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Formulation & Evaluation of Syzynium jambolanam extract for treatment of diabetes mellitus

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ABSTRACT

Diabetes mellitus has become a serious and chronic metabolic disorder that results from a complex interaction of genetic and environmental factors. The patient of diabetes had polyuria (passing excessive urine) Diabetes can be caused by too little insulin, resistance to insulin, or both. Diabetes is a chronic disease marked by high level of sugar in the blood. Diabetes mellitus is a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrates, fats and protein metabolism resulting from the defect in insulin secretion, insulin action or both.

More than 300 million individuals worldwide are affected by this condition, and the number is growing rapidly because current medical technology has no permanent cure Homoeopathy is one such area of medicine that has had some success in the treatment of diabetes. Diabetes can be caused by too little insulin, resistance to insulin, or both. Diabetes is a chronic disease marked by high level of sugar in the blood

Diabetes mellitus is a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrates, fats and protein metabolism resulting from the defect in insulin secretion, insulin action or both.

There are two major types of diabetes that is Type 1 DM, Type 2 DM. other types are Homoeopathy uses natural materials such as plants, animals, minerals to prepare medicines from. Plants form a major portion of homoeopathic medicines. Plants such as *Syzygiumjambolanum*, *Gymnemasylvestre*, etc. have long been used to treat diabetes traditionally as well as in homoeopathy. These plants act in reducing the blood glucose level.

Introduction:

Diabetes mellitus:

Diabetes Mellitus represents a medical condition characterized by disruptions in the metabolic processes of carbohydrates, fats, and proteins, and is often linked to either relative or absolute deficiencies in insulin. Diabetes is the body's failure to metabolize blood sugar properly. It represents a series of metabolic conditions associated with hyperglycemia and caused by defects in insulin secretion and/or insulin action. Exposure to chronic hyperglycemia may However result in microvascular complications in the retina, kidney or periphery. .The metabolic condition that is persistent has serious social, health, and economic repercussions, Diabetes mellitus is a rapidly spreading global issue. 285 million persons worldwide (or around 6.4% of the adult population) were reportedly affected by this illness in 20 I0. In the absence of better treatment or control, this figure is projected to rise to 430 million. The two main causes of the rise are aging and obesity. Furthermore, it has been demonstrated that nearly 50% of alleged diabetics do not receive a diagnosis until 10 years after the onset of the condition, indicating that the true prevalence of diabetes worldwide must be extremely high.the term "diabetes mellitus" was first used by the Greek doctor Aristaeus (OM). Diabetes is a Greek term that means "to pass through," and Mellitus is a Latin word that means "honey" (referring to sweetness). Diabetes has become a serious cause of concern in the modern world. It has had a potent effect worldwide and has affected people of all age groups. Another reason why it is such a troublesome factor is the fact that it is a gateway to multiple diseases such as coronary artery disease (CAD), cataract, blood pressure to name a few. People suffering from diabetes often fall prey to tons of other diseases.

Mechanism:

Diabetes mellitus (DM) is a set of related diseases in which the body cannot regulate the amount of sugar (specifically, glucose) in the blood. The blood delivers glucose to provide the body withenergy to perform all of a person's daily activities.The liver converts the food a person eats into glucose. The glucose is then released into the bloodstream. In a healthy person, the blood glucose level is regulated by several hormones, primarily insulin. Insulin is produced by the pancreas, a small organ between the stomach and liverThe pancreas also makes other important enzymes released directly into the gut that helps digest food. Insulin allows glucose to move out of the blood into cells throughout the body where it is used for fuel. People suffered diabetes either do not produce enough insulin (type 1 diabetes) or cannot use insulin properly (type 2 diabetes), or both (which occurs with several forms of diabetes)In diabetes, glucose in the blood cannot move efficiently into cells, so blood glucose levels remain high. This not only starves all the cells that need the glucose for fuel, but also harms certain organs and tissues exposed to the high glucose levels.

Diabetology's pathophysiology:

To create and sustain a healthy physiological state, a variety of systems and pathways in the human body work in unison. The capacity of the organism to maintain homeostasis, or a continual steady condition, is at the heart of these activities. The development of an injury or a pathological condition in multiple organs is caused by an aberration of homeostasis.

