

PROTECTIVE EFFECT OF CYNODON DACTYLON EXTRACT ON HIGH FAT DIET INDUCED HYPERLIPIDEMIA IN EXPERIMENTAL ANIMALS

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ABSTRACT

Hyperlipidemia has been ranked as one of the greatest risk factors contributing to prevalence and severity of coronary heart diseases . Coronary heart disease, stroke, atherosclerosis and hyperlipidemia are the primary cause of death The hypolipidemic activity of *Cynodon dactylon* extract was studied on high fat diet induced models of hyperlipidemia in rats. Hyperlipidemia in experimental rats evidenced by an enhancement in the levels of Lipid profile. The *Cynodon dactylon* extract showed significant hypolipidemic effect by reduction in the level of serum Cholesterol, TG, LDL, VLDL and increase in HDL level .

KEY WORDS: hypolipidemic activity , *Cynodon dactylon* and coronary heart diseases.

INTRODUCTION

Hyperlipidemia is the condition of abnormally elevated levels of any or all lipids and/or lipoproteins in the blood.. Hyperlipidemia characterized by elevated serum total cholesterol and low density and very low density lipoprotein cholesterol and decrease high density lipoprotein are the risk factor for coronary heart diseases Kaesancini et al.,(1994).Currently available hypolipidemic drugs have been associated with number of side effects [Brown et al.,1996]. The consumption of synthetic drugs leads to hyperuricemia, diarrhoea, nausea, myositis, gastric irritation, flushing, dry skin and abnormal liver function.

Medicinal plants are used for various research purposes. 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 [Berliner et al.,1996].

C. dactylon is widely cultivated in warm climates all over the world. The plant is a folk remedy for anasarca, calculus, cancer, carbuncles, convulsions, cough, cramps, cystitis, diarrhoea, dropsy, dysentery, epilepsy, headache, haemorrhage, hypertension, hypolipidemic, hysteria, insanity, kidneys, laxative, measles, rubella, snakebite, sores, stones, tumours, urogenital disorders, warts, and wounds. **Chopra et al.,(1992).**

MATERIALS AND METHODS

Collection Of Plant Materials

The flower extract of *Cynodon dactylon* are collected from Trichy district which were carefully identified with the help of Regional Floras.

Extraction Of Plant Material

The shady dried plants materials were subjected to pulverization to get coarse powder. The coarse powder material was subjected to Soxhlet extraction separately and successively with alcohol and distilled water. These extracts were concentrated to dryness in flash evaporator under reduced pressure and controlled temperature (40-50°C). The Aqueous and alcohol extracts put in air tight containers stored in a refrigerator.

Experimental Design

Group I was considered as control which received 0.5% sodium carboxy methyl cellulose; Group II was considered as high fat diet group and received the butter diet; Group III was considered as test group and received the test extract that is ethanol extract of *Cynodon dactylon* at the dose of 100 mg/ Kg body weight per oral along with the high fat diet and Group IV was considered as standard group which received the standard drug Lovastatin (dose of 75 mg/kg body weight per oral) along with the high fat diet.

- Group I** → served as normal control
- Group II** → Served as an experimental control (Cholesterol at a dose of 400mg /kg /bw for 20 days)
- Group III**→ Contains animals fed with *Cynodon dactylon* Flower extract alone.(2ml/day for 14 days)
- Group IV** → Contain animals fed with plant extract and Cholesterol at a diet. dose of 400mg /kg /bw for 20 days)

Table: 1. Effect of *Cynodon dactylon* extract (100 mg / kg b.w.,) on serum cholesterol & Triglycerides (TG) and AI in Cholesterol induced rat.

Parameter	Control	GII – Cholesterol induced	Cynodon dactylon flower extract	Cynodon dactylon flower extract + cholesterol induced
Cholesterol (mg/dl)	48.26±0.97	78.19±0.28	50.26±0.21	54.76±2.01
Triglycerides (mg/dl)	1.59±0.91	4.23±1.24	1.88±0.45	2.02±1.31
AI	0.87±0.50	8.51±1.33	2.33±2.43	4.45±2.34

Table: 2. Effect of *Cynodon dactylon* extract (100 mg / kg b.w.,) on Lipid profile parameter.

