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Research Article

Hypocholesterolemic Effect of Ethanolic Extract of Fruits of *Terminalia Chebula* in High Fat Diet Fed Foster Rats

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ABSTRACT

The effect of ethanolic extract of fruits of *Terminalia chebula*, given orally at doses 500mg/kg (Dose-A) & 250mg/kg (Dose-B) for 30 days. Extract showed significant reduction of serum level of cholesterol and triglycerides in hyperlipidemic rats.

Keywords: Cholesterol, *Terminalia chebula*, Hypocholesterolemia, Tri Glyceride.

1. INTRODUCTION

Increased plasm lipid level, mainly total cholesterol(TC), triglycerides(TG) and low density lipoproteins(LDL) along with decrease in high density lipoproteins(HDL) are known to cause hyperlipidemia which is core in initiation and progression of arteriosclerosis impasse. Therefore, prime consideration in therapy for hyperlipidemia and arteriosclerosis is to enervate the elevated plasma levels of TC,TG and LDL along with increase in HDL lipids levels[1].

Terminalia chebula Retz. belonging to the family-Combretaceae, commonly known as harde, is a deciduous tree found throughout the Indian forests and plains. The tree is about 15-25 m. in height and 1.5-2.5 m. in girth. Harde is drupe, brown in color. It is ovate longitudinallywrinkled, 2 to 3.5 cm. Long and 1.3 to2.5 cm. Broad. Fruit has 5 to 6 ribs. Fruit is astringent, antiseptic, rejuvenative, tonic, anthelmintic and laxative. It is used in chronic ulcer wound, piles and stomatitis.[2-4].

Fruit contain about 30-32% of tannin, free tannic acid, gallic acid and ellagic acid, glucose and sorbitol[4,5].

2. EXPERIMENTAL

2.1 Plant material

Fruit of Terminalia chebula obtained from Yucca enterprises,Mumbai, were authenticated and identified by Dr.A.B.Sheerwani. (Retd. Prof. and Head), Deptt. of Botany, Holkar Science College, Indore. A voucher specimen has been deposited in our laboratory for further reference.

2.2 Preparation of extract

Powdered fruit were soxhlet-extracted with 90% ethanol. The ethanolic extract was evaporated in vacuo and residue(yield:21.5%w/w).

Preliminary phytochemical analysis shows the presence of glycosides, tannins, phenolic compounds and flavonoids[6].

2.3 Chemicals

The concentrate was weighed and the two doses were prepared, *dose A* 500gm/kg of body weight and *dose B* 250 gm/kg of body weight were prepared.

Cholesterol, triglyceride kits were purchased from the authorized dealer. A strip of Stanlip (references standard) was also purchased from the authorized pharmacy.

2.4 Preparation of normal and high fat diet

Along with this normal diet two high fat diets were prepared namely *Diet A* and *Diet B*. *Diet A* contains powdered soybeans chunks, milk powder, egg albumin and salt. *Diet B* contains powdered soybean chunks, milk powder, cheese, vanaspati and salt.

The final percentage of each component in the diets was as follows: Carbohydrate 65%, Proteins 15%, Fat (diet A) 18%, (diet B) 22%, salt 2%, fiber 2%. [7]

2.5 Animals

Foster rats (150-250g) were obtained from the experimental animal house, School of Life Science, Devi Ahilya University, Indore. They were maintained under standard housing condition (Room temperature 25±2^{0}c and 45-55% RH with 10:14h, L:D cycles). The animals were given standard laboratory feed and water ad libitum. The study was cleared by Animal ethics committee (School of Life Science, Devi Ahilya University, Indore). All the animals received humane care according to criteria outlined in the guide for the care and use of laboratory animals prepared by the national academy of the sciences and published by national institute of health.

Animals were divided into 9 groups of 6 animals each. 1) Control. 2) Diet A. 3) Diet B. 4) Diet A+ std drug, 5) Diet B + std drug, 6) Diet A + extract dose A. 7) Diet A + ext dose B. 8) Diet B + extract dose A. 9) Diet B + extract dose B.

Forced oral feeding of the high fat diet that induced hypercholesterolaemia was treated for 30 days. At the end of this period blood samples were collected after fasting overnight. The animals were anesthetized by ether and blood samples were collected with the help of disposable syringe by cardiac puncture.

2.6 Studied activity

Total serum cholesterol estimation

Total serum cholesterol was determined using Cholesterol PAP kit form Beacon Diagnostic pvt ltd Navsari[8]

Triglyceride estimation

Triglyceride estimation was done by triglyceride kit using GPO/PAP method, from Crest biosystems, a division of Coral Clinical systems, Goa.[9]

2.7 Statistical analysis

The data expressed as mean ± S.E.M. were analyzed by students t-test. A value of $P<0.01$ was chosen as the criteria of statistical significance.

3. RESULTS

Reported in Table I.

4. DISCUSSION

In the present study we have investigated the antihyperlipidemic effect of *Terminalia chebula* extract in high fat fed rat. The ethanolic extract of *Terminalia chebula* showed significant hypocholesterolemic activity when orally administered in rats.

Tannins have been reported to increase faecal bile acid excretion, thereby leading to reduction in cholesterol levels. Secondary plant metabolites such as alkaloids and tannins from the extract may be responsible for the antihyperlipidemic activity. The decrease in plasma cholesterol level could be due to inhibition of cholesterol biosynthesis, decreased absorption of dietary cholesterol, reduced level of serum cholesterol and to increased faecal bile acid excretion. It is evident from the results that feeding *Terminalia chebula* extract along with fatty diet for 30 days resulted in less marked cholesterol and triglycyrides as compared to the control group i.e. the group maintained on fatty diet (Diet A and B)alone. These results offer pharmacological evidence on the folkloric uses of *Terminalia chebula* fruits for hypocholesterolemia.

Thus on the basis of results of the present study, it can be concluded that *Terminalia chebula* have a definite potential as hypocholesterolemic activity. Further research on the fractionation of extract, isolation, purification and characterization of active constituents responsible for the hypocholesterolemic activity and their mechanisms are in progress.

Table I. Effect of *Terminalia chebula* ethanolic extract and Stanlip on cholesterol and triglyceride in the serum of foster rats of both sexes at the end of 30days experiment

Group	Treatment	Cholesterol*in mg/dL	Triglyceride* in mg/dL
I	Control	215.1 ± 2.8	117.1 ± 2.5
II	Diet A	224.4 ± 3.9	148.2 ± 4.1
III	Diet B	227.8 ± 4.1	151.5 ± 4.6
IV	Diet A + Std drug	208.4 ± 1.9	113.2 ± 2.1
V	Diet B + Std drug	209.1 ± 2.2	115.6 ± 2.3
VI	Diet A + Extract dose A	212.9 ± 2.8	116.5 ± 3.6
VII	Diet A + Extract dose B	216.2 ± 2.2	114.8 ± 2.5
VIII	Diet B + Extract dose A	212.6 ± 2.6	120.5 ± 3.1
IX	Diet B + Extract dose B	219.4 ± 3.7	122.6 ± 3.6

Absorbance at 517nm (shimadzu 1700)

*Values are mean ± S.E.M. of 6 determinations, student t-test.

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