Glucerogen Regulation

Insulin is a 51-amino acid polypeptide made up of two chains (A and B) joined by disulfide bridges that are released by the B cells of the islet of Langerhans in the pancreas. Pro hormone convertases PC I and PC 2 as well

as exo-protease carboxypeptidase synthesize insulin from pro-insulin. Insulin and C peptide are produced by the activity of these enzymes. Two subunits (extracellular) and two f3 subunits (intramembrane), connected by disulfide bonds, make up the tyrosine kinase insulin receptor, which is where insulin binds. The tyrosine kinase insulin receptor's B subunit's autophosphorylation is encouraged by insulin's interaction with the receptor. Insulin instructs the liver to turn extra glucose into glycogen for storage. It also instructs other cells in the body, including adipose and skeletal muscle cells, to absorb more glucose by moving the glucose transporter GLUT4 to the cell surface. This assists in restoring normal glucose levels in the blood. whenever there is a low blood glucose level. Glucagon is produced when the pancreatic cells are stimulated. In order to maintain homeostasis, the liver is signaled by glucagon to release glucose from glycogen stores into the blood. Symptoms frequently include increased thirst and hunger as well as frequent urination.

Diabetes can lead to numerous health issues if it is not addressed. Acute complications can result in hyperosmolar hyperglycemia, diabetic ketoacidosis, or even death. Heart disease, stroke, chronic renal disease, diabetic foot ulcers, eye damage, nerve damage, and cognitive impairment are examples of serious long-term consequences. Diabetes results from either an insufficient amount of insulin being created by the pancreas or from the body's cells failing to react appropriately to that insulin. Glucose from food must enter cells for energy to be utilized, and insulin is the hormone that facilitates this process. Diabetes mellitus comes in three primary varieties. Because of the absence of beta cells, type 1 diabetes is brought on by the pancreas' inability to make enough insulin. Diabetes mellitus which is insulin-dependent or juvenile diabetes was the prior names for this kind. A negative autoimmune reaction results in beta cell loss. This autoimmune reaction has an unidentified cause. Despite typically developing in childhood or adolescence, type 1 diabetes can sometimes strike adults. Insulin resistance, a disease in which cells do not react to insulin as it should, is the precursor to type 2 diabetes. A shortage of insulin may also develop as the condition worsens. Previously, this type was referred to as "adult-onset diabetes" or "non-insulin dependent diabetes mellitus." Although type 2 diabetes is more prevalent in older folks, type 2 diabetes has become more prevalent in younger people as a result of a marked rise in childhood obesity rates. Combining an excessive body weight with insufficient exercise is the most frequent cause. The third major kind of diabetes, known as gestational diabetes, affects pregnant women who have never had the disease. After delivery, blood sugar levels in women with gestational diabetes typically return to normal. The chance of acquiring type 2 diabetes later in life is increased for women who had gestational diabetes during pregnancy. Injections of insulin are necessary to treat type 1 diabetes. Maintaining a healthy diet, routine exercise, a normal body weight, and abstaining from tobacco use are all necessary for the prevention and treatment of type 2 diabetes.

Causes :

The six subtypes of diabetes mellitus that fall into these categories include type 1 diabetes, type 2 diabetes, hybrid forms of diabetes, hyperglycemia first observed during pregnancy, "unclassified diabetes," and "other particular types." Examples of hybrid forms of diabetes include type 2 diabetes with a high risk of ketosis and adult-onset, immune-mediated hybrid diabetes. "Hyperglycemia originally found during pregnancy" refers to both gestational diabetes and pregnancy-related diabetes mellitus (type 1 or type 2 diabetes first diagnosed during pregnancy). The "other particular types" section has a few dozen potential explanations. Contrary to popular opinion, diabetes can present itself in a variety of ways, and some people may have more than one.

Types of diabetes mellitus :

1. **Idiopathic diabetes**

A distinguishing feature of type 1 diabetes is the loss of the insulin-producing beta cells in the pancreatic islets, which causes an insufficient amount of insulin to be produced. This group also includes immune-mediated and idiopathic diseases.

Most cases of type 1 diabetes are immune-mediated, in which a T cell-mediated autoimmune response causes the death of beta cells and, as a result, insulin. 10% of instances of diabetes mellitus in Europe and North America are caused by it. The majority of those affected are in generally good health and healthy weight when the start begins**.** In general, insulin responsiveness and sensitivity are typical, especially early on. Although type 1 diabetes now affects more adults than children, the term "juvenile diabetes" has historically been used to describe it since it frequently develops in youngsters. The phrase "brittle" diabetes, also known as unstable diabetes or labile diabetes, was historically used to characterize the significant and frequent swings in levels that frequently occur in insulin-dependent diabetes for no obvious reason. However, this phrase should not be utilized because it lacks a biological foundation. Yet erratic and unpredictable high blood sugar levels, the risk of diabetic keto acidosis, and dangerously low blood sugar levels can all be symptoms of type 1 diabetes. Infection, gastroparesis (which causes irregular dietary carbohydrate absorption), and endocrinopathies (such as Addison's disease) are some additional consequences. Impaired counter regulatory response to low blood sugar is another. Only 1% to 2% of people with type 1 diabetes are thought to experience these occurrences.

