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ANTIHYPERLIPIDEMIC ACTIVITY OF *MOMORDICA DIOICA* ROXB

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ABSTRACT

The inhibitory effect of the ethanolic extract of fruits of Momordica dioica Roxb. was tested in hyperlipidemic rats using two animal models induced using Triton WR-1339 as and by 30% corn oil. At the dose of 500 mg/kg p.o the ethanolic extract of fruits of Momordica dioica Roxb. reduced the total cholesterol, serum triglyceride, HDL-cholesterol, LDL-cholesterol and VLDL- cholesterol levels significantly as measures of its hypocholesterolemic or hypolipidemic effects. Thus, the ethanolic extract of fruits of Momordica dioica Roxb. was found to be active using these two hypolipidemic assays.

Keywords: *Momordica dioica Roxb., Triton WR-1339, Hypocholesterolemic, Hypolipidemic, LDL-cholesterol.*

Introduction

It has been well established that nutrition plays an important role in the etiology of hyperlipidimias, atherosclerosis and other coronary heart disease (CHD) complications like myocardial infarction [1]. The etiology and pathogencity of coronary heart diseases lie in the casual relationship between the development of atherosclerosis, elevated plasma lipid percentage cholesterol levels in blood and plasma, genetic makeup, endicrinological aberration, immunologic and autonomic factors, blood flow and coagulation To reduce the rate of mortality, it is therapeutically recommended to under go diet or/and drug therapy to lower lipid levels within the normal range. Therapy of hyperlipidemia merits the consideration in the established atherosclerotic state [2].

The herbal hypolipidemics have gained importance to fill the lacunae created by the allopathic drugs .A number of plants have been found to be useful in hyperlipidemia. Condiments like garlic, onion and coriander used in day to day preparation of food in Indian kitchens have been identified as hypolipidemics in Ayurveda [3].

Momordica dioica belonging to family Curcubitaceae found in coastal Karnataka and Andhra Pradesh state. It has been reported that the plant contain aliphatic constituents (6-methyl tritriacont-50on-28-of and 8-methyl hentracont-3-ene) and sterol (pleuchiol) and pentacylic triterpene (momodicaursenol) an unknown isolated from the seeds, has been identified as urs-12, 18(19)-dien-3 beta-ol [4].

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The chloroform, ethyl acetate & ethanolic extract of *Momordica dioica* Roxb. fruit is previously reported to have the antidiabetic activity in alloxan induced experimental rats [5], flavonoidal fraction from ethanolic extract of the fruit is reported to have hepatoprotective property [6], hexane extract of the fruit is reported to have antifeedant property [7], seed oil has shown insecticide property [8], ethanolic and aqueous extract of the root is reported to have antifertility activity [9]. Further, three triterpenes and two steroidal compounds were isolated from the dry root of *Momordica dioica* and have shown anticancer property [10].

The aim of the present study was to examine the possible antihyperlipidemic activity of ethanolic extract of fruits of *Momordica dioica* Roxb. in Triton WR 1339 and corn oil induced hyperlipidemia.

Materials and Method

Plant Material

The fresh fruits of *Momordica dioica*, Roxb. were collected from local market of Bangalore, Karnataka, identified and authenticated by Dr. Gajendra Rao, Survey Officer, Regional Research Institute, Bangalore. A specimen sample of the same was preserved in the herbarium section at RRI, Bangalore, as RRCBI,Acc No.1693 for future reference. The fresh fruits of *Momordica dioica* were isolated, chopped into small pieces, dried under shade at room temperature for seven days and powdered.

Preparation of ethanolic extract:

A 95% w/v ethanolic extract was prepared by soxhlet extraction method. The dried powdered fruits of *Momordica dioica*, (200g) were extracted with 95%v/v ethanol for 21hrs. using soxhlet extractor . The combined extracts were concentrated at 40°C to obtain dark brownish yellow residue.

Experimental animals

Wistar male rats were purchased from Veternary College and Hospital, Bangalore. They were housed, three per polypropylene cage under standard laboratory conditions at room temperature 25°C ± 2°C) with 12 h light /dark cycle. They were fed with standard mice feed (Amrut rat and mice feed, Pranav agro industries Ltd. Sangli, India). All the experimental procedures were performed according to the committee for the purpose of control and supervision of experiments on animals (CPCSEA), ministry of social justice and empowerment Government of India, norms and approved by the Institutional Animal Ethics Committee (IAEC). The oral acute toxicity study was performed using the up & down procedure (OPPTS guidelines).

Triton WR-1339-induced hyperlipidemia

A total of 30 rats were divided into five groups of six rats each.

Group 1- Normal control

Group 2- Hyperlipidemic control – Administered with Triton WR-1339 (200mg/kg i.v.)

Group 3- Administered with Lovastatin (10 mg/kg p.o)

Group 4- Administered with ethanolic extract of fruits of *Momordica dioica* Roxb (500 mg/kg p.o)

Group 5- Administered with ethanolic extract of fruits of *Momordica dioica* Roxb (250 mg/kg p.o)

Rats were orally administered samples solutions once a day for consecutive 2 weeks. After the last treatment of samples, rats were fasted 24 h before Triton WR-1339 injection. Hyperlipidemia was induced in a tail vein with 200 mg/kg of Triton WR-1339, and blood was collected 18 h later [11].

Thirty percent corn oil-induced hyperlipidemia

A total of 24 rats; the rats were divided into five groups of six rats each.

Group 1- Normal control

Group 2- Hyperlipidemic control – Administered with 30% corn oil (3 g/kg, p.o.)

