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THERAPEUTIC EFFECTS OF CINNAMOMUN ZEYLANICUMON BARK ON HYPERLIPIDEMIA IN HYPERCHOLESTEREMIC RATS

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ABSTRACT

Background: Cinnamon is one of the most important spices used daily and regularly by humans everywhere in the world.

Aim: The aim of this study was to evaluate the anti-obesity effect of cinnamon bark.

Objective: This research was conducted to find the pharmacological effect of cinnamon bark on hypercholesteremia and to evaluate its anti-obesity effects.

Methodology: Cinnamon bark extraction was obtained from the maceration technique. Cinnamon bark powder (30 g) was extracted with acidified methanol (100 ml) 4 times, successively 4h, 12h, 4h and 12h. The centrifuge supernatants were combined, and the methanol was evaporated in vacuum at 30°C.The residue was dissolved in water and lyophilized to obtain cinnamon powder.

Results: The most essential findings of this examination were that extract of cinnamon powder at doses of 2 g/kg consistent with day for 35 days decreased body weight, total serum cholesterol, triglycerides, and LDL levels, while levels of HDL increased compared to those of the treated control (institution D) in hyperlipidemia grownup male rats.

Conclusion: In this study, it was discovered that methanolic extract of Cinnamomum showed significant anti-hyperlipidemic effects in adult male rats. A significant decrease was observed in BMI measurements, blood glucose degree analyses, serum triglyceride analyses, serum LDL analysis, serum HDL evaluation, and serum LDL cholesterol assessment.

Keywords: Body mass index, cinnamon zeylanicum, obesity, weight loss

INTRODUCTION

Obesity is a health problem related to many metabolic disorders. Medication and bariatric surgery are the main strategies when it comes to preventing and treating overweight[1]. Global obesity has doubled since 1980. Around 1.5 billion adults in 2008 (20 age and over) are overweight. On gender division, two hundred million men and nearly three hundred million women are obese in these statistics.The World Health Organization (WHO) predicts that by 2025, 2.3 billion adults worldwide will be overweight. Among them, seven hundred million will be obese. [2].

Herbs and spices have been identified as resources of diverse phytochemicals for many centuries.Whilst herbs and spices are used as medicinal remedies, they are also referred to as herbal medicines[3].Cinnamon has been used since ancient times because the inner bark of the plant Cinnamon tree belongs to Lauraceae plant. Main varieties of cinnamon are C. Zeylanicum (additionally known as C. Verum, C. Cylone) from Sri Lanka, and cinnamon, that's specifically produced in China. The word "cinnamon" comes from Greek for "aromatic wood" [4].

Cinnamon, rosemary, ginger, pepper, saffron, garlic, onion and turmeric are many natural bioactive ingredients derived from common spices that have exposed weight loss benefits[5].Many cinnamons' bark sorts are of the maximum critical and famous flavors in the global, which might be use not best in cooking then additionally use in traditional and the modern-day remedy[6]. In standard, around 250 training of the Genus *Cinnamomum* are seemed and convey in timber inside the global[7].Cinnamon is specially used in the perfume and flavor corporation for its aroma, and it could be protected into precise food, fragrance, and the medicinal meals. The maximum vital elements of cinnamon are cinnamaldehyde and trans cinnamaldehyde, which can be gift within the Essential oil and because of this contribute to the aroma and several natural moves of Cinnamon [8].

In in-vitro research, ithasbeen proven that polyphenols can inhibit the differentiation of adipocytes. They also inhibit lipolysis adipogenesis, or intestinal lipid absorption, thereby lowering frame mass.The polyphenolic compounds are inducing of the fatty acid oxidation (antagonists of Cannabinoid receptor, which lessen inflammatory changes [9].It needs to be shown that management of cinnamon abstract relieves dyslipidemia through regulating LDL-R face in hypercholesterolemic animals, accordingly, showing a protective impact in hypercholesterolemia. Further, a polyphenol abstract of cinnamon has been tested to lessen infection, oxidative strain, and hyperlipidemia through activating antioxidant indicating and related record elements in excessive-fat-based[10].

