

Research Article

ANTIHYPERLIPIDEMIC ACTIVITY OF *SYZYGium CUMINI* LINN. SEED EXTRACT ON HIGH CHOLESTEROL FED DIET RATS

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ABSTRACT

Aim: Preliminary phytochemical studies and Antihyperlipidemic activity of *Syzygium cumini* Linn. Seed Extract was investigated. **Materials and Method:** Hyperlipidemia was induced in rats by giving high cholesterol diet (2% cholesterol, 1% sodium cholate and 2% coconut oil) for seven days in standard rat chow diet. The Alcoholic extract of *Syzygium cumini* seeds (100 mg/Kg body weight) was orally administered once a day to rats fed with a high cholesterol diet for seven days. **Results and Discussion:** High cholesterol fed diet rats exhibited significant increase in serum cholesterol, triglycerides, low density lipoproteins, very low density lipoprotein, atherogenic index and significant decrease in high density lipoproteins, high density lipoproteins ratio. Treatment with extract significantly decreased serum cholesterol, triglycerides, low density lipoproteins, very low density lipoprotein, atherogenic index and significantly increased the high density lipoproteins, high density lipoproteins ratio in hyperlipidemic rats. **Conclusion:** Antihyperlipidemic activity of Alcoholic extract of *Syzygium cumini* Linn. which may be due to the presence of alkaloids, Flavonoids, Phenols, Saponins, Tannis (Gallic acid, Ellagic acid) and Triterpenoids found in the preliminary phytochemical screening.

Introduction

Coronary arterial diseases are responsible for more deaths than all other associated causes combined. Elevated serum cholesterol levels leading to atherosclerosis can cause coronary heart disease (CHD)¹. Hyperlipidemia is a major cause of atherosclerosis and atherosclerosis-associated conditions, such as coronary heart disease (CHD), ischemic cerebrovascular disease, and peripheral vascular disease². Among these hypercholesterolemia and hypertriglyceridemia are closely related to ischemic heart disease³. Reduction in serum cholesterol levels reduces the risk for CHD, substantially¹. Currently available hypolipidemic drugs have been associated with a number of side effects. Medicinal plants play a major role in antihyperlipidemic activity³. The plant *Syzygium cumini* Linn. (Myrtaceae) species is distributed in India where it is used as a antiasthmatic, anti-diarrhoeal, and anti-diabetic remedy. Current investigation was to study effect of alcoholic extract *Syzygium cumini* Linn. of seed in high cholesterol diet induced hyperlipidemia in rats.

Material and Method

Chemicals

Cholesterol, sodium cholate and coconut oil were all purchased from SD-fine chemicals, India., All other reagent used was of analytical grade.

Instrument

UV spectrophotometer (Shimadzu-UV-1601), Centrifuge Machine (Etek-research centrifuge-TC-4100D).

Collection and Authentication of Plant Material

The seeds of *Syzygium cumini* Linn. were collected from the college campus of Modasa-Gujarat (India) and were authenticated by Dr. M.S.Jangid, Botany Department from Sir P.T Science College-Modasa, India. The seeds were dried, grinded and the powder was used for the extraction.

Extraction of Plant Material

The fruits of *Syzygium cumini* Linn. (Jamun) were washed well and pulp was removed. The seeds were washed with distilled water to remove the traces of pulp from the seeds and were dried at room temperature. The seeds were powdered in an electrical grinder and stored until further use. The powdered seeds were extracted in a Soxhlet with 95% ethanol at a temperature of 50 °C for 12 h. The

resultant extract was filtered. The filtered extract was then concentrated to dryness on a water bath at a temperature of 40°C. The dried mass was stored in a refrigerator and considered as the extract⁵.

Preliminary phytochemical screening

Preliminary phytochemical screening of the Jamun seed extract was carried out for the detection of the various plant constituents⁶.

Animals

Sprague Dawley female rats weighing 200-250 gm were acclimatized to the experimental room having temperature 23 ± 2 °C, controlled humidity conditions, and 12:12 hour light and dark cycle. Animals were caged in polypropylene cages in a group with maximum of three animals per cage. The rats were fed with standard food pellets and water *ad libitum*. The study was approved by Institutional Animal Ethical Committee, Shri B. M. Shah College of Pharmaceutical Education and Research, Modasa, Gujarat, India (IAEC/BMCPER/02/2008-09).