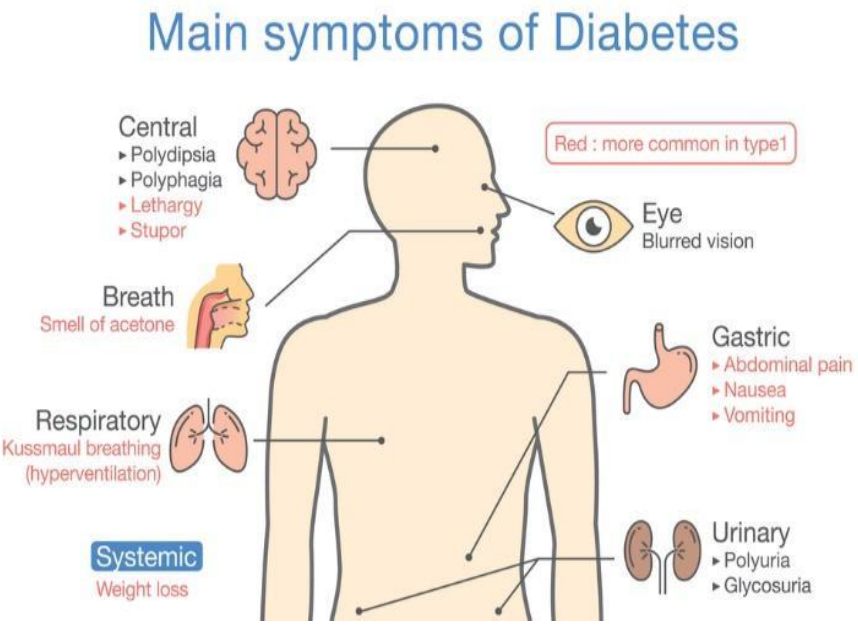

Fig 1 – symptoms of diabetes mellitus type 1

- **Diabetes type 1 and an autoimmune assault.**

Numerous genes, particularly specific HLA genotypes, are known to affect the risk of type 1 diabetes, and this condition is partially hereditary. One or more environmental variables, such as a viral infection or food, can cause the onset of diabetes in those with a genetic predisposition. Numerous viruses have been mentioned, but there isn't

enough concrete proof to prove this theory in regard to people as of yet. Although the mechanism is not fully understood, findings point to gliadin, a protein found in gluten, as one dietary element that may contribute to type 1 diabetes development. A significant percentage of people with type 1 diabetes are diagnosed in their adult years, though it can happen at any age. Type 1 diabetes in adults, which manifests more gradually than in children, is diagnosed as latent autoimmune diabetes of adults (LADA). Since there is a difference, some people refer to this condition as having "type 1.5 diabetes." Initial type 2 diabetes diagnoses for adults with LADA are frequently made based solely on their age rather than any underlying cause.

2. Type 2 diabetes :

Insulin resistance and perhaps decreased insulin production are two features of type 2 diabetes. The insulin receptor is thought to play a role in the impaired sensitivity of bodily tissues to insulin. The precise flaws, however, are unknown. Cases of diabetes mellitus with a recognised defect are given a different classification. The most prevalent kind of diabetes mellitus is type 2. Before reaching the criteria for type 2 diabetes, many persons with the disease have signs of pre -diabetes (impaired fasting glucose and/or impaired glucose tolerance). By making lifestyle adjustments or using drugs that increase insulin sensitivity or decrease the liver's synthesis of glucose, pre-diabetes can develop into overt type 2 diabetes more slowly or perhaps be prevented.

