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JAMUN A ANTI-DIABETIC HERBAL DRUG

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Abstract:

Jamun, scientifically known as Syzygium cumini, belongs to the family Myrtaceae. It is also referred to as Black Jamun. It is used in the treatment of type-II diabetes. Diabetes mellitus is a metabolic disorder characterized by abnormally high blood glucose levels. Type-II diabetes is a condition that affects how the body processes blood sugar (glucose). Different parts of the jamun fruit, such as its seeds and roots, are utilized to treat type-II diabetes. The bioactive components present in these parts are rich in carbohydrates, protein, and other nutrients. These components exhibit various therapeutic effects including antibacterial, antifungal, antiviral, cardioprotective, antiallergic, hepatoprotective, antiulcerogenic, antidiarrheal, and anti-hyperlipidemic properties. This review article emphasizes the anti-diabetic (type-II) activity of the jamun fruit. The extraction of jamun can be carried out using various methods. Among all its properties, the anti- diabetic effects are the most promising, and the seeds contain Jambosin. Therefore, in the current era, there is a need for scientific exploration to utilize this plant in the food and pharmaceutical industries.

Key words-*Jamosine,anti-ulcer,anti-diabetic,Bio-active,Extraction*

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INTRODUCTION:

JAMUN

Biological source: Syzygium cumini

Family: Myrtaceae

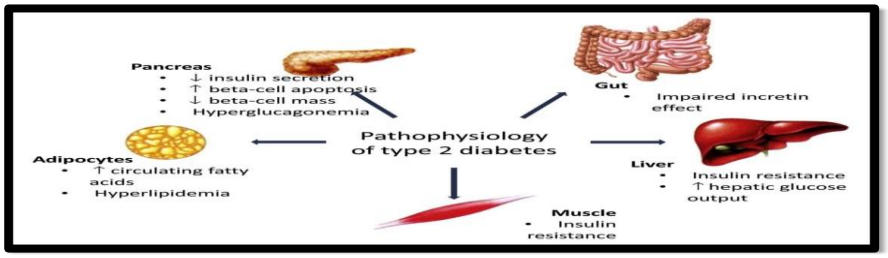
Also known as Syzygium jambolanum and Eugenia cumini. Other names are Jambul, Black Plum, Java Plum, Indian Blackberry, Jamblang, Jamun. It is used in the treatment of type II diabetes.

Diabetes mellitus

Diabetes mellitus is a fixed of metabolic issues characterized through hyperglycemia (multiplied blood sugar levels). Hyperglycemia is as a result of decreased insulin secretion, negative glucose utilisation, and extended glucose production, all of which may be associated with the underlying motive of diabetes mellitus. Genetic and environmental elements engage to purpose the numerous forms of diabetes mellitus. Diabetes is a severe or chronic ailment, disease or contamination because of atypical or immoderate manufacturing of the kidney. Diabetes is divided into two as diabetes and diabetes insipidus, depending on whether or not sugar is present in the urine. type 1 diabetes,kind 2 diabetes ,Gestational diabetes ,Genetic defects (beta mobile improvement and insulin action),Neonatal diabetes Endocrine diseases ,Blood related illnesses diabetes Drugprompted diabetes Immune-mediated diabetes ,other genetic syndromes. Use of Diabetes causes Diabetes Islet endocrine cells (beta and alpha) inside the pancreas secrete insulin from beta cells and glucagon hormone from alpha cells. both beta cells and alpha cells alter hormone release consistent with the sugar environment and adjust blood sugar degrees. under normal conditions, when blood sugar rises, beta cells inside the blood secrete extra insulin. In case of hypoglycemia, alpha cells secrete excess glucagon. Diabetes is because of hyperglycemia (high blood sugar) caused by low or no insulin production (type 1 diabetes) or decreased insulin or insulin resistance (type 1 diabetes). An autoimmune reaction (an unknown attack on a person's personal cells) damages the beta cells of the pancreas, main to type 1 diabetes. As a end result, beta cells in the body are destroyed and insulin stages lower. . In kind 2 diabetes, insulin deficiency and insulin sensitivity purpose insulin to have inadequate impact. The insulin released from the beta cells can't be utilised through the body (skeletal muscle and adipose tissues), signifying insulin resistance. Insulin resistance is complicated; however, it's far maximum normally prompted through extended body weight and getting old.[1] 2 kind-I type 1 diabetes (T1DM) kind 1 diabetes (T1DM) accounts for 5% to 10% of DM and is characterized by using autoimmune destruction of insulin-producing beta cells in the pancreatic islets. As a end result, there's a complete deficiency of insulin. it's far concept that a aggregate of genetics and surroundings (inclusive of infections, toxins, or sure ingredients) reason the immune system to fail. T1DM usually happens in children and adults, however can arise at any age.[2] type-II . kind –ii diabetic is a situations that influences the may additionally the body procedures blood sugar (glucose). type 2 diabetes (T2DM) debts for about ninety% of all diabetes cases. In T2DM, the response to insulin is decreased, described as insulin resistance. In this situation, insulin is useless and it starts offevolved to govern glucose levels by way of generating insulin, however over time, insulin ranges decrease, inflicting T2DM. T2DM typically impacts humans over the age of 45. but, this circumstance is greater not unusual in youngsters, teenagers and teens due to the increase in weight problems, bodily state of no activity and malnutrition.[2,3]

