

# Evaluation of antidiabetic and phytochemical activity of 50% methanolic extract of jamun seed (*syzygium cumini*)

<sup>1</sup>Deepika Yadav, <sup>2</sup>Adarsh Lalit, <sup>3</sup>Siddharth Singh, <sup>4</sup>Jyoti M Galgut and <sup>5</sup>M.Aadil Beg

<sup>1,2,4,5</sup>Genesis Institute of Biomedical Research, BHEL Habibganj, Bhopal (M.P) India

<sup>3</sup>Noble College, Sagar (M.P) India

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## ABSTRACT :

Jamun (*syzygium cumini*) is an important medicinal plant of india. The present study was carried out to identify antihyperglycemic activity and the putative antidiabetic compound from the *S. cumini* [SC] seed .The 50% methanolic extract of *syzygium cumini* seeds have the anti-hyperglycemic properties and give positive result on alloxan- induced diabetic mice. Phytochemical analysis was investigated. Flavonoids are strongly present in extract, biologically active phytochemical alkaloids, terpenoids and tannins are also present.

*syzygium cumini*, anti-hyperglycemic, alloxan- induced diabetes.

## Introduction :

Diabetes mellitus is a chronic disorder of carbohydrate, fat and protein metabolism that cause by the defective or deficient insulin secretory response by pancreas. It is a heterogeneous group of disorders that have hyperglycemia as a common feature. It may occasionally arise secondarily from any disease causing extensive destruction of pancreatic islets, including pancreatitis, tumors, certain drugs, iron overload (hemosiderosis), certain acquired or genetic endocrinopathies and surgical excision. Diabetes mellitus divided into two common variants type 1 (insulin-dependent diabetes mellitus, IDDM) and type 2 (non-insulin-dependent diabetes mellitus, NIDDM). In Type 1 diabetes, for example, the islet cells of the pancreas fail to produce an amount of insulin adequate to allow blood glucose to enter cells where it's used for energy. In type 2, the cells may resist insulin's action, once again leaving too much glucose in the blood .

Over the last few years many researchers has been done to identifying and validating plant derived substances for the treatment of various diseases. Many of the modern medicines are produced indirectly from medicinal plants, for example aspirin. The Jamun (*syzygium cumini*) is another plant, which has enormous traditional uses against various diseases.

The *Syzygium cumini* (or *Eugenia jambolana*)

tree belongs to the Myrtaceae family. This also called as jamun, jambul and jambol in india and malaya. The bark of jamun is acrid, sweet, digestive, astringent to the bowels, anthelmintic and used for the treatment of sore throat, bronchitis, asthma, thirst, biliousness, dysentery and ulcers. It is also a good blood purifier.[9] [Muniappan and Panddurangan, 2012]. In Union medicine various parts of Jambolan acts as liver tonic, enrich blood, strengthen teeth and gums and form good lotion for removing ringworm infection of the head. *E. jambolana* leaf extract showed hypoglycemic action in diabetic rats [5]. *Eugenia jambolana* Lam., commonly known as black plum or "jamun" is an important medicinal plant in various traditional systems of medicine. It is effective in the treatment of diabetes mellitus, inflammation, ulcers and diarrhea and preclinical studies have also shown it to possess chemopreventive, radioprotective and antineoplastic properties [11]. The study revealed that *Syzygium cumini* extracts contains rich availability of carbohydrates, phenols, flavonoids and tannins as their secondary metabolites. Further the ethanolic extracts of leaves and aqueous extracts of seeds were found to have very high anti microbial property for wide range of gram positive and gram negative bacterial strains. Various extracts of fruit and seeds of *Syzygium cumini* were found to have antidiabetic, anti-inflammatory, hepatoprotective, antihyperlipidemic, diuretic and antibacterial

activities [2,3,6]. The antibacterial properties of "Syzygium aromaticum" commonly known as "Clove" tested against food borne pathogens (*S. aureus*, *P. aeruginosa*, *E. coli*). The addition of metal ions ( $Zn^{++}$ ,  $Cu^{++}$ ,  $Pb^{++}$ ,  $Ca^{++}$ ,  $Mg^{++}$ ,  $Fe^{++}$ ) along with methanolic extract of clove samples gave positive results against test organisms [1]

### **Experimental Details:**

#### **2.1 Plant material**

The fully mature *Syzygium Cumini* seeds were collected in June- July 2012 from, Saket Nagar Bhopal (M.P.) India from a single tree.

#### **2.2 Preparation of plant extract**

The *Syzygium cumini* fruits were first washed well and pulp was removed from the seeds. Seeds were washed several times with distilled water to remove the traces of pulp from the seeds. The seeds were dried on Shade, powder was further extracted by 50% methanol by maceration technique. Extract was collected at crystal form and further subjected.

#### **2.3 Induction of Diabetes**

Male albino mice 25-30 g were used for this experiment. Alloxan monohydrate dissolved in sterile normal saline at dose 120 mg/kg, was injected intraperitoneally to the overnight fasted mice. Food was provided to them 2 h after the injection. After a few nights, mice with marked hyperglycemia were selected and used for the study.

#### **2.4 Experimental design**

Adult albino mice were taken and divided into three groups each containing six animals. Group 1 (untreated normal mice as control) group 2 (treated mice) group 3 (known drug treated mice). The mice showing stabilized diabetes having fasting blood glucose values 95 mg/dl or above was considered as diabetic animals consider it as zero day. Dosing with the aqueous extracts was started on the 1st day and continued for 15th days. Fasting blood glucose was determined on day 0, 1, 3, 5, 7, 9, 14 of the study by the glucometer.