MATERIALS AND METHODOLOGY

Dried cinnamon (C. Zeylanicum L., Lauraceae) bark was purchased from a local agricultural herb, spice, and medicinal plant market of Sialkot. The plant was verified and authenticated by a

botanist. The shade dried plant matter was grounded into a fine powder with the help of herbal grinder and stored until the aqueous extract was extracted. Cinnamon bark extraction was obtained from the maceration technique. Cinnamon bark powder (30 g) was extracted with acidified methanol. The centrifuge supernatants were combined, and the methanol was evaporated in vacuum at 30°C. Later, the residue was dissolved in water and lyophilized to obtain cinnamon powder.

Animals Used

Eight grown-up male Sprague Dawley rats, weigh 200-210 grams, and age 10 – 12 weeks were used for the experiment. Animals were obtained from the experimental fauna of the Agricultural Research Center of the Superior University, Lahore. Rats were housed in a well – ventilated animal rooms under managed hygienic conditions at a temperature of 24 °C, 50% relative humidity, and a 12 hours mild/12 hours dark cycle. Experiments on rats were performed according to the national animal welfare regulations and the instructions of the Institutional Animal Ethics Committee (IAEC).

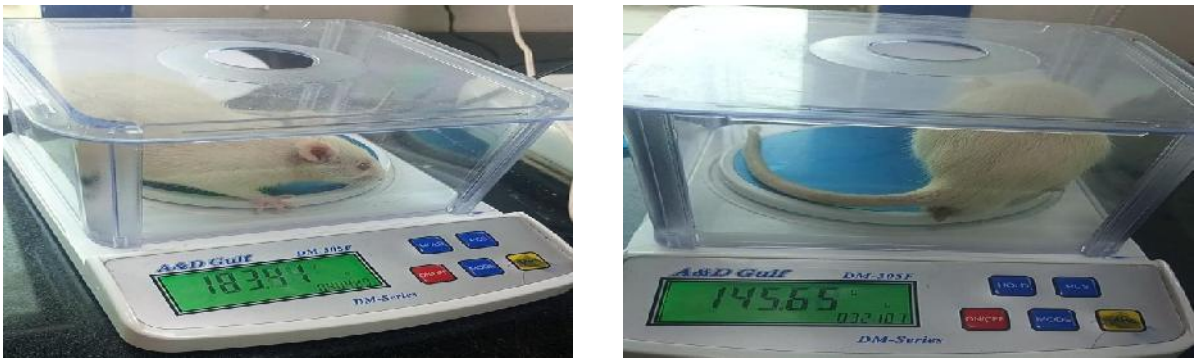

Fig 3.1: Sprague Dawley Rats

Preparation of Basal Diet

The distribution of dietary fats, proteins, nutrients, minerals, and carbohydrates conflicted with the proposed nutritional payments for adult rats. The body weight loss plan consisted of 20% protein, 10% sucrose, 1% vitamin combination,5% salt aggregate and 5% fibers. The remainder was corn starch as much as 100%.

Preparation of aqueous extract

Cinnamon bark powder 200g was dissolved in 100ml methanol that boiled for 10 minutes, cooledit, and cleared out 20% extract to achieve by using double layer gauze.

Induction of Obesity

Obesity and hyperlipidemia were induced in rats via feed on big fat food (HFD) weight reduction plan which resources energy 45% from plump for four weeks. From three to four weeks (HFD) feed was adequate to encourage weight problems and this perfect of fat rats is carefully resembling the fact of fatness on people.

Design of Experiment

Eight adult male Sprague Dawley rats were randomly divided into four groups, two rats in each group. Group A (control) was fed with the laboratory diet, group B (treated) fed the laboratory diet and cinnamon extract for 35 days. The remaining 4 rats are fed a fat-mix diet containing cholesterol, fat, carbohydrates, and nutrients. Then the hypercholesterolemic rats are divided into 2 groups, group C and group D (n=2 for each group). Group C and group D are given Cinnamon powder extract for 35 days. TC, TG, LDL-C and HDL-C serums are measured after 35 days.

These groups eat up HFD for four weeks and 5 days to induce weight problems. The overweight rats then render weight problems with the aid of oral of cinnamon powder (2g/kg) for 35 days. Group A and B are kept overweight rats (fantastic control) and organizations C and D are orally give cinnamon powder in doses 2mg/kg and 4mg/kg and cinnamon powder gives the equal doses individually for 5 weeks. Thecase of the experiment body weights of rats are statistic. Blood samples of lipid profile are collected for serum.

Indicators measurements

The weight measurements of rats and the food intake were recorded from beginning and during the experimental period.

Increasing body weight

In the 30 days, period, the body weight was calculated in final weight and initial weight for each rat.