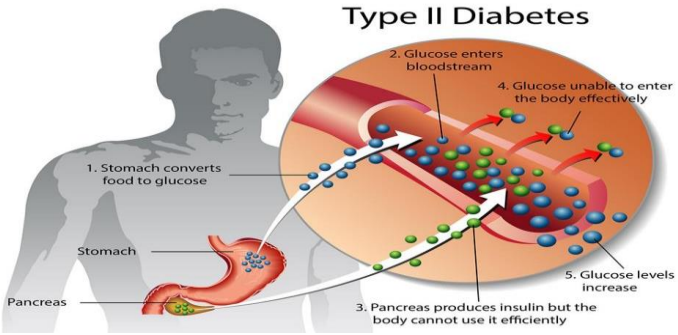

Fig 2 – type 2 diabetic mellitus

Genetics and lifestyle choices play a major role in type 2 diabetes. Obesity (defined as a body mass index greater than 30), a lack of physical exercise, a poor diet, stress, and urbanisation are among lifestyle variables known to have a role in the onset of type 2 diabetes. Dietary elements like drinks with added sugar are linked to a higher risk. The kind of fats consumed is also crucial, with polyunsaturated and monounsaturated fats decreasing risk while saturated and trans fats raising it. Some people may be more susceptible to developing diabetes if they don't exercise.

3. <u>Diabetic Pregnancy :</u>

With a combination of relatively insufficient insulin secretion and responsiveness, gestational diabetes is similar to type 2 diabetes in a number of ways. Between 2 and 10% of all pregnancies have it, and it may get better or go away after birth. All expectant women are advised to get tested beginning between 24- and 28-weeks' gestation. Due to the rise in insulin-antagonist hormone levels that take place during the second or third trimester, this is when it is most frequently identified. However, after delivery, it is discovered that 5 to 10% of women with gestational diabetes also have another kind of disease, usually type 2. Although completely curable, gestational diabetes necessitates close medical monitoring throughout the whole pregnancy. The use of insulin may occasionally be necessary, along with dietary modifications and blood glucose monitoring. Gestational diabetes can harm the mother's or the fetus's health, even if it may only be temporary. The baby is at risk for macrosomia (high birth weight), skeletal muscle anomalies, congenital heart and central nervous system abnormalities, and others. Infant

respiratory distress syndrome may be brought on by elevated insulin levels in a fetus's blood that prevents the foetal body from producing surfactants. When red blood cells are destroyed, the blood's bilirubin level can rise. In extreme circumstances, neonatal death may happen, most frequently as a result of insufficient placental perfusion brought on by vascular damage. When placental function declines, labor induction may be necessary. If the foetus is clearly in distress or if there is a higher risk of harm from macrosomia, such as shoulder dystocia

Homeopathic treatment for diabetes mellitus :

Homeopathy represents a mode of healthcare introduced by the German physician and chemist, Dr. C.F.S. Hahnemann. Homeopathy works at a deep level within individuals, harmonizing both the body and mind. In endocrine disorders, homeopathic medicine enacts a dual role: stimulating the gland in the event of inadequate secretion and regulating it when secrete is in excess. Such disorders often have a constitutional or genetic basis, in which homeopathic medicine adapts effectively, choosing remedies based on the individual's unique totality.

Homeopathy is a widely used and approved form of treatment for a variety of medical conditions. The majority of these issues have symptomatology in common Although the DNA Insulin product is only intended to lessen the secondary symptoms of diabetes, such as agitation, lack of appetite, aggravation when the weather changes, thirst, itching, and others; it was our goal to ascertain whether DNA Insulin had a discernible impact on the patients' metabolisms.

Homeopathy has a variety of known effects on metabolism. Research from Eastern Europe and Ireland by the Maitreya Corporation has revealed significant changes in the use of homeopathy in a variety of medical procedures.

Medicinal Plant Drug :

Biological Sourse: Syzygiumjambolanam

Synonyms-Syzygium Eugenia cumini,

other common names include jamun, Black plum, Indian Blackberry, Jamblang etc.

Family-Myrtaceae

Origin and distribution-The original home of *Syzygiumcumini*is India or the East Indies. It is found in Thailand, Philippines, Madagascar and some other countries. The plant has been successfully introduced into many other tropical countries such as the West Indies, East and West Africa and some sub tropical regions including Florida, California, Alge. A large tree cultivated throughout India for the edible fruits (Black Plum) and is reported to contain vitamin C, gallic acid, tannins, and anthocyanins, includes cyanidin, petunidin and other components.

Botnical distribution-The bark of the jamun looks like scaly and darkish brown in colour. The appearance of their leaves is oblong, glassy, leather like texture and fibroid in nature. The flowers are white in colour and have stalkless, good aroma and filmy layered petals. It can grow annually during the month of March to April. Mostly their flowers are structured in a bundle and develops up to a diameter of 6m. The fruiting process starts after 2 months of flowering stage and mostly they are found in clusters. Generally, jamun fruits ripens during the month of April to July. The flowers are numerous, scented, pink or nearly white, without stalks, and borne in crowed fascicles on the ends of the branchlets. The stamens are very numerous and as long as the calyx. Fruit is oval to elliptic;1.5-3.5 cm long, dark purple or nearly black, luscious, fleshy and edible; it contains single large seed.