Pathophysiology Of Diabetic Type-II

T2DM is an insulin-resistant disease associated with beta cell dysfunction. At first, there is a compensatory increase in insulin to control blood sugar within the normal range. As the disease progresses, beta cells are replaced and insulin secretion is unable to control glucose levels, resulting in hyperglycemia. Most patients with T2DM are obese or have a high amount of body fat, mostly in the abdominal area. Adipose tissue itself stimulates insulin secretion through a variety of conditions, including FFA release and adipokine dysregulation. People with GDM who are physically inactive, have high blood pressure, or have dyslipidemia are also at risk of T2DM. Changes in the data suggest adipokine dysregulation, inflammation, abnormality in incretin biology (with incretins such as glucagon-like peptide-1 (GLP-I) or incretin resistance), 3 hyperglycemia, lycopenemia, increased renal glucose reabsorption, and involvement of the gastrointestinal microbiota in the stomach.[4]



Fruit compostion

amun The dietary composition of the fruit seems to be rich in carbohydrates (consisting of glucose, sucrose, fructose and galactose), proteins (aspartate, alanine, glutamine, tyrosine and cysteine; does not incorporate amino acids), vitamins. . (ascorbic acid, thiamine and niacin) and minerals (potassium, calcium, sodium, phosphorus and iron). It become additionally observed that Jamun consists of many bioactive substances that make contributions to human fitness. The shade, taste and aroma of jamun are carefully associated with the amount of phytochemicals (polyphenols, tannins and gallic acid) in its composition.[5,6]

Seed compostion

The nutritional content material of salmon fruit turned into analyzed and the approximate composition of the seeds became observed to be (%): moisture content sixteen.34 ± 0.49, ash content material 2.18 ± 0.06, protein content 1.97 ± zero.fifty nine, uncooked fats content material zero.65 ± zero.01, crude fiber content four.19 ± 0.12; The contents of jamun fruit were eighty two.19 ± 2.forty six, 2.04 ± zero.06, 2.15 ± zero.06, 0.83 ± 0.02 and 1.seventy six ± zero.05, respectively. In any other look at, according to the results, Jamun seed composition (%). in accordance to preceding studies, moisture content material is 3.21-fifty three, ash is 1.five- 21.72, carbohydrate is 6.05-89.68, fiber is 1.21-sixteen.nine, protein is 1.ninety seven-eight.5, fats is 1.ninety seven-eight.five, and fats is 1.ninety seven-eight.5. it's been pronounced to be 0.sixty five-4.86 and ascorbic acid to be five.7-5. (mg) 1.25-18.62. A latest evaluation of Jamun seeds acquired from the gathering of ripe Jamun fruits in Brazil confirmed that the moisture, ash, carbohydrate, protein and lipid content (%) turned into sixty two.25 ± 6.32, zero.36 ± 0.02, 14.ninety five ± It showed that it was calculated as 6.09 and 19.ninety six ±. zero.00 and a couple of.forty seven ± zero.24. The oil content material of jamun seeds varies relying on the fruit, and even though special solvents are used, the primary fatty acid is oleic acid [21,22]. The fatty acids in jamun seed oil are 32.2% oleic acid, 31.7% myristic acid, sixteen.1% linoleic acid, 6.5% stearic acid, 4.7% palmitic acid, 3.zero% vernonic acid, 2%, it's far suggested to incorporate eight laurin, 2.eight% steriferic acid. 1.8%, malvacic acid -1.2%. lately, Jamun seeds have been purified from fatty acids using one of a kind solvents. in this analysis the usage of hexane, the fatty acid composition is as follows (%); oleic acid - 26.eight, linoleic acid - 25.2, palmitic acid - 19.nine, stearic acid - 6.four, linoleic acid - 2.6, arachidic acid - 1.2, decasapentaenoic acid - 0.6, erucic acid five - zero.5, myristic acid - 0.4, docosahexaenoic acid - 0.3 and lauric acid - 0.three. This plant additionally has many biological chemical substances. [7-13]

