

ANTIHYPERLIPIDEMIC ACTIVITY OF CAPSAICIN IN HIGH FAT DIET INDUCED RATS

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ABSTRACT

Capsaicin is natural medicine extracts from capsicum and other pepper plants the systematic pharmacological studies carried out support its hyperlipidemic activity. The experimental model selected for the present study is administration high fat diet and cholesterol (0.5%) orally at every alternative day. Treatment with Capsaicin significantly reduced elevated levels of cholesterol and total protein and significantly increased HDL cholesterol level in hyperlipidemic rats. There was a significant ($P < 0.002$) decrease in the amount of cholesterol, total protein levels in capsaicin and high fat diet treated group and Atrovastatin and high fat diet treated groups compared to respective high fat diet treated group.

Keywords: Capasaicin and lipid profile.

INTRODUCTION

Hyperlipidemia is an abnormal elevation of plasma lipids including largely cholesterol, triglycerides and phospholipids¹⁻². An elevation of plasma lipids may be caused by a primary genetic defect or secondary to diet, drugs or diseases. Despite of differences in lipoprotein distribution and metabolism between humans and rats, hyperlipidemic rat models were extensively used in lipid research³.

Hyperlipidemia disease has afflicted humankind since antiquity. The treasure house of plant kingdom has a number of plants to treat this ailment. The indigenous system of medicine provides an abundant data about plants available for treatment of Hyperlipidemia. A lot of work has been carried out by researches on various plants to evident their effectiveness in Hyperlipidemia. But still lots many are left which are used in the indigenous system but no systematic studies regarding their pharmacology have been carried out. One such natural medicine in indigenous system of medicine claimed to be useful in treatment of high fat deposition in various organs. Capsaicin is natural medicine extracts from capsicum and other Pepper plants the systematic pharmacological study is

carried out to support its hyperlipidemic activity⁴.

MATERIALS AND METHODS

Selection and collection of plant material

The basic plant material of "capsicum annum" fruits were used for the study was obtained from Sri Venkateshwara university, Tirupathi India. The plant can be identified and authenticated by Dr. Madhava chetty, Department of botany and voucher specimen of the plant were preserved at institute herbarium library.

Preparation of fruit extract

The collected fruits were dried at room temperature, pulverized by a mechanical grinder, sieved through 40 meshes. The powdered materials were extracted with ethanol using "soxhlet extraction apparatus". This ethanolic extract was then concentrated and dried under reduced pressure to give a sticky residue & preserved in refrigerator in air tight containers until further use⁵.

Dose selection

The Capsaicin dose firstly selected doses;
1.50mg/100ml- Action: cholesterol 189 mg/dl
2.100mg/100ml- Action: cholesterol 159 mg/dl
3.200mg/100ml- Action: cholesterol 109 mg/dl
So we selected final dose is 200mg/100ml (2mg/ml)

Experimental design

The experiment conducted for 45 days.
Wister rats (n = 24) are divided in to 4 groups as per following.

Group 1

(Normal) received normal diet.

Group 2

High fat diet (egg white, vegetable fat, cakes, potatoes, cholesterol) and drinking tap water.

Group 3

2 mg/ml capsaicin + high fat diet treated.

Group 4

0.05mg Atrovastatin + high fat diet

STATISTICAL ANALYSIS

Statistical analysis was carried out using paired t-test and one-way analysis of variance (ANOVA) followed by Bonferroni's test. Differences below $P < 0.05$ implied statistically significance⁶. All results were expressed as mean \pm SEM.

RESULTS**Cholesterol**

Administration of high fat diet and cholesterol in rats show significant ($P < 0.001$) increase in the cholesterol levels in blood serum compared to respective Normal group. Treatment with capsaicin and Atrovastatin show significant ($P < 0.001$) reduction in the amount of cholesterol in capsaicin with high fat diet treated group and atrovastatin with high fat diet group compared to respective high fat diet group⁷.

Cholesterol levels in blood serum of all groups normal, high fat diet treated group, capsaicin with high fat diet administered group and Atrovastatin with high fat treated group.

Total protein

There was a significant ($P < 0.002$) increase in the Total Protein levels in blood serum of high fat diet treated group compared to Normal

group. There was a significant ($P < 0.002$) decrease in the amount of Total Protein levels in capsaicin + high fat diet treated group and atrovastatin+high fat diet treated groups compared to respective high fat diet treated group.

DISCUSSION

Despite considerable effort on the part of a number of investigators, there has been only a limited success in developing an ideal animal model of lipidemic disease that faithfully mimics human Hyperlipidemia. Various procedures have been reported by numerous investigators from time to time such as selective diets, High fat diets, drug induced Hyperlipidemia in experimental animals.

In the animal model, Hyperlipidemia induces not only fat deposition damage to the cells of organs that leads generation of free radicals. The increased deposition of cholesterol and lipids in liver and other organ tissues known to lead damage to the tissues and various blood vessels. Administration Capsaicin significantly reduced both fat deposition and reduced in serum cholesterol and increased serum HDL levels in capsaicin treated groups when compared to their respective high fat diet groups. This indicates that Capsaicin has beneficial effect in preventing hyperlipidemia. Capsaicin alone and combination with other natural drugs significantly improved vascular reactivity and blood pressure in high fat diet induced hyperlipidemia model.

CONCLUSION

In conclusion, the present study results indicate that high fat play the aggregative and alleviative roles respectively in the context of lipid as high fat diet feeding for 45 days resulted in raising lipid levels in blood. Treatment with Capsaicin significantly reduced elevated levels of cholesterol and total protein and significantly increased HDL cholesterol level in hyperlipidemic rats. Capsaicin treatment reduced elevated levels of biomarkers of oxidative stress. Further the treatment with capsaicin significantly decreased serum cholesterol and total protein levels.