Scientific classification-

Kingdom : Plantae
Order :Myrtales
Family :Myrtaceae
Genus :Syzygium
Species :Cumini
Binomial name :Syzygiumcumini

Parts used- seeds, leaves ,fruits , bark

The fabulous benefits of the jamun in human make it new research for reducing the financial burden on the Indian health care system are as follows:

- Purifies the blood and regulate the blood glucose level
- Maintain the normal urination and sweating
- Stimulates the liver function
- Rectify indigestion

Fig 3 – Jamun fruit

S.no	Parts of plant	Nutritional constituents	Chemical constituents	Bioactive constituents	Medicinal uses
1.	Seed	Moisture, crude fat, proteins, vitamins, minerals, carbohydrates	Polyphenols, Tannins, and some metals like zinc, chromium, sodium,	Hexahydroxydiphenoyl Glucose and its isomers hexahydroxydiphenic-acid	Diabeties, Liver disorder, Allergies, viral infection,

2.	Leaves	-	Aliphatic alcohols, betulinic acid, phenolic compounds	Myricetin 3-o-4"- acetyl alpha L- rhamopyranoside, tocopherol	Dysentry, inflammation
3.	Stem bark	-	Betulinic acid, tannis, ellagic acid	Beta-sitosterol, friedelin, myricetin,	Digestive problem, asthama, ulcers, removes the impurities from blood.
4.	Fruits	Carbohydrates, fats, proteins, vitamins, Sugar, non reducing sugar	Mallic acid, oxalic acid, citric acid, tannis	Anthocyanins, gallic acid, malvidin-3-laminaribioside, riboflavin	Diarrhoea, spleen and diuretic disease, stomach infection

Table 1 – Numerous constituents of the various parts of syzygiumjambolanam and its medicinal uses

Microscopy:

- ***Syzygiumcumini*seed :**

Shows cotyledons consisting of single layered epidermis, mesophyll composed of isodiametric thin-walled, parenchymatous cells fully packed with simple starch grains, oval ,rounded measuring 7-28 µ in diameter a few schizogenous cavities are also found.

- ***Syzygiumcumini*seed powder**:

Brown coloured; shows a few parenchymatous cells and numerous oval, rounded starch grains, measuring 7-28 µ in diameter

- ***Syzygiumcumini*stem bark :**

Mature bark shows a wide zone cork differentiated into upper and lower cork zones, forming a rhytidome; cork consisting of tangentially elongated rectangular cells, upper few layers thick, stratified and reddish brown, having groups of 2-4 stone cells and crushed elements of phloem; lower cork thin and colorless; cork cambium not distinct; secondary phloem composed of sieve elements, and phloem rays; phloem parenchyma thin walled and polyhedral in shape ; stone cells ,oval to angular, elongated fibresaseptate; both stone cells and fibres single or in groups present throughout this region; phloem rays 1-4 cells wide; reddish brown content ,rosette crystals of calcium oxalate and simple ,round to oval starch grains, measuring 5-11 µ in diameter.

Phytochemistry :

'Phyto' is the Greek word for plant. There are many families of phytochemicals and they help the human body in a variety of ways. Phytochemicals may protect human from a host of diseases. Phytochemicals are non nutritive plant chemicals that have protective effects and disease preventive properties. Fruit of *Syzygiumcumini*contains Malic

acid is the major acid (0.59 of the wt. of fruit), a small quantity of oxalic acid is also reported to be present. Gallic acid and tannins account for astringency of the fruit. The Fruit of *Syzygiumcumini*is purple in colour due to the presence of cyaniding diglycosides.

***Syzygiumcumini*seed powder**: Brown coloured shows a few parenchymatous cells and numerous oval, rounded starch grains, measuring 7-28 µ in diameter. *Syzygiumcumini*seeds are extensively used for various ailments such as anti-inflammatory, hypolipidemic, antidiabetic and antioxidant, neuroprotective and recently it has been reported for the DNA protection against radiation. Although the *syzygiumcumini*seeds were used for several biological activities; the possible cardioprotective activity reported the effect of the *Syzygiumcumini*(Jamun) seeds against the DOX induced acute myocardial stress in rats. Phytochemicals such as saponins, terpenoids, flavonoids, tannins, steroids and alkaloids have anti-inflammatory effects .Glycosides, flavonoids, tannins and alkaloids have hypoglycemic activities. *Syzygiumcumini*might be responsible for its high antioxidant activity.