Food Intake

Food intake was calculated daily of whole diet feeding or period for separate rat. The unconsumed diet was removed and substitutes with a new laboratory diet.

Experiment Design

The test was accompanied to determine the result of cinnamon on no mature male rats. A trend of 8 rats was divided into four businesses of rats every. Every cage confined one rat and was labeled carefully for identity of the unique agencies.

Group A (untreated manipulate). The group rat's resource as untreated controls or normal controls, each rat received preserve of laboratory weight-reduction plan (40 g/day) and water for 35 days.

Group B. Every rat gathered cinnamon powder (2 g/kg body weight) mixed with laboratory weight loss plan (forty g/day) and water for 35 days.

Group C (handled control). Every rat functioned to cope with control and was orally administered to laboratory eating regimen (forty g/day) plus 1% LDL cholesterol with carbohydrates nutrients and water for 35 days.

Group D. Every rat orally received cinnamon powder (2 g/kg frame weight) mixed with laboratory weight loss plan (forty g/day) plus 1% LDL cholesterol with carbohydrates nutrients and water for 35 days.

Collection of Blood Specimen

At the forestall of 35 days, after a 12 h fasting period, all rats were euthanizing the usage of ketamine 0.25ml because of the anesthetic agent. Blood samples were acquired in look at the tube and allowed to coagulate at an accurate room temperature. Respectively, the pattern was transferred right into a dry clean centrifuge tube and centrifuge it at 3000 rpm for 30 min for maintaining apart serum. The supernatant serum was rapidly taken away and kept at 20 °C for biochemical evaluation of serum lipid profile.

Fig 3.2 Collection of Blood Specimen

RESULTS

Effect of Cinnamon on serum lipid profile of adult male rats (A vs B)

Parameters (mg/dl)	Group A(n=2)(control)	Group b(n=2)(treated)
Serum total cholesterol	71	69
Serum TG	72	76
Serum HDL Cholesterol	30.2	30
Serum LDL cholesterol	28	23

Table 4.1: Effect of Cinnamon on serum lipid profile of adult male rats (A vs B)

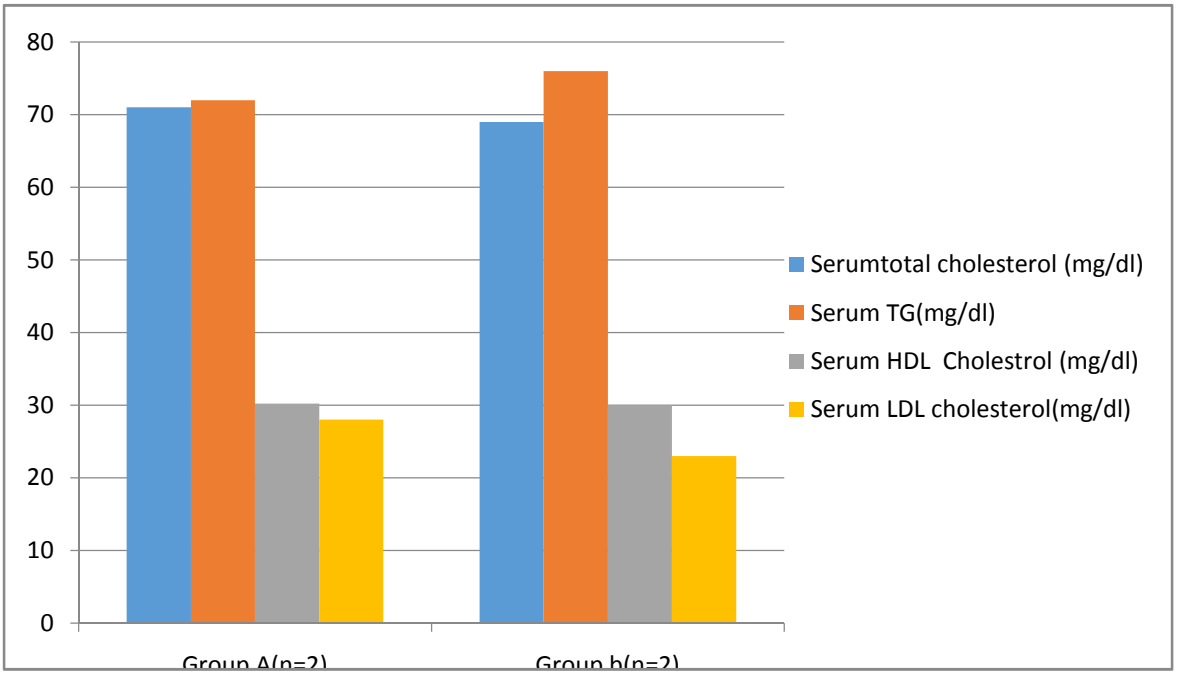

Figure 4.1 Effect of Cinnamon on serum lipid profile of adult male rats (A vs B)

