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Hypoglycemic and Hypolipidemic effect of *Coccinia indica* Wight &Arn in alloxan induced diabetic rats

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Abstract

Diabetes Mellitus is characterized by elevated plasma glucose concentrations resulting from insufficient insulin. The present study was aimed to investigate the hypolipidemic effect of *Coccinia indica* aqueous leaf extract in alloxan induced diabetic rats. The results of this study revealed that a continuous administration of *Coccinia indica* extract for 21 days prevents the elevation of the level of serum lipids secondary to the diabetes state

Keywords :
Diabetes mellitus, Coccinia indica

Introduction

Diabetes is the most common endocrine disorder characterized by hyperglycemia and a predisposition to chronic complications like retinopathy, nephropathy, neuropathy and macrovascular disease (1). It is associated with increased passive permeability of many nutrients like glucose, galactose, cholesterol and conjugated salts (2).Natural carbohydrate rich in fibre content have been found effective against hyperlipidemia and ischaemic heart diseases (3). Diabetes mellitus is a disease that affects more than subjects in the next ten years (4).Long before the use of insulin indigenous remedies have been used for the treatment of diabetes mellitus. There is an increasing demand by patients to use the natural products with antidiabetic activity. This is because insulin cannot be used orally and continuous insulin injections have many side effects and toxicity (5).

Many medicinal plants have been found to possess active principles useful for treating the disease and are frequently considered to be less toxic and free from side effects than synthetic chemicals (6). Hence the present study was aimed in investigating the hypolipidemic effect of *Coccinia indica* aqueous leaf extract in alloxan-induced diabetic rats.

Materials and Methods

Coccinia indica belonging to Curcurbitaceae family was locally collected and identified at the department of Botany, PSG college of Arts and Science College, Coimbatore.

Preparation of the Extract:

Fresh tender leaves were collected, dried in shade and powdered.10 gm of leaf powder was mixed with 100 ml of distilled water and stirred for 2 hrs. It was kept overnight at 4C and the supernatant was collected. This was used as the crude leaf extract to study the hypolipidemic effect in alloxan induced diabetic rats.

Animals used for experiment

Male albino rats (150-200 gm) were obtained from Centre for Animal health. Madhavaram, Chennai. All the rats were fed with normal diet. Rats were divided in to 4 groups of 6 each. The animals were treated as per the following protocol

Group I : Kept as normal group
Group II : Alloxan Monohydrate was used to induce diabetes mellitus in rats. After 24 hrs of fasting a single dose (200 mg/ kg body weight) of 5% alloxan monohydrate in saline was injected intra peritoneally.

Group III : Alloxan injected and leaf extract given orally after 5 days and the treatment continued for 21 days.

Group IV : Normal rats, treated with leaf extract orally for 21 days.

Collection of rat blood

After 21 days feeding of extract, on the 22nd day the blood was directly collected by cardiac puncture with a sterilized syringe. The serum sample was collected and used for the estimation of glucose[7] and cholesterol[8], triglycerides[9], LDL, VLDL and HDL[10] as per the standard methods.

Results and Discussion

Many plants have been used for the treatment of diabetes mellitus in Indian system of Medicine and in other ancient systems of the world. Out of these only a few have been evaluated as per modern system of medicine. From many such plants only extracts have been prepared and their usefulness evaluated in experimental diabetes in animals. Most of them to act directly pancreas (pancreatic effect) and stimulate insulin level in the blood. Some have extra pancreatic effect by acting directly on tissues like liver, muscle etc., and alter favorably the activities of the regulatory enzymes of glycolysis, glyconeogenesis and other pathways. This study demonstrated the hypoglycemic and hypolipidemic effect of *Coccinia indica*

leaf extract on blood glucose and cholesterol, TG, LDL, VLDL level in alloxan induced diabetic rats. The results are depicted in Table-1. The group II alloxan induced diabetic rats showed a significant (P<0.05) increase in blood glucose level when compared to the group I rats. In group III, there was a significant decrease of blood glucose level when compared to the group II rats.