Fig 4 jamun seeds

Anti-diabetic activity

Different parts of jambolanespicially fruits, seeds and stem bark possesses promising activity against Diabeties mellitus and it has been confirmed by several experimental and clinical studies. the seed of Jamun possesses antihyperglycemic effects in both types 1 and 2 models of DM.Jamun seed and pulp extract stimulated the release of insulin from the cultured Langerhans cells from both normal and diabetic rats, with better effects seen in the cells from the normoglycemic animals. The pulp and seed extracts were also found to inhibit the hepatic and renal insulinase activity in a concentration-dependent manner. In addition to decreasing hyperglycemia and hyperinsulinemia, animal studies have also shown that Jamun seeds prevented the diabetes-induced secondary complications such as nephropathy, neuropathy, gastropathy, diabetic cataract and also decreased peptic ulcer diseases. These properties are useful in the management of the hyperglycemia-induced complications and in improving the quality of life of the patients.

Jamun Inhibits a-Glucosidases:

a-Glucosidase inhibitors (acarbose, miglitol, and voglibose), which inhibit the digestion of carbohydrates, are used to establish greater glycemic control over hyperglycemia in DM type 2, particularly with regard to postprandial hyperglycemia.In vitro studies by Ahmed et al.46 have shown that the Jamun extract significantly inhibited the a-amylase, aglucosidase, and sucrase activities in a dose-dependent manner. The heat treatment of the sample resulted in a significant increase in the a-amylase inhibitory activity of the sample, while a marginal increase in the

a-glucosidase and sucrase inhibitory activities was observed. These findings emphasize that inhibition of carbohydrate hydrolyzing enzymes is one of the mechanisms through which Jamun exerts its hypoglycemic effect in vivo.

Jamun Improves Glucose Utilization and Maintains

Glucose Homeostasis

In the postprandial state, insulin promotes the uptake of glucose by tissues, glycolysis, oxidation, and glycogenesis. Studies suggest that administering Jamun increases glycogen content in the liver and muscle cells of diabetic animals7–12,15,16,28 and increases the activities of enzymes crucial for glycogenesis, glycolysis, and concomitantly decrease enzymes involved in gluconeogenesis.

Materials and methods

Materials

Dried jamun (syzyniumjamboalam) were procured from the local market of Bhilai and were grounded into a course powder. High purity commercially available chemicals of AR grade were used in the investigation for different analysis.

S.no	Parameters	Fruit	Seed	Seed kernel
1.	Colour	Dark purple	White to pink	Black
2.	Shape	Oblong	Oblong	Oblong
3.	Texture	Smooth	Coarse	Coarse

Table 2 – Physical characteristic of jamun fruit and seed

Method for preparation of jamun seeds extract

Ultrasonication assisted extraction

25g of jamun seed powder was mixed with 100ml of ethanol and ultrasonicated for 40sec at 20KHz. It was then subjected to shaking for 3hrs and then filtered using filter paper. It was then concentrated using vacuum rotary evaporator at 50degrees and stored at 4-5degrees for further analysis.

Fig 5 – preparation of extract

Phytochemical Screening of Extract:

- **Detection of alkaloids:** Extracts were dissolved individually in dil. Hydrochloric acid and filtered. The filtered acidified extracts were then subjected to the following tests:

  Mayer's Test: Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow colored precipitate indicates the presence of alkaloids.

  Wagner's Test: Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

  Hager's Test: Filtrates were treated with Hager's reagent (saturated picric acid solution). Presence of alkaloids confirmed by the formation of a yellow colored

- **Detection of glycosides:** (Coumarin glycosides) Alcoholic extract when made alkaline, shows blue or green fluorescence indicating the presence of glycosides.

- **Detection of tannins**
  Gelatin Test: To the extract, 1% gelatin solution containing sodium chloride was added. Formation of white color precipitate shows the presence of tannins in the extract.

Detection of flavonoids

Alkaline Reagent Test: Extracts were treated with few drops of sodium hydroxide solution. Development of deep yellow color, which becomes colorless on the addition of dilute acid, shows the presence of flavonoids.