Group 3- Administered with ethanolic extract of fruits of *Momordica dioica* Roxb (500 mg/kg p.o)

Group 4- Administered with ethanolic extract of fruits of *Momordica dioica* Roxb (250 mg/kg p.o)

Sample solutions were orally administered once a day for 2 weeks. After 2 h later of the last treatment, 30% corn oil (3 g/kg, p.o.) was orally offered to the rat. Rats were sacrificed and then the blood was collected 2 h later [11].

Measurement of serum lipid values

Serum triglyceride, total cholesterol and HDL-cholesterol were measured by enzymic colorimetric methods using kits (Span diagnostics Ltd, Surat, India) LDL-cholesterols levels were calculated using the Friedwald's equation shown as follows: LDL-cholesterol = total cholesterol − HDL-cholesterol − (triglyceride/5).Using the data obtained including triglycerides, the VLDL-cholesterol levels were calculated using empirical equation of FriedeWald's equation shown as follows: VLDL- cholesterol= Triglyceride/5.

Statistical analysis

All the values of body weight, fasting blood sugar, and biochemical estimations were expressed as mean±standard error of mean (S.E.M.) and analyzed for ANOVA and post hoc Dunnet's t-test. Differences between groups were considered significant at $P<0.05$ levels.

Results

As shown in Table 1, Triton WR-1339 induced hyperlipidemia with considerably increases in total cholesterol, serum triglyceride, LDL- cholesterol, and VLDL- cholesterol levels and decreases the HDL- cholesterol level versus normal control animals (Group I). Treatment with ethanolic extract of fruits of *Momordica dioica* Roxb at 500 mg/kg per day (p.o.) for 2 weeks produced a statistically significant decrease of hyperlipidemia and increase of HDL-cholesterol.

Table 1: Effect of ethanolic extract of fruits of *Momordica dioica* Roxb. on the serum lipid levels in Triton WR-1339-treated rats

Groups	Total cholesterol	Serum Triglycerides	HDL-cholesterol	LDL-cholesterol	VLDL-cholesterol
I	75.66±1.11	70.33±1.28	28.33±1.28	61.4±1.98	14.06±0.22
II	274.50±4.62*	205.66±4.48*	16.83±0.4*	298.70±5.40*	41.13±0.89*
III	182.00±1.65#	96.16±1.04#	26.00±0.57#	175.23±1.80#	19.23±0.20#
IV	198.33±1.47#	106.83±1.95#	23.33±0.60#	196.40±1.41#	21.36±0.39#
V	252.50±1.17#	168.66±1.68#	16.83±0.47	270.40±2.22#	33.63±0.33#

Values represents Mean ± SEM (n = 6)

*P<0.001, significant as compared to corresponding data of the Normal control group (Group I)

#P<0.001, significant as compared to corresponding data of the Hyperlipidemic control group (Group II)

Table 2: Effect of ethanolic extract of fruits of *Momordica dioica* Roxb. on the serum lipid levels in 30% Corn oil treated rats

Groups	Total cholesterol	Serum Triglycerides	HDL-cholesterol	LDL-cholesterol	VLDL-cholesterol
I	76.33±3.15	72.83±1.70	30.66±1.63	60.05±2.91	14.56±0.35
II	119.66±2.57*	210.66±3.37*	19.50±2.88*	142.30±3.15*	42.13±0.67*
III	94.66±3.07#	139.00±2.43#	24.66±1.21#	97.30±1.21#	27.80±0.48#
IV	112.50±3.49	190.16±2.81#	20.00±1.67	130.53±3.37	38.03±0.56#

Values represents Mean ± SEM (n = 6)
*P<0.001, significant as compared to corresponding data of the Normal control group (Group I)
#P<0.001, significant as compared to corresponding data of the Hyperlipidemic control group (Group II)

Discussion

The rats treated with Triton WR-1339 caused marked increase in the level of total cholesterol, serum triglyceride, LDL- cholesterol, and VLDL- cholesterol. Triton WR-1339 act as a surfactant to block the uptake of lipoproteins from the circulation by extra hepatic tissue, resulting in an increase in the level of circulating lipoproteins [12].

Administration of ethanolic extract of fruits of *Momordica dioica* Roxb at 500 mg/kg per day (p.o) for 2 weeks produced a statistically significant decrease of hyperlipidemia and increase of HDL-cholesterol. The standard drug Lovastatin at 10 mg/kg per day (p.o) also produced a statistically significant decrease of hyperlipidemia and increase of HDL-cholesterol but did not bring them to base line values.

Several studied shows that an increase in HDL-cholesterol is associated with decrease in coronary risk and most of the drugs decrease coronary total cholesterol increase HDL-cholesterol [13].

As a method for the induction of the extrinsic hyperlipidemia, a large amount of olive oil or corn oil is orally administered to induce high triglyceride level in blood by the mechanism of a lipid absorption increase and a triglyceride hydrolysis inhibition. The ethanolic extract of fruits of *Momordica dioica* Roxb at 500 mg/kg per day (p.o.) reduced total cholesterol, serum triglyceride, LDL-cholesterol and VLDL-cholesterol and elevated serum HDL-cholesterol levels.

It has been reported that saponins [11] and flavonoids [14] of several plants have shown antihyperlipidemic effect. The extract of fruits of *Momordica dioica* Roxb. has given positive test for saponin and flavonoid. So, the antihyperlipidemic activity extract of fruits of *Momordica dioica* Roxb. fruits may due to presence of saponins, flavonoids.

In conclusion, the finding of the present work indicates the usefulness of the extract of fruits of *Momordica dioica* Roxb in the treatment of hyperlipidemia.

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