The present study was designed to investigate the hypolipidemic effect of *Cinnamomum tamala* Nees. leaves extracts in high cholesterol diet induced hyperlipidemia. Aqueous and ethanolic extracts of leaves of *Cinnamomum tamala* Nees. were administered in doses of 400mg/kg /day p.o. each for 10 days. Simultaneous administration of *Cinnamomum tamala* Nees. leaves extracts significantly (p<0.001) prevent the rise in serum levels of total cholesterol, triglyceride, LDL-C, VLDL-C and atherogenic index whereas significant (p<0.01) increases in the level of HDL-C.

**Keywords**: Hyperlipidemia, HCD, LDL-C

## Introduction

Hyperlipidemia contributes significantly in the manifestation and development of atherosclerosis and coronary heart diseases (CHD). Atherosclerosis, are the most common cause of mortality and morbidity worldwide. Although several factors, such as diet high in saturated fats and cholesterol, age, family history, hypertension and life style play a significant role in causing heart failure, the high levels of cholesterol particularly TC, TG and LDL cholesterol is mainly responsible for the onset of CHDs. A 20% reduction of blood cholesterol level can decrease about 31% of CHD incidence, and 33% of its mortality rate.

In addition hyperlipidemia is induced by secondary effect of diabetes, therefore the agent having some antioxidant and anti-diabetic effect also showed favorable effect to hyperlipidemia. HMG Co A reductase inhibitor has been used in the treatment of hyperlipidemia, and simvastatin is one of the most perevalently used HMG CO A reductase inhibitors.

Spices are dried parts of herbs used as flavouring agents in cooking in oriental countries owing to their taste and aroma. Indian bay leaf (*Cinnamomum tamala* Nees.) is one among them. The dried leaf of this plant is a spice commonly used in Indian homes for seasoning. It belongs to the family *Lauraceae* and is indigenous to the Asian minor and southern Europe.

Until now, the anti diabetic activity, anti-bacterial activity, antioxidant activity, antimicrobial, anti-inflammatory activity, anti-diarrhoeal activity, of CT extracts have been evaluated.

Based on this information present study was designed to investigate the antihyperlipidemic effect of *Cinnamomum tamala* Nees. extracts (ethanolic and aqueous) serum lipid and lipoprotein profile in high cholesterol diet induced hyperlipidemia.

## Material and Methods

**Plant materials and chemicals**

The leaves of *Cinnamomum tamala* Nees. collected at local area of Sangli were authenticated from botanist of Jaysingpur College, Jaysingpur. Simvastatin was obtained as gift sample from Cipla, Kurkumbh, Pune. Diagnostic kits for estimation of Cholesterol (Span Diagnostics), triglyceride (Biolab diagnostics), HDL-C (Coral Clinical) were used. High cholesterol diet was prepared in college lab.

**Plant extracts**

The leaves of plant were dried in shade, under normal environmental condition and then coarse powder was prepared. Aqueous extract was prepared by cold maceration. Drug powder was taken in a 1000 ml conical flask and macerated with sufficient quantity of chloroform water for 7 days. During maceration, it was shaken twice daily. On 7th day it was filtered and the filtrate was concentrated. The remaining solvent was evaporated by heating on a water bath (50°C) to get aqueous extract. Ethanol extract was obtained by extracting powder with 95% ethanol by soxhlet extraction method with for 72 hr. After completion of
the extraction the solvent was removed completely to get extract. All the extracts were stored in desiccators.

**Experimental**

Male albino rats (Wistar strain) weighing between 150-200g were maintained at 25 to 30°C and kept in well ventilated animal house in large polypropylene cages and were fed standard rats chow and water *ad libitum*. The animal experiment was approved by animal ethical committee of institute.

**Preparation of doses**

**Oral administration of extract**

Dissolving 500mg/kg, body weight of *Cinnamomum tamala* Aqueous extract in distilled water and ethanolic extract suspended in tween-80, and given by oral gavage.

Composition of High fat diet (HCD)

High fat diet cocktail was prepared by mixing cholesterol (100g), cholic acid (50g) in 1 liter of coconut oil supplemented with egg.

**Experimental procedure**

The animals were fed a high-cholesterol diet for 10 days. To confirm the induction of hyperlipidemia, blood samples were collected by retro orbital vein. The TC concentration of the blood samples was then determined using a standard diagnostic kit. The rats were then divided into 5 groups of 6 animals based on their cholesterol levels, after which the treatments were administered orally once daily for 10 days.

**Biochemical assay**

At the end of the experimental period Blood was withdrawn from retro-orbital plexus of rat under ether anesthesia and centrifuged at 2000 rpm for 30min so as to get serum. Serum total cholesterol, triglyceride HDL-C was estimated by using diagnostic kits.