Parameters (mg/dl)	Group A(Control)	Group C(Fatty mixture diet
Serum total cholesterol	71	135
Serum TG	72	105
Serum HDL Cholesterol	30	30
Serum LDL cholesterol	26	83

Table4.2: Effect of fatty mixture feeding on serum lipid profile on adult male rats. (A vs C)

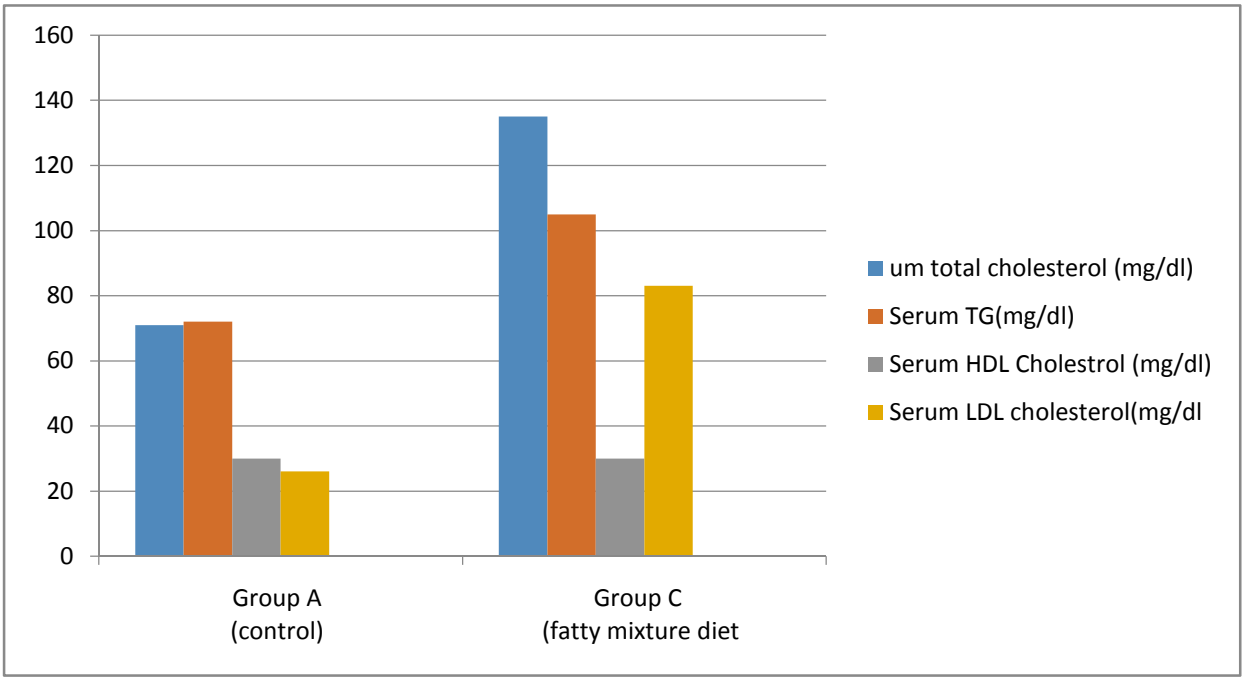

Fig 4.2 Effect of fatty mixture feeding on serum lipid profile on adult male rats (A vs C)

Parameters (mg/dl)	Group C (Fatty diet)	Group D (Treated)
Serum total cholesterol	135	119
Serum TG	105	192
Serum HDL Cholesterol	30	29
Serum LDL cholesterol	83	71

Table 4.3: Effect of cinnamon on lipid profile of Adult male rats fed with fatty mixture feed. (C vs D)