Induction of hyperlipidemia

High Cholesterol diet was prepared by mixing cholesterol 2%, sodium cholate 1% and coconut oil 2%, with standard powdered standard animal food. The diet was placed in the cage carefully and was administered for seven days.

Dose Preparation and Administration of Extracts

The extract of Jamun seed was dissolved in distilled water and a dose of 100 mg/Kg was given to the animals once in a day along with the High Cholesterol diet orally. Treatment was given daily for seven days.

Protocol for Antihyperlipidaemic Activity

The experimental animals were divided into three groups, six animals in each group

- Group-1: Normal
- Group-2: High cholesterol diet control
- Group-3: High cholesterol diet treated with Jamun Extract [100 mg/kg body weight (b.w.), Orally (p.o.)]

Blood sample collection and analysis

On the 8th day, blood was collected by retro-orbital sinus puncture, under mild ether anaesthesia after 8 hr fasting and allowed to clot for 30 minutes at room temperature. Blood samples were centrifuged at 3000 rpm for 20 minutes. Serum was separated and stored at -20°C until biochemical estimations were carried out. Serum samples were analyzed spectrophotometrically for Cholesterol, triglyceride and HDL-C was estimated using diagnostic kits which were procured from Lab-Care Diagnostics (India) Pvt. Ltd.- Mumbai (India).

VLDL, LDL, HDL-ratio and Atherogenic index were calculated by using the formula of Friedewald and colleagues⁷.

Statistical Analysis

Experimental results were mean ± SEM of 6 animals. Statistical differences between the means of the various groups were evaluated using one-way analysis of variance (ANOVA) followed by Tukey test. Data were considered statistically significant only when p value < 0.05.

Result and Discussion

The rats fed with High cholesterol diet for seven days exhibited significant increase in Serum cholesterol, Triglyceride, LDL, VLDL, Atherogenic index and significant decrease in HDL and HDL ratio (Table no. 1). Effect of one week treatment with Jamun Extract at a dose of 100 mg/kg b.w., p.o. significantly reduced the elevated serum cholesterol, LDL, Atherogenic Index and significantly increased the HDL-C, HDL-ratio. The Gymnema extract had significant effect on Triglyceride as well as VLDL. This finding proves that the seed extract of Jamun can be used for the treatment of Hyperlipidemia. Hence, apart from the wide usage of Jamun seed as antidiabetic it can also be used for the treatment of Hyperlipidemia.

Conclusion

The Jamun extract at a dose of 100 mg/kg body weight orally showed Antihyperlipidemic activity which may be due to presence of Flavonoids, Phenols, alkaloids, Tannis (Phenolic compounds) and Triterpenoids found in the preliminary phytochemical screening. Further studies are needed to evaluate the antihyperlipidemic potential of the Jamun seed in clinical study.

Table 1: Effect of *Syzygium cumini* seed extract on various parameters in High cholesterol diet rats.

Parameter	Normal	High Cholesterol Diet Control	High cholesterol diet treated with Jamun Extract (100 mg/kg b.w., p.o.)
Cholesterol (mg/dl)	65.82±1.90	378.73±4.99*	282.02±6.38**
Triglyceride (mg/dl)	77.83±7.89	181.79±10.24*	125.89±05.23**
HDL-C (mg/dl)	2.08±1.20	1.56±0.90*	1.54±0.89**
LDL (mg/dl)	6.21±6.57	447.38±21.65*	321.17± 26.10**
VLDL (mg/dl)	17.48±0.48	36.35±1.29*	25.17±0.50**
HDL-ratio	178.49±14.52	4.47±0.35*	13.1±00.61**
Atherogenic Index	2.08±0.10	8.56 ±0.09*	4.25±0.20**

Each value is mean ± S.E.M. (n = 6)

*Significantly different from Normal groups (p< 0.05).

**Significantly different from high cholesterol diet control groups (p< 0.05).

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