Geographical Distribution

Jamun is discovered at some point of the Indian subcontinent, such as India, Bangladesh, Ceylon, Burma, Pakistan and Madagascar. Jamun is grown everywhere in the international, including the us. Jamun grows well in deep, fertile and well-drained soils. 10-12 It additionally grows within the West Indies, Israel, California and Algeria. Jamun turns into a mature tree inside 40 years, frequently attaining a top of one hundred ft (30 m). The jamun canopy can increase up to 36 toes (eleven m) and its trunk may be 2-three feet (zero.6-zero.nine m) in diameter. Jamun has many branches which might be speedy beginning from scratch. Jamun bark stems are frequently cracked, hard and peeling, with the decrease cease becoming light in shade. As top increases, the trunk bark turns into smooth and light gray. Jamun leaves are opposite, oblong or elliptical, blunt or tapering to some extent at the tip. The leaves are 2 to ten inches (5-25 cm) lengthy and 1 to four inches (2.five-10 cm) huge. New leaves are purple, the higher a part of mature leaves is dark green, the lower part is lighter, bright, difficult, the midrib is mild yellow and scents like turpentine. March-April is the flowering time of Jamun. Jamun produces many plant life ranging from 10 to forty plants. Jamun flower is round to oblong in form, 1 to four inches (2.five-10 cm) long and 1/2 inch (12.7 mm) extensive, with a aromatic, funnel-formed blade up to 0.sixteen inch (four mm) is lengthy. and four to 5 leaves form a small disc. flora are green-white, in the end turning red to red. Jamun starts offevolved to undergo fruit at the age of eleven-14, in summer the wide variety of organizations will increase to 10 or maybe forty, and reaches adulthood from June to July. Jamun's fruits are oval or round and half of to 2 inches (1.2 to 5 cm) in size. The culmination are inexperienced in thebeginning and turn from mild to darkish pink or even black as they ripen. 10-15 Jamun fruit is good and bitter and after consuming Jamun your tongue turns to blood. Jamun seeds are oblong in form, white in color and flip crimson. It turns brown when dry. (Hindus and Buddhists don't forget Jamun as a sacred tree and it's far frequently determined on the premises of Hindu temples. Lord Krishna loves Jamun and its leaves and culmination are a part of the services made to the god at some point of food.[14,15,16]

Parts of jamun

Jamun roots **Jamun seeds**

Jamun fruit

Chemical constituents present in the jamun plant)

Table no 1: Chemical constituents present in the jamun plant

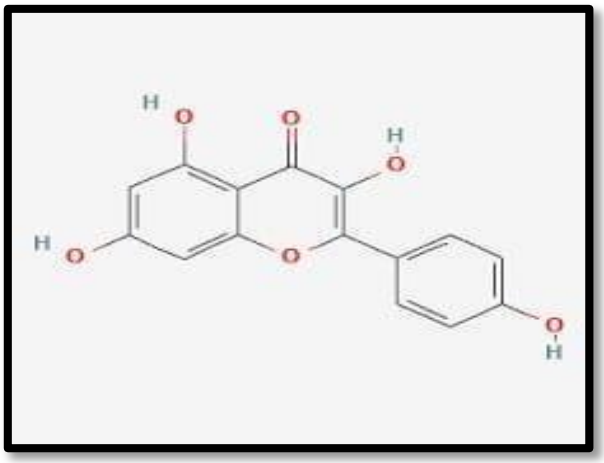
Sr.no	Species	Common name and use	Distributions	Reference
1	S. aquem	Watery Rose-apple, fruits edible	A small tree distributed in Assam and Meghalaya	16
2	S.ammottlanum	fruits edible	WesternGhats, The Nilgris, Palani and Anamalai hill	16,17
3	S. aromaticum	Clove, dried flower buds commercially important	Evergreen trees cultivated in Tamil Nadu and Kerala	16,17
4	S. claviflorum	fruits edible	The Andamans	16
5	S. fruticosum	Wild jamun	Avenue	16,17
6	S. mappaceum	Ornamental plant	Assam, Meghalaya, Arunachal Pradesh and Tamil Nadu	16
7	S. jambos	Rose-apple	Many part of the india	16,17

➢ **Chemical constituents present in a the jamun plant**

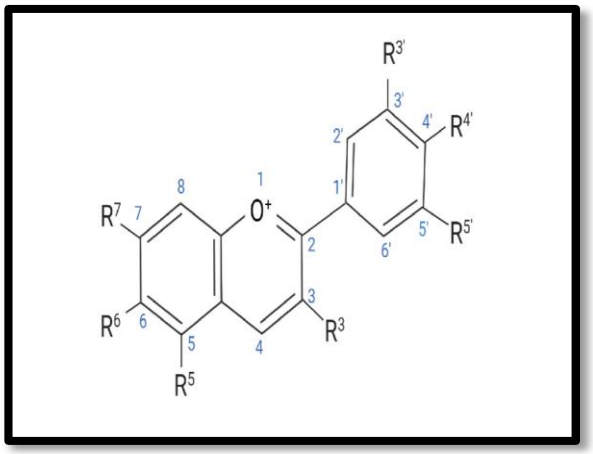
Table no 02:- Chemical constituents present in the jamun plant