### **Results and Discussion:**

Out of nine there are three mice is used as controlled in one group. Similar diet is given to all the group describe below including this group of mice as per guideline of CPCSEA. This group has not given any of drug or exposure after inducing diabetes. All the mice are positively increase the blood sugar level. During the experiment one mouse was died on 7th day. (Table 1)

One other group having three mice was administered with known drug (Glimepiride) given the positive response towards the reduction of blood glucose level in all the mice. In this experiment one mice was died followed by 7th day. Average blood glucose of all the mice was taken for plotting the graph.

A last group of three mice were administered with 50% methanol *Syzygium cumini* extract. This extract gives the positive response according to control diabetes mice. This are gives better performance than the control group. (Graph 1)

A.N. Nagappa et al, 2003, study the effect of the petroleum ether, methanol, and aqueous extracts of *Terminalia catappa* Linn (combretaceae) fruit, on fasting blood sugar levels and serum biochemical analysis in alloxan-induced diabetic rats were investigated. All the three extracts of *Terminalia catappa* produced a significant antidiabetic activity at dose levels 1/5 of their lethal doses. Concurrent histological studies of the pancreas of these animals showed comparable regeneration by methanolic and aqueous extracts which were earlier, necrosed by alloxan.

Rao and Naidu (2010) suggested that the plant extract (methanolic) of *Rhinacanthus nasutus* was capable of ameliorating at the dosage of 200 mg/kg, hyperglycaemia in streptozotocin-induced diabetic rats and could be a potential source for isolation of new orally active agent(s) for anti-diabetic therapy.

Mohammed Fazil Ahmed et al, 2010, conclude that alcoholic whole plant extracts of *Vinca rosea* at high dose (500mg/kg) exhibited significant antihyperglycemic activity. These extracts also showed improvement in parameters like body weight and lipid profile as well as regeneration of cells of pancreas and so might be of value in diabetes treatment. Further investigation is necessary to

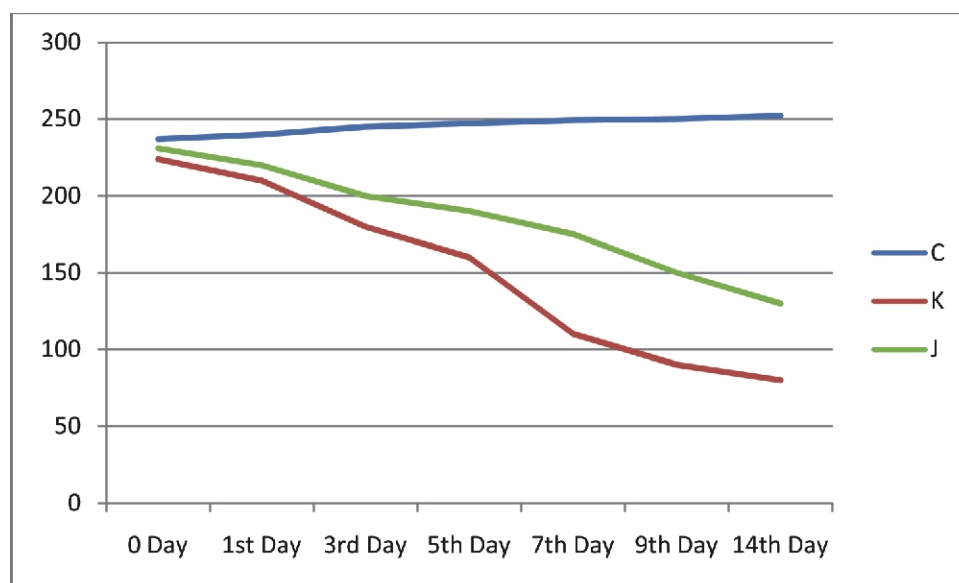
determine the exact phytoconstituents (s) responsible for antidiabetic effect.

In light of the results, our study indicates that methanolic extracts of *syzygium cumini* exhibited significant anti-hyperglycemic activities in alloxan-induced hyperglycemic rats through

the regeneration of cells of pancreas. We perform the Phytochemical test of *syzygium cumini* seeds and observed that alkaloids, terpenoids, and tannins are present and flavonoids are strongly present. These phytochemical shows the anti diabetic activity.(Table 2)

Table

Code of mice	0 Day	1st Day	3rd Day	5th Day	7th day	9th day	14th day
C	237	240	245	247	249	250	252
K	224	210	180	160	110	90	80
J	231	220	200	190	175	150	130



Graph 1: Comparative effect of known drug (K), Jamun seed extract (J) on blood glucose level in alloxan induced diabetic in rats. C= control mice.

Table 2: PHYTO-CHEMICAL ESTIMATION

Sr. No.	Phytochemical nature	Jamun(50%methanol extract)
1	Alkaloids	+
2	Flavonoids	++
3	Terpenoids	+
4	Steroids	-
5	Tannins	+
6	Saponins	--

**Conclusion :**

From the above discussion it conclude that 50% methanolic plant extracts of *syzygium cumini* at exhibited significant antihyperglycemic activity. *syzygium cumini* is an organic and natural product may give the better response towards the diabetes. Regular use of Jamun may reduce the diabetic activity and also work as a poor men friendly and it will be a good drug of choice. Further investigation is in necessary to determine the exact phytoconstituents responsible for antidiabetic effect.

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Corresponding Author:

*Deepika Yadav*

E-mail : gibrbhopal@gmail.com