hot and cold aqueous leaf and bark extracts of jamun (*Syzygium cumini*) showed

important virucidal activity (100% prevention) that was further confirmed in virus yield decreased assay (~98–99% decreased) and by egg based in ovo assay against avian influenza virus (H5N1 serotype of viruses) as revealed by Sood *et al.*, (2012)<sup>[44]</sup>.

#### Antiallergic activity

HPLC analysis revealed that hydrolyzable tannins and flavonoids are the major components of the extract. Aqueous extract of jamun (*Syzygium cumini*) showed antiallergic effect and indicate that its antiedematogenic effect is due to the inhibition of mast cell degranulation and of histamine and serotonin effects, whereas the inhibition of eosinophil accumulation in the allergic pleurisy model is probably due to an impairment of CCL11/eotaxin and IL-5 production as revealed by Quideau (2006)<sup>[31]</sup>.

#### Central nervous system (CNS) activity

Kumar *et al.*, (2007)<sup>[16]</sup> have studied on the Central Nervous System Activity of ethyl acetate and methanol extracts from jamun (*Syzygium cumini*) seed on Albino mice in rota rod and actophotometer at the dose level of 200 mg/kg and 400 mg/kg. They found that the safety dose for animals to be 2000 mg/kg body weight and both the extracts significantly caused reduction in the spontaneous loco-motor activity in mice thus, representative central depressant effect.

#### Hepatoprotective activity

Medicine or drugs that are consumed during medication to treat various diseases may get accumulated in the liver and due to injury, for example, paracetamol if given as over dose causes serious liver injury. Das and Sarma (2009)<sup>[9]</sup> have studied hepatoprotective effect in albino rats by ethanol extract of jamun pulp (*Syzygium cumini*). Hepatotoxin utilized was paracetamol. They found that the rats (induced with paracetamol) have significant hepatoprotective activity against hepatotoxin when 100 and 200 mg/kg/day of jamun pulp extract was given, thus showing reduction in these rum levels of all liver enzymes and total bilirubin and an increase in the total protein.

#### Conclusion

The preponderance of medicinal, pharmacological, anti-inflammatory, cardioprotective, antiviral and hepatoprotective attributes available in jamun plant parts. Support the fact that jamun is a highly health beneficial fruit. The positive effects can not only be harnessed by utilizing the fresh fruit but also be making available by utilization and consumption of processed products. Studies have suggested the usefulness of the bioactive compounds present in jamun (*Syzygium cumini*) in mitigating the various illnesses related with cardiac, gastrointestinal and nervous system. The pharmacological effects available in jamun are attributed due to the presence of flavonoids, terpenes, alkaloids, phenyl propanoids, tannins and lipids. Out of all the pharmacological effects, the antidiabetic activity is most important. Jamun possesses strong pharmacological properties, which proves this traditional medicinal plant having plethora of bioactive compounds and studies must be carried out for further research worth for phytochemical and clinical aspects for development of safer drugs that can be utilized for treating various human diseases.

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