We identified that this effect of *Coccinia indica* leaf extract not only showed hypoglycaemic effect but also hypolipidemic effect. In alloxan diabetic rats there was a significant (P<0.05) increase of total cholesterol and triglycerides is serum compared to that of group I. There was a significant decrease in group III animal when compared to the group II animals.

The insulin deficient subjects fail to activate the enzymes and causes hyper triglyceridemia. Excess of fatty acid in plasma produced by the alloxan induced diabetes promotes the liver conversion of home fatty acids in to phospholipids and cholesterol[11].In group III there was an significant increase in VLDL and LDL level when compared to the group II rats. Lowering of serum lipid concentrations through dietary or drugs therapy seems to be associated with a decrease in the risk of vascular disease[12].The results of this study revealed that a continuous administration of *Coccina indica* extract for 21 days prevented the elevation of the levels of serum lipids secondary to the diabetes state.

Table-1 Levels of Serum Lipids and Glucose in experimental and Control Groups

Groups	Cholesterol (mg/dl)	Triglycerides (mg/dl)	VLDL (mg/dl)	LDL (mg/dl)	Glucose (mg/dl)
Group I	112.50 ± 12.50	76.63 ± 0.85	15.35 ± 0.27	36.90 ± 0.47	81.75 ± 1.13
Group II	355.00±10.00*	224.20 ± 7.51*	35.50 ±0.43*	204.40±0.67*	192.03 ± 18.07*
Group III	191.25 ± 6.50*	107.25 ± 6.01*	22.90 ±0.83*	103.25±0.43*	119.43 ± 1.61*
Group IV	94.75 ± 5.44^{NS}	83.08 ± 0.86^{NS}	20.68 ±0.44*	40.55±0.45*	65.28 ± 3.28*
CD (0.05) CD (0.01)	18.452 26.509	18.452 26.509	1.058 1.521	0.923 1.326	16.99 24.41

Values are expressed by mean of 6 samples
* - Significant NS – Not significant

Bibliography

1. Taylor, S.I., The metabolic basis of Inherited disease, Diabetes Mellitus, (1995)1841-43

2. Parmesh Dutt, Sarkar, A.K., Lipid Composition of Intestinal brush border Membrane in alloxan induced acute experimental diabetes, Ind.J.Exp.Biol., 31, (1993), 501-504

3. Hugh,T., Ischemic heart disease and dietary, Am. J. Clin. Nutri., 25, (1972),926-31

4. Lesabre, B., Diagnostique du Diabette Ja nouvelle Classification de L'oms, Concours Medical ,14, (1981) 2267-2272

5. Halim Eshrat.M., AliHussain,Hypoglycemic, hypolipidemic and antioxidant properties of combination of curcumin from C*urcuma longa* S Linn and partially purified product from *Ajhroma Augusta Linn.* In Streptozotozin induced diabetes , Indian Clinical Biochem, 17(2), (2002)33-43

6. Ponnachan P.T.C., Paulose, C.S., Panikkar, K.K.,Effect of leaf extract of *Aegle marmelose* in diabetic rats, In.J. Exp. Bio., 31, (1993) 345-347

7. Trinder, P., Determination of glucose in blood using glucose Oxidase with an alternated oxygen acceptor, Ann. Biochem., (1969) 624-27

8. Allain, C.C., Enzymatic Determination of total Serum Cholesterol, Clinical Chemistry, 20, (1974) 470-475

9. Fossati, P., and Prencipe, L., Serum Triglycerides determined colorimetrically with an enzyme that produce hydrogen peroxide, Clinical Chemistry, 28, (1982) 2077 - 080.

10. Krauss-Fired Mann,N.,Hormonal regulation of hepatic gluconeogenesis, Physiol Rev, 64, (1984)170 - 176

11. Rhoads, G.,Gulbrandse, C.L., and Kagan, A., Serum lipoproteins and Coronary artery disease in a population study of Hawaiian Japanese men, New England journal of Medicine, 294, (1976),293-298.