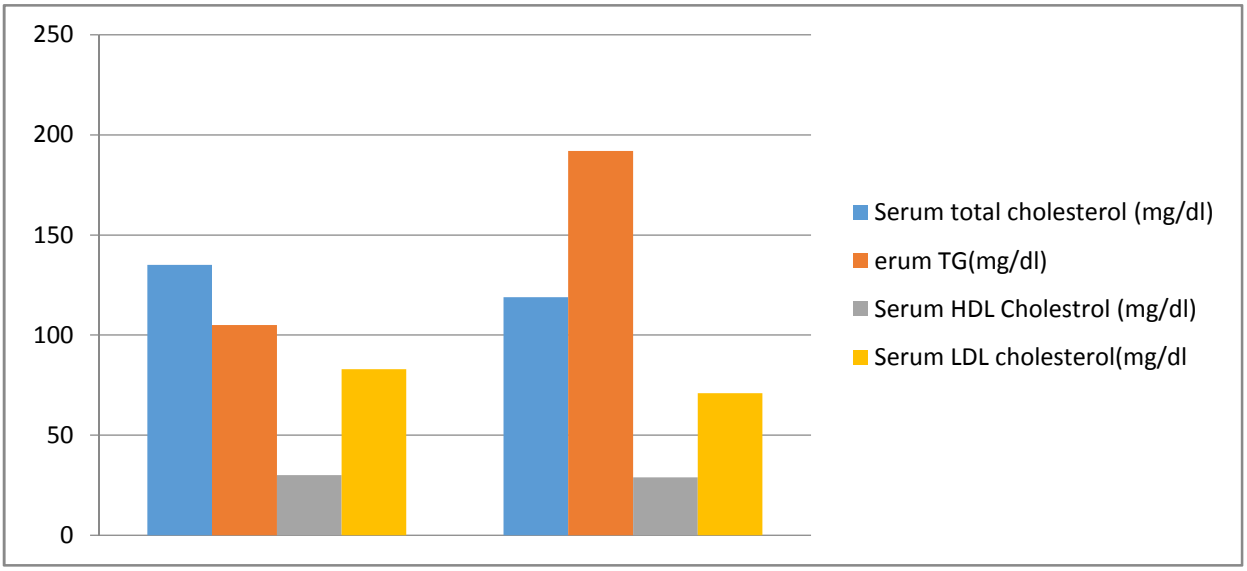

Fig 4.3 Effect of cinnamon on lipid profile of adult male rats fed with fatty mixture feed. (C vs D)

DISCUSSION

Based on the consequences, an impact explosion inside the very last weight body weight benefit and food feeding was examined (Table 2) after management of the excessive fat's mixture for 35 days within the treat manipulate (Group D) compared to that of the untreated manipulate (Group A). This is likely purpose by way of the accumulation of fat within the body. Those findings are dependable with the outcomes of a previous look at which indicates a fast growth within the frame weight of rats feed a high fat weight reduction plan over eight weeks. In similarity a few other examinees no longer manual those outcomes.

The overall serum LDL cholesterol, triglyceride, and HDL ranges additionally expressively growth after the 35 days management of the excessive fat combination (Table 2). Those findings have been reliable with those of numerous previous research which recommends that rats feed an eating regimen rich in LDL has increase serum lipid profile limitations.

The bark of assorted cinnamon species is located internationally as a spice in cooking. Cinnamon has been a safe flavoring agent in meals for many years and there have been no reports of any side results. We observe a small lower within the final weight, body weight advantage, meals intake, in addition to serum overall cholesterol, triglycerides and LDL cholesterol in normal adult male rats treat with extract of cinnamon powder (Group B and Group C) evaluate to the ones within the untreated manage (Group A). However, these variations are not enormous.

The most essential findings of this examine is that extract of cinnamon powder at doses of 2 g/kg frame weight consistent with day for 35 days barely decreased body weight advantage, total serum cholesterol, triglycerides, and LDL levels, while HDL is growth compared to those of the treated control (Group D) in hyperlipidemic grownup male rats (Table 3).

Cinnamon extract is powerful in stopping hyperlipidemia, the maximum critical hazard aspect associates with high incidence of myocardial infarctions and cardiovascular diseases (CVDs).

CONCLUSION

It is concluded that hypolipidemic effect was validated by methanolic extract of cinnamon bark on hypercholesterolemic rats. Our study suggested an impressive anti-hyperlipidemic results in hypercholesterolemia rats by lowering serum general cholesterol, triglyceride, LDL ranges, and growing serum HDL on day number 30th. The in-depth mechanism of action of this extract can be found out by studying it on molecular level.

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