**Statistical analysis**

One way analysis of variance (ANOVA) followed by Dunnetts t-test was carried out and P<0.005 was considered significant.
in various components of lipid profile under experimentally induced hyperlipidemia. Ample of evidence exists with respect to the fact that HDL cholesterol is inversely related to total body cholesterol and a reduction of plasma HDL cholesterol concentration may accelerate the development of atherosclerosis leading to ischemic heart diseases, by impairing the clearing of cholesterol from the arterial wall. Flavonoids are reported to increase HDL-C concentration and decrease in LDL and VLDL levels in hypercholesteremic rats. Flavonoids and polyphenols found in our CT extracts could therefore be considered favorable in increasing HDL and decreasing LDL and VLDL in CT treated rats. Simvastatin which was used as positive control in this study is a HMG-CoA reductase inhibitor. HMG-CoA reduces serum triglyceride levels through the modulation of apolipoprotein C-III and lipoprotein lipase. Rats treated with Simvastatin showed marked reduction in all serum lipoproteins and increase in HDL level as compared with HCD group.

Result of present study revealed that the aqueous and ethanolic extract of leaves of Cinnamomum tamala Nees. improved the serum lipid profile in rats by decreasing serum TC, TG, LDL-C and increasing serum HDL-C, thus improving the atherogenic index. This finding provides some biochemical basis for the use of leaves extract of Cinnamomum tamala Nees. as antihyperlipidemic agent having preventive and curative effect against hyperlipidemia. Further, studies are required to gain more insight into to the possible mechanisms of action.

References


Table 1: Effect of ethanolic and aqueous extracts of leaves of *Cinnamomum tamala* Nees. on lipid profile in HCD induced hyperlipidemic rats.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>GROUPS</th>
<th>TC (mg/dl)</th>
<th>TG (mg/dl)</th>
<th>HDL (mg/dl)</th>
<th>VLDL (mg/dl)</th>
<th>LDL (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Control</td>
<td>77.77± 4.05</td>
<td>70.15± 6.16</td>
<td>34.81± 1.58</td>
<td>14.03± 1.23</td>
<td>27.08± 2.91</td>
</tr>
<tr>
<td>2.</td>
<td>HCD</td>
<td>183.33± 6.67</td>
<td>148.92± 6.53</td>
<td>18.51± 1.36</td>
<td>29.77± 1.30</td>
<td>135.04± 5.47</td>
</tr>
<tr>
<td>3.</td>
<td>HCD+ Simva.(10mg/kg)</td>
<td>103.33± 7.13*</td>
<td>97.22± 5.28* (↑43.64)</td>
<td>31.47± 2.54* (↑70.01)</td>
<td>19.60± 1.03* (↓34.16)</td>
<td>51.80± 3.97* (↑161.64)</td>
</tr>
<tr>
<td>4.</td>
<td>HCD + Eth.200mg</td>
<td>150.00±10.33* (↑18.19)</td>
<td>121.54±3.29* (↑18.38)</td>
<td>25.92± 1.58* (↑40.03)</td>
<td>24.41± 0.75* (↑18.00)</td>
<td>99.77± 9.85* (↑126.57)</td>
</tr>
<tr>
<td>5.</td>
<td>HCD + Eth.400mg</td>
<td>128.33± 6.01* (↓30.00)</td>
<td>112.74± 5.56* (↑24.29)</td>
<td>28.10± 2.19* (↑51.80)</td>
<td>22.51± 1.12* (↑24.38)</td>
<td>77.67± 3.97* (↓42.48)</td>
</tr>
<tr>
<td>6.</td>
<td>HCD + Aqu.200mg</td>
<td>153.33±7.60* (↑16.37)</td>
<td>124.36±6.05* (↑16.49)</td>
<td>22.58± 1.66 (↑21.98)</td>
<td>24.86± 1.21* (↑16.49)</td>
<td>105.96±6.06 (↑121.53)</td>
</tr>
<tr>
<td>7.</td>
<td>HCD + Aqu.400mg</td>
<td>146.66±6.15* (↓20.01)</td>
<td>119.60±7.54* (↑19.68)</td>
<td>26.65± 1.72* (↑43.97)</td>
<td>23.86± 1.52* (↑19.85)</td>
<td>96.15± 4.88* (↓28.79)</td>
</tr>
</tbody>
</table>
Table 2: Effect of ethanolic and aqueous extracts of leaves of *Cinnamomum tamala* Nees. on body weight HCD induced hyperlipidemic rats

<table>
<thead>
<tr>
<th>Days</th>
<th>Mean Body weight (gm)</th>
<th>% change in body weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>HCD</td>
</tr>
<tr>
<td>0th day</td>
<td>148.33</td>
<td>138.66</td>
</tr>
<tr>
<td>5th day</td>
<td>161.33 (↑18.76)</td>
<td>164.66 (↑18.75)</td>
</tr>
<tr>
<td>10th day</td>
<td>169.10 (↑14.00)</td>
<td>179.66 (↑29.56)</td>
</tr>
<tr>
<td>15th day</td>
<td>178.33 (↑20.22)</td>
<td>187.33 (↑35.10)</td>
</tr>
<tr>
<td>20th day</td>
<td>183.66 (↑23.81)</td>
<td>199.33 (↑44.09)</td>
</tr>
</tbody>
</table>

Fig.1: Effect of ethanolic and aqueous extracts of leaves of *Cinnamomum tamala* Nees. on lipid profile in HCD induced hyperlipidemic rats.