

SHORT COMMUNICATION

EFFECT OF ORAL CURCUMIN ADMINISTRATION ON SERUM PEROXIDES AND CHOLESTEROL LEVELS IN HUMAN VOLUNTEERS

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**Abstract:** The effect of curcumin administration in reducing the serum levels of cholesterol and lipid peroxides was studied in ten healthy human volunteers, receiving 500 mg of curcumin per day for 7 days. A significant decrease in the level of serum lipid peroxides (33%), increase in HDL Cholesterol (29%), and a decrease in total serum cholesterol (11.63%) were noted. As curcumin reduced serum lipid peroxides and serum cholesterol, the study of curcumin as a chemopreventive substance against arterial diseases is suggested.

**Key words:** curcumin  
arteriosclerosis

serum peroxides

cholesterol  
human study

INTRODUCTION

In some arterial diseases there is a positive correlation between high serum LDL and the disease process. The endothelial injury of the vascular wall is mediated by the lipids because of their tendency to undergo peroxidation and to produce reactive species of oxygen (1). Compounds that can scavenge the activated oxygen species may therefore be useful as chemopreventive agents against arterial diseases. It has been shown that curcumin, (diferuloyl methane) inhibits lipid peroxidation induced by chemical agents such as carbon tetrachloride, paraquat and cyclophosphamide (under publication). Use of curcumin in inhibiting chemically induced papillomas has also been recently shown (2,3). In the present study the use of curcumin for reducing serum lipid peroxides and cholesterol was studied in human volunteers.

METHODS

Ten healthy volunteers (male and female) were chosen for the study. Individual consent was obtained to conduct the study. The age of the volunteers varied from 24 to 45 year and weight 46 to 70 kg.

Curcumin (98% pure) used in the study was a gift from Bombay Oil Industries Ltd., Angamali. Gelatin

Capsules (00 size) was a gift from Associated Capsules Ltd., Bombay. 0.5 g of Curcumin was weighed and filled in each capsule manually.

Initial weights and blood pressures of the subjects undergoing the study was taken. Blood was collected and serum was analysed for total cholesterol (4), HDL Cholesterol (5) and serum lipid peroxides (6). Triglyceride was estimated by hydrolyzing with lipase and then its oxidation with glycerol-3-PO<sub>4</sub> oxidase using Ranbaxy Diagnostics Kit. The subjects were asked to take the capsule for one week in the morning after breakfast. There was no restriction in the diet. After 7 days the blood was drawn again and biochemical analysis were repeated. Weights and blood pressures were recorded. Values of estimates were expressed individually. Mean and standard deviation was calculated by Student t-test.

RESULTS

Curcumin administration did not produce any weight change of the subjects. Moreover, none of the volunteers reported any other toxic symptoms such as nausea, vomiting headache, abnormality in bowel movements, indicating that curcumin does not produce such toxic effects with dosages used. A slight lowering of blood pressure was observed, and a mild tranquil

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feeling was reported by some subjects between 1-3 hr after curcumin administration.

The serum lipid peroxides measured as malondialdehyde by thiobarbituric acid method showed a considerable decrease in all the subjects after curcumin administration. Average pre-drug administration values of 10 subjects,  $5.08 \pm 1.14$  were significantly lowered to  $3.40 \pm 0.89$  ( $P < 0.05$ ) after curcumin treatment (Table I).

Curcumin administration also resulted in a significant lowering in total cholesterol levels by nearly 12% ( $P < 0.05$ ) ( $213 \pm 29.3$  to  $188.4 \pm 37.3$ ) (Table II).

TABLE I: Effect of curcumin on serum lipid peroxide in human volunteers.

Case No.	Lipid peroxide in nmoles of malondialdehyde/ml serum	
	Before	After
1	4.60	4.60
2	5.00	2.80
3	3.40	3.20
4	5.40	2.80
5	5.40	2.60
6	5.00	3.20
7	5.40	3.20
8	4.20	3.00
9	4.60	3.20
10	7.80	5.40
Average	$5.08 \pm 1.14^*$	$3.40 \pm 0.89^*$

\*Significant  $P < .005$

TABLE II: Effect of curcumin administration (oral) on serum lipoproteins.

Case No.	Total Cholesterol (mg/100 ml)		HDL Cholesterol (mg/100ml)		Serum triglycerides (mg/100ml)	
	Before	After	Before	After	Before	After
1	237.8	210.8	63.43	73.4	368.7	343.7
2	183.7	151.3	63.42	97.9	393.7	456.0
3	197.2	138.3	51.79	75.8	87.5	81.25
4	221.6	216.2	68.70	75.8	106.25	75.0
5	186.4	137.8	63.4	87.2	62.5	43.7
6	254.0	243.2	44.9	61.2	125.0	137.5
7	178.3	175.6	58.0	81.4	56.25	62.5
8	191.9	183.7	66.06	70.4	306.26	256.25
9	227.0	200.0	66.06	81.4	131.25	62.5
10	254.0	227.0	63.42	73.4	93.75	87.5
Average	$213 \pm 29.3$	$188.4 \pm 37.3^*$	$60.9 \pm 7.3$	$78.6 \pm 9.9^*$	$173 \pm 130.3$	$160 \pm 142$

\*Significant;  $P < .005$

It was further noted that HDL - Cholesterol increased in all the subjects after curcumin administration, from  $60.9 \pm 7.3$  to  $78.6 \pm 9.9$ . The values were significant ( $P < 0.05$ ). Percentage increase in HDL - Cholesterol was 29%.

There was also a non-significant decrease in serum triglycerides in these subjects after curcumin administration, from an average value of  $173 \pm 130.3$  to  $160.5 \pm 142$ .

## DISCUSSION

In the present report we have determined the effect of curcumin on serum lipid profile in human healthy volunteers. A similar effect in rabbits and rats fed with hyperlipidaemic diet has been reported earlier (7,8). Curcumin could effectively lower the serum cholesterol in human beings in a short period of time. Moreover it could also mobilize the extra hepatic cholesterol as seen by the increased HDL-Cholesterol after treatment.

Turmeric (*Curcuma longa*) is used as a coloring agent and food additive in Indian culinary preparations from time immemorial. Turmeric and curcumin have been reported to be anti-oxidants and could scavenge the radicals and superoxides *in vitro* and *in vivo*. In the present study we have found that curcumin could not only reduce the cholesterol but also scavenge serum peroxide. Increased serum peroxide has been shown to be associated with cardiac arrhythmias. Moreover

peroxides have also been shown to be highly disruptive to vasculature (9). The study indicated here that curcumin can scavenge the serum peroxides and thereby possibly act as a chemopreventive agent against atherosclerotic changes. Its usefulness as an anti-carcinogen has also been documented (2). Nagabhushan et al (10) has shown its non-mutagenetic action.

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