Lead acetate Test: Extracts were treated with few drops of lead acetate solution. Development of yellow color precipitate shows the presence of Flavonoids`

Test for detection	Observation	Inference
1.Alkaloids:		
-Hager's test	Positive	Alkaloid present
2. Flavoniods:		
-Alkali reagent test	Positive	Flavonoid present
-Sulphuric acid test	Positive	Flavinoid present
3.Tannis:		
-Gelatin test	Negative	Tannins absent

Table 3 – Phytochemical screening of jamun seed extract

Preparation of dilution series:

The extract is taken into five different test-tubes in a concentration series of 0.1ml, 0.2ml, 0.3ml, 0.4ml, 0.5ml then each test tube is diluted with 10ml of water.

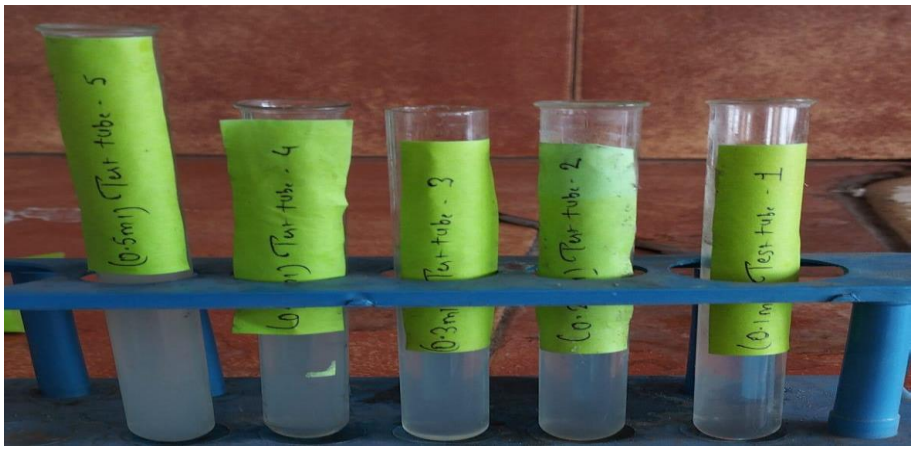

Fig 6- Hypotonic solution of different concentrations

Observation of sample in UV Spectrophotometer

Standard sample 0.1ml

0.2ml 0.3ml

0.4ml 0.5ml

Concentration:	Absorbance:
Standard smaple	375nm – 380nm
0.1ml	210nm – 215nm
0.2ml	230nm - 235nm
0.3ml	250nm - 255nm
0.4ml	280nm - 285nm
0.5ml	310nm - 315nm

Table 4 – observed values of diluted samples in uv spectrophotometer

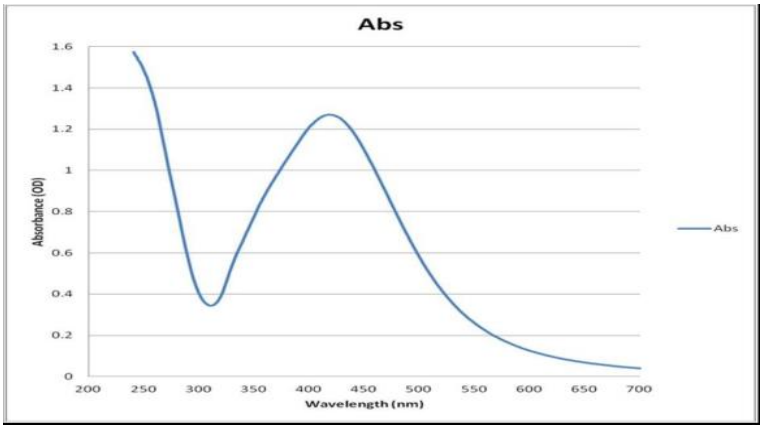

Fig 7 - Uv radiation absorbance of syzyniumjambolanam

Evaluation Process

Specimen details:-
Name - BALB/c
Gender - Female
Weight - 0.185 kg
Blood glucose level (standard) - 156 mg/dL

Process:

- **Collection of blood sample and glucose determination:**

Blood samples were collected by end tail vein cutting method and blood glucose level was determined by using a one touch electronic glucometer, using glucose strips.

- **Induction of glucose**

30g glucose in water has been given to rat in order to increase the blood glucose level.

- **Introduction of syzyniumjambolanam ethanol extract in terms of homeopathy:**

The ethanol extract of syzyniumjambolanam is introduced to BABL/c in the homeopthic formulation for 7 days.

