

HYPOLIPIDEMIC POTENTIAL OF ETHANOLIC EXTRACT OF *VERBESINA ENCELIOIDES* BENTH. ROOTS

RAKESH K. SINDHU*, NEERU VASUDEVA and SURENDRA KUMAR SHARMA

Pharmacognosy and Phytochemistry division, Department of Pharmaceutical Sciences,
Guru Jambheshwar University of Science & Technology, Hisar-125001, India

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Hyperlipidemia has been ranked as one of the greatest risk factors contributing to the prevalence and severity of coronary heart diseases (1). Coronary heart disease, stroke, atherosclerosis and hyperlipidemia are the primary cause of death (2). Hyperlipidemia is characterized by elevated serum total cholesterol and low density and very low-density lipoprotein cholesterol and decreased high-density lipoprotein levels. Hyperlipidemia associated lipid disorders are considered to cause atherosclerotic cardiovascular disease (3). Among these, hypercholesterolemia and hypertriglyceridemia are closely related to ischemic heart disease (4). The main aim of treatment in patients with hyperlipidemia is to reduce the risk of developing ischemic heart disease or the occurrence of further cardiovascular or cerebrovascular disease (5). Currently available hypolipidemic drugs have been associated with a number of side effects (6). The consumption of synthetic drugs leads to hyperuricemia, diarrhoea, nausea, myositis, gastric irritation, flushing, dry skin and abnormal liver function (7). Medicinal plants are used for various research purpose. It has been reported that traditional systems have immune potential against various diseases. More than thirteen thousand plants have been studied for various pharmacological properties. An herbal treatment for hypercholesterolemia has no side effects and is relatively cheap, locally available. They are effective in reducing the lipid levels in the system (8).

EXPERIMENTAL

Material and Methods

The plant of *Verbesina encelioides* Benth. root was collected during the month of July 2007 from

Village Dinod, Bhiwani (Haryana), North India. The plant material was taxonomically identified and authenticated by Dr. H.B. Singh, Head, Raw materials Herbarium and Museum division, with ref. no. NISCAIR/RHMD/Consult/2007-08/890/74. The voucher specimen has been deposited in the herbarium section of the Pharmacognosy Division, Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar for further reference. The root was dried under shade, sliced into small pieces, pulverized using a mechanical grinder and stored in an air tight container for further use.

Preparation of extracts

About 500 g of air dried powdered root was extracted with ethanol in a Soxhlet extractor for 72 h. The aqueous extract was prepared by maceration with distilled water for 24 h. Ethanol and aqueous extracts were concentrated in rotary vacuum evaporator. Dried extracts were stored at 4°C till further use.

Preparation of doses

Lovastatin (Zubliant) 75 mg/kg was taken as standard drug for hypolipidemic activity. The ethanol extract 200 and 400 mg/kg was prepared in 1% PEG. Aqueous extract 400 mg/kg was prepared in distilled water. The stock solution of standard was prepared in DMSO.

Experimental animals

Wistar rats of either sex (weighing 100–150 g) were used according to experimental protocols after approval from Institutional Animal Ethical Committee, Guru Jambheshwar University of Science and Technology, Hisar. The animals were

* Corresponding author: e-mail: rakeshsindhu16@gmail.com

Table 1. Cholesterol, triglycerides, high density lipoproteins and very low density lipoprotein profile of rats.

Groups	Dose (mg/kg b.w.)	Cholesterol	Triglycerides	High density lipoproteins	Very low density lipoproteins
Control	G-1	85 ± 3.72	92.6 ± 10.76	52.8 ± 2.20	18.52 ± 2.15
Standard	G-2, 75	59 ± 1.69**	50.2 ± 2.75**	37.4 ± 2.28**	10.04 ± 0.55**
Ethanol	G-3, 200	77 ± 2.74	73 ± 2.9	61 ± 1.15	17.29 ± 2.87
	G-4, 400	64.2 ± 2.29**	62 ± 3.18**	40.4 ± 2.58*	12.4 ± 0.64*
Water	G-5, 200	81.4 ± 3.12	78.6 ± 3.73	63 ± 3.52	15.88 ± 1.12
	G-6, 400	80.6 ± 5.36	71.4 ± 4.64	50.6 ± 4.27	14.28 ± 0.93

* p < 0.05 with respect to control ** p > 0.01 with respect to control

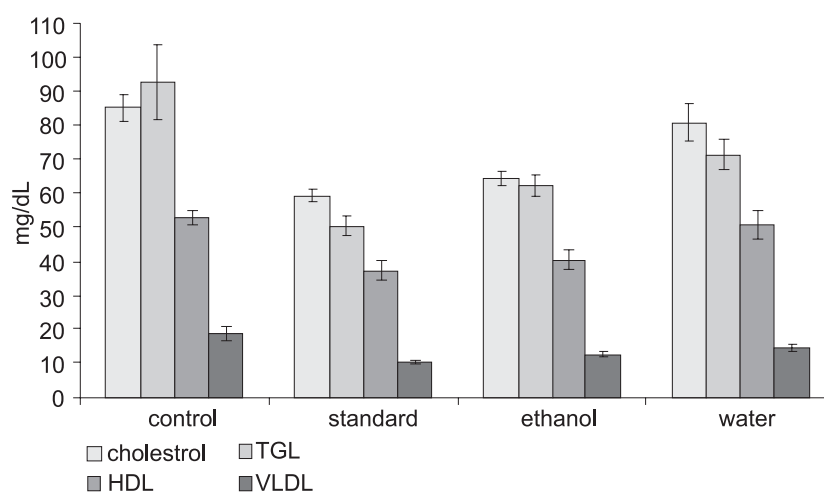


Figure 1. Hypolipidemic activity (ethanol and aqueous extract) of *Verbesina encelioides* Benth. roots using normal rats

housed under standard environmental conditions (25 ± 2°C and relative humidity 50 ± 5%) and fed with standard diet and water *ad libitum*. The animals were acclimatized to laboratory environment for a period of 14 days before performing the experiments.