Parameter	Control	GII – Cholesterol induced	Cynodon dactylon flower extract	Cynodon dactylon flower extract + cholesterol induced
HDL Mean ± SD	58.3±0.4	31.2±1.1	56.4±0.71	50.3±1.51
LDL Mean ± SD	27.5±1.8	42.3±0.31	29.5±0.96	30.2±1.15
VLDL	12.21±0.38	21.51±0.51	14.56±1.5	13.43±45
LDL/HDL	0.54±21	2.60±34	0.92±45	1.46±65

Cholesterol, Triglycerides and Atherogenic index (AI): significant raise in serum cholesterol and triglycerides level was observed in group II when compared to Group I (Table 1). High cholesterol and triglycerides diet and cafeteria fed is a significant risk factor for the development of coronary heart disease, which is a leading cause of mortality and morbidity in many countries. In the present study, *Cynodon dactylon* extract at 100 mg/Kg of body weight dose orally, showed reduction in serum cholesterol and triglycerides content in rat, which were mainly due to decrease in VLDL and LDL levels. These findings are quite similar with the reports of Omran *et al*, (2006). Table 1 shows the changes of Atherogenic Index in control and treated rats. It appears clear from these results that the cholesterol induction significantly affects the cardio vascular risk markers. Indeed, AI was statistically increased in cholesterol control group 90% compared with the values found in their normal control group.

Serum HDL, VLDL, LDL and LDL-C / HDL-C ratio

High cholesterol diet caused a significant increase in serum Total cholesterol & Triglycerides with a significant decrease in the HDL /LDL ratio (table-2). The ratio of LDL-C to HDL-C is also a protective indicator of cardio vascular disease incidence. The cholesterol induction

produced a significant increase of this marker. Many suggest that the cholesterol lowering activity of this product appears to be due to the enhancement of LDL-C catabolism through hepatic receptors. Several studies reveal that an increase in HDL cholesterol and decrease in TC, LDL cholesterol and TG is associated with a decrease in the risk of ischemic heart diseases. Most of the antihyperlipidemic drugs are causing significant reduction in both TC and HDL cholesterol levels [Fiser et al.,1974]. The lipoprotein called “good cholesterol” facilitates the mobilization of triglycerides and cholesterol from plasma to liver where it is catabolised and eliminated in the form of bile acids. The possible mechanism of this activity may result from the enhancement of lecithin cholesteryl acyl transferase (LCAT) and inhibition of Hepatic Triglyceride Lipase (HTL) on HDL which may lead to a rapid catabolism of blood lipids through enterohepatic tissues Kellner *et al.*,(1951).

VLDL particles are smaller than the chylomicrons and also are rich triglycerides though to a lesser extent VLDL particles sizes vary widely ,with a concomitant variation of the chemical composition ;the larger particles are rich in triglycerides and in apo-c and the smaller particles depleted of TG and surface materials result from the hydrolysis of VLDL by lipoprotein lipase activity. VLDL is the main carrier if triglycerides and it is less harmful than but still can damage the arterial lining .VLDL production is directly related to the body fat (Kesavalu *et al.*, 2001).Severe elevation in the VLDL cholesterol lead to hypercholesterolemia. Triglycerides are mainly stored in the adipose tissue .The plasma lipoproteins are major sources of fatty acid to synthesis triacylglycerols. The excess of fat diet increased the TG level which is one of the causes of hardening of arteries (XU *et al.*, 2003). High cholesterol diet is a significant risk factor for the development of coronary heart disease, which is a leading cause of mortality and morbidity in many countries. In the present study, *Cynodon dactylon* extract at the dose of 100 mg/kg orally in rat, prevented high cholesterol diet and cafeteria fed (70%), when compared with serum cholesterol levels in mice receiving high cholesterol diet.

CONCLUSION

From the results it was evident that the *Cynodon dactylon* showed significant protection on hypercholesterolemia induced by high cholesterol diet. Hence the research carried out by us proclaims the hypocholesterolemia effect of *Cynodon dactylon* extract in hypercholesterolemia male albino rats.

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