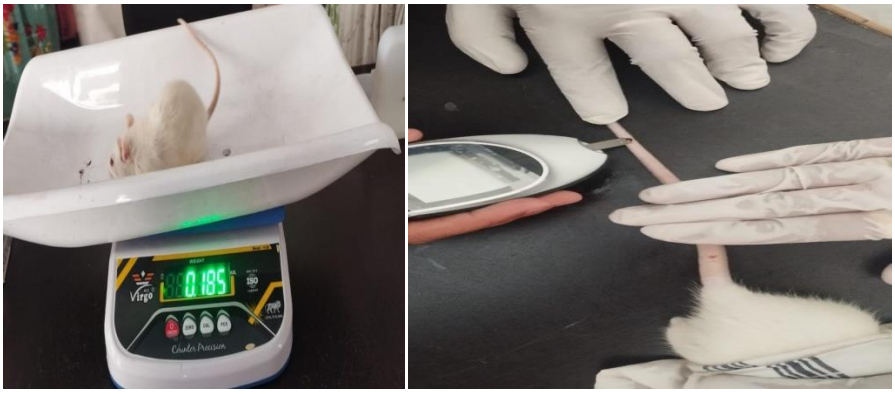

Fig 7 – weighing & taking blood sample.

Fig8 – Induction of glucose to BABL/c for 48 hrs

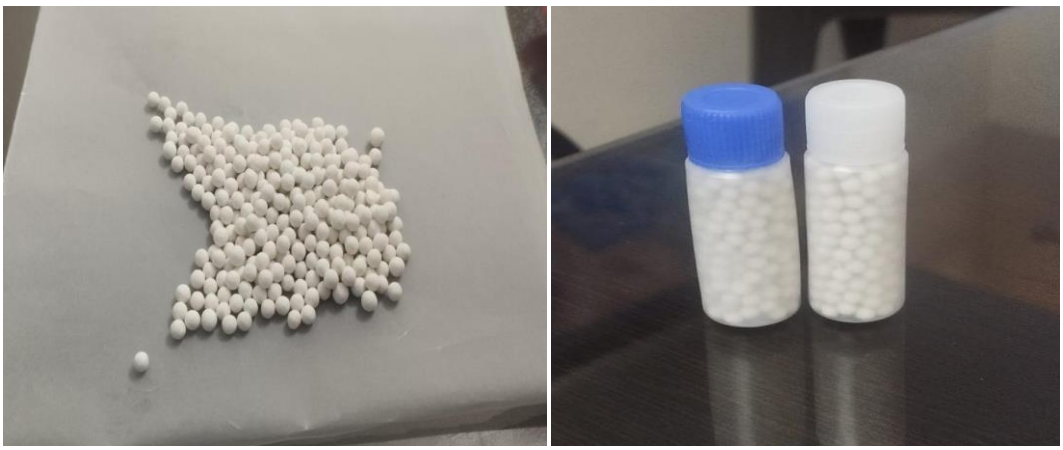

Fig 9– Homeopathic diabetes medication introduced to BABL/c

Fig10 – Checking weight & glucose level after inducing medicine for 7 days

Days	**Glucose level** (mg/dL)	**Weight** (kg)
Day 1	160	0.187
Day 2	158	0.185
Day 3	156	0.185
Day 4	154	0.184
Day 5	150	0.184
Day 6	147	0.185
Day 7	143	0.185

Table 5 – Glucose level chart after inducing medicine

Conclusion-

The effect of *Syzygiumcumini*and its phytochemicals should also be investigated for its anti- diabetic activity and chemo preventive effects in other models of carcinogens, that includes chemical, radiation and viral carcinogenesis models. Mechanistic studies responsible for the chemo preventive and radioprotective effects are also lacking and need to be studied in detail The *Syzygiumcumini*also known as the jamun plant contains
a diverse assortment of secondary metabolites i.e. alkaloids ,flavonoids, terpenoids, steroids, tannins, saponins and reducing sugars that play a vital role in preventing various diseases. The antidiabetic, anti-inflammatory, antiviral, antibacterial, anti analgesia, anti-oxidant, anti-abortifacient of the various parts of plants is due to the presence of diverse secondary metabolites. Studies should also be on understanding which of the phytochemicals are responsible for the observed beneficially effects. Although most of the studies of *Syzygiumcumini*as antidiabetic agent with its possible mechanism of action and delaying complications of diabetes such as cataract, neuropathy have been conducted but detailed research on isolation of bio actives through clinical trials followed by standardization is seriously required to know potential of plant .Most of the pharmacological work was carried out on seeds of *Syzygiumcumini*but the pharmacological potential of other parts also required to be explore.

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