Hypolipidemic activity

The animals were divided into 6 groups, each group consisting of 5 animals. The control group (G-1) was given the solvent (PEG 400). The standard group (G-2) was given lovastatin at the dose of 75 mg/kg body weight. The ethanol extract was administered at 200 and 400 mg/kg body weight dose to groups G-3 and G-4, respectively. The aqueous extract was administered at 200 and 400 mg/kg body weight dose to groups G-5 and G-6, respectively. The doses were administered orally once daily in the morning for a period of eight days. At the beginning and at the end of experiment the body weights of all the animals were recorded. Twenty hours prior to experiment, feed but not water was

withdrawn. On the morning of first day, blood samples were taken under light anesthesia by retro-orbital puncture. Then, the first dose was administered. During the period of experiment the animals had free access to food and water. Twenty hours prior to the end of experiment food was withdrawn and blood samples were taken by retro-orbital puncture on 18th day (9). Immediately thereafter, the animals were sacrificed by euthanizing with chloroform and liver was removed for determination of morphological changes in liver cells and preserved in formalin solution. The transverse sections of 10–15 µm thickness were cut and stained with hematoxylin and eosine (10). The serum total cholesterol, triglycerides, high density lipoprotein, very low density lipoproteins were determined from the collected blood samples in autoanalyzer (Remi) (Table 1).

Statistical analysis

The data were expressed as the mean ± SEM. The results were compared with control group using

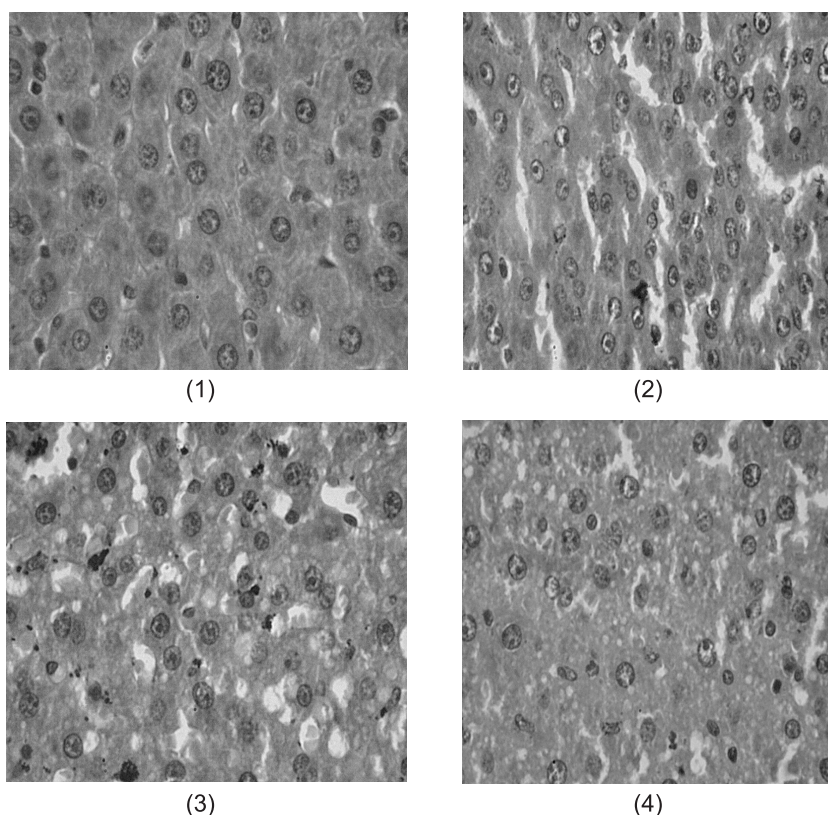


Figure 2. Transverse section of liver of rats (1) Control; (2) Standard; (3) Ethanolic; (4) Aqueous

ANOVA followed by Dunnett's test. The results were considered as statistically significant if $p < 0.05$ when compared with control.

RESULTS AND DISCUSSION

Hyperlipidemia is the one of the risk factor for coronary artery disease. The increased blood level of total cholesterol, LDL, VLDL and lowered level of HDL cholesterol has been identified in the development of hyperlipidemia. The hyperlipidemic allopathic drugs are available in market but the side effects and contraindication of these drugs have marred their popularity (11). Recently herbal hypolipidemic have gained importance to fill the lacurance created by the allopathic drugs (2)

The present study was carried out to evaluate the hypolipidemic activity of ethanolic and aqueous extracts of roots of *Verbesina encelioides*. The aqueous extract at treated doses i.e., 200 mg/kg and 400 mg/kg body weight did not show any significant hypolipidemic activity. The ethanol extract showed the significant activity when compared to control at 400 mg/kg dose (Table 1). There was a significant decrease in total cholesterol, triglycerides, high den-

sity lipoproteins and very low density lipoproteins level ($p < 0.01$) as compared to control (Figure 1). Histological study of the liver was performed. In hyperlipidemic conditions, mononuclear cells infiltration, pientotic nuclei, rupturing in the endothelium of central vien and small to large vacuoles are noticed. No such changes were observed in the control and the drug treated rats (Fig. 2) Thus, these findings indicate that this plant may be useful for the treatment of hyperlipidemia.

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Erratum

In page 121, issue 1/2011 the affiliation of one of the authors should read:
Praadeep Kumar – Chitkara College of Pharmacy, Chandigarh-Patiala National Highway,
Rajpura-140401, Patiala, Punjab, India