Sr. no	Plant part	Chemical present
1	Seeds	Jambosine ,gallic acid, ellagic acid, corilagin 3,6-hexahydroxy diphenoylglucose,1-galloylglucose, 3-galloylglucose, quercetin, β -sitoterol,4-6 hexahydroxydiphenoylglucose [2,56]
2	Stem bark	Friedelin,friedelen – α -ol ,betulinic acid , β -sitosterol,kaempferol, β -sitisterol-Dglucose, gallic acid, ellagic acid,gallotannin and elligitannin,andmyricetine [2,56]
3	Flowers	Oleanoicacid , ellagic acid, isoquercetin, quercetin,kammpferol and myricetine [2]
4	Fruits pulp	Anthocyanins, delphinidin, petunidin,malvidin-diglucosides [2,57,58]
5	Leaves	β -sitosterol, betulinic acid, mycaminose, crategolic (maslinic) acid, n-hepatcosane, n-nonacosane, n-hentriacontane, noctacosanol, n-triacontanol, n-dotricontanol, quercetin, myricetin, myricitrin and the flavonol glycosides myricetin 3-O-(4"-acetyl)-α Lrhamnopyranosides [2,59]
6	Essential oils	α-terpeneol, myrtenol, eucarvone, muurolol, α-myrtenal, 1, 8-cineole, geranyl acetone, α-cadinol and pinocarvon [60]

Chemical structure



Anthrocymin



Ellagic acid

Analysis strategies

Physical analysis

Which includes colour and shape has been analyzed. By way of measuring the period (cm) and tenderness ratio, the common fruit weight (g) was calculated the usage of a virtual caliper and the percentage of safe to eat cloth, seeds and fruit juice became obtained and evaluated. [10]

Chemical Analysis

Estimate TSS using a handheld refractometer consistent with the recommended manner. pH turned into measured using a virtual pH meter (Jenway, United Kingdom). Titration is used to calculate titratable acidity (in % citric acid). The volumetric technique turned into used to estimate the amount of overall and reducing sugars.Te ascorbic acid stage 2-6 changed into measured the usage of dichlorophenol-indophenol obvious titration..[23]

Phytochemical evaluation

Stems, end result, leaves, roots and seeds of Jamun with different phytochemicals (table 02). Hexane, petroleum ether, chloroform, ethanol, ethyl acetate, methanol and aqueous extracts of Jamun leaves were pronounced to incorporate low to excessive tiers of cardiac glycosides, flavonoids, anthraquinones, saponins, phenols, steroids, phytosterols, penners, proteins, hexane. , petroleum ether, chloroform, amino acids, critical oils, carbohydrates, fixed oils, mucus and fats. Jamun includes micronutrients like magnesium, iron, manganese, calcium, copper, zinc, phosphorus, potassium, nitrogen and sulfur. Flavonoids, terpenoids, tannins and carbohydrates were detected within the ethanolic extract of jamun leaves. it's far observed in chloroform, ethyl acetate and methanol extracts.[23]

Extraction:

Extraction is the process of doing away with energetic substances from solids or beverages using liquid solvents. Selective solvents are used to split energetic substances from inactive or inactive materials in plant or animal tissues. on this way, the preferred additives are dissolved the usage of a

solvent known as solvent,and the insoluble element is the pulp. undesirable gadgets are eliminated after deletion. prepare the extract the use of ethanol or another appropriate solvent.

Extract: An extract may be defined as a natural practise containing all materials which are soluble in a solvent. Marc: residue obtained after extraction vehicle: solvent used for extraction type of extraction ◦ Dry merchandise (labels, caps) Belladonna extract ◦ Ointments (salves, suppositories) Glycerin extracts)

i. Maceration.
ii. Infusion.
iii. Digestion.
iv. Decoctiona.
v. Percolation.
vi. Soxhlet extraction.
vii. Microwave-assisted extraction.
viii. Ultrasound-assisted extraction.

Acetone Extract

Jamun leaf extract contains glycosides, phenols, saponins, proteins and resins, at the same time as root bark extract includes alkaloids and flavonoids. All phytochemicals except saponins have been detected in the root extracts.

Chloroform Extract

Jamun leaf extract changed into discovered to include alkaloids, steroids and proteins, whilst no protein changed into visible within the root extract. Alkaloids and tannic acid seed extracts include phenols, proteins and carbohydrates, while alkaloids and tannins are located most effective inside the root bark chloroform extract. [24]

Methanol Extract

Methanol extracts of leaves and stem pores and skin contain alkaloids, glycosides, flavonoids, phenols, steroids, saponins, tannins and carbohydrates, whilst root extracts additionally comprise proteins and resin. [24]

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