The present study concludes that capsaicin may be useful in the management of hyperlipidemia. Hence, the present study indicates that capsaicin may be useful in the management hyperlipidemia. It may be used in combination with other natural drugs.

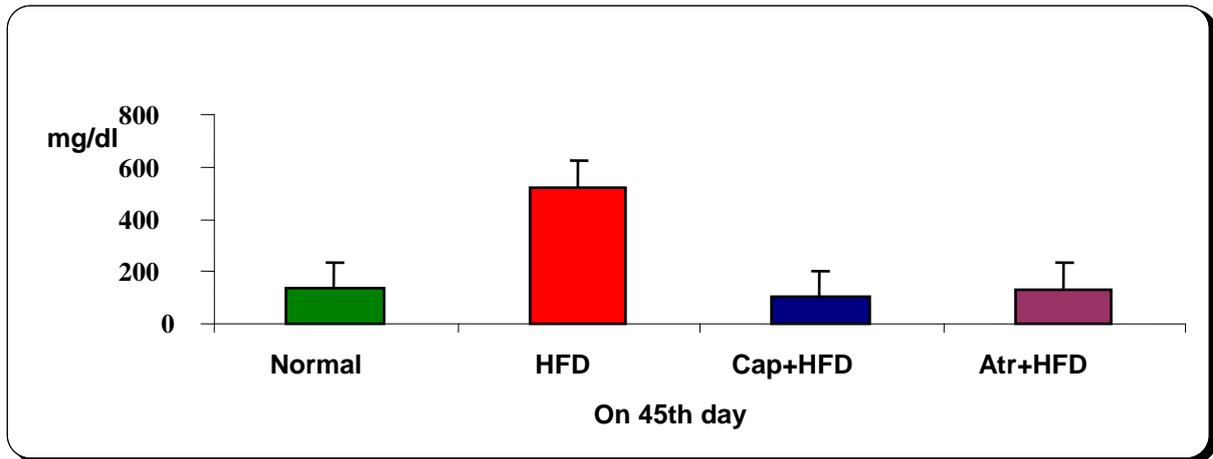


Fig. 1: Cholesterol

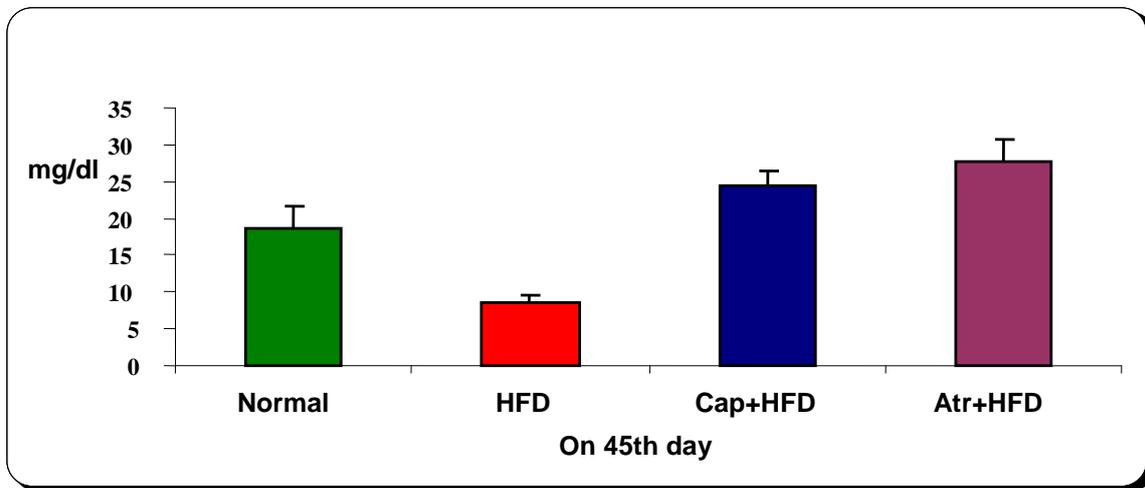


Fig. 2: HDL Cholesterol

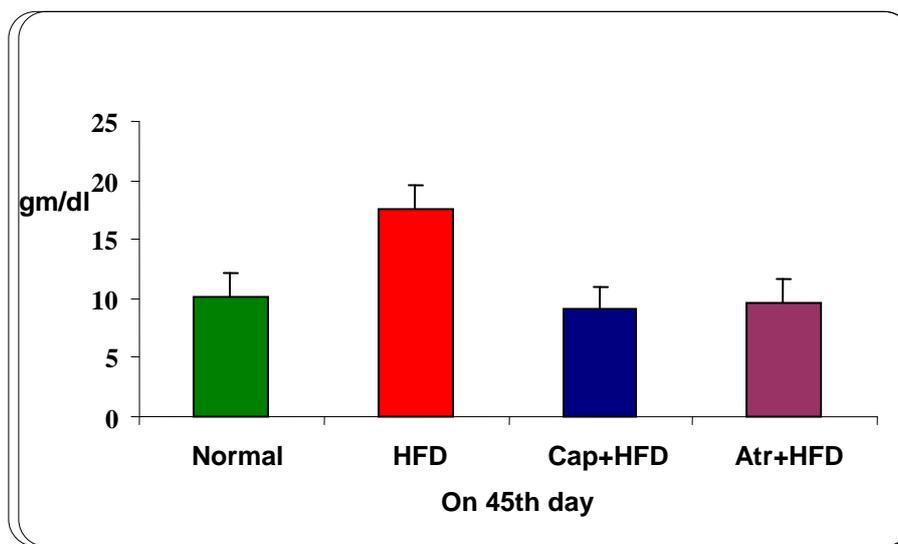


Fig. 3: Total Protein

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