

Research Article

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Non-traditional and Non-Conventional Therapies: How does this Work?

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ABSTRACT

Too much fat in the blood can mix with harmful free radicals and cause heart disease. This study tested three natural remedies, turmeric (*Curcuma longa*), fenugreek leaves, and lemon juice to see if they lower blood fats. The study took place at Jinnah Hospital, Lahore from January to May 2025. Ninety patients with high blood fats (ages 19-70) joined. People with diabetes, high blood pressure, kidney or liver problems, or alcohol use were not included. Everyone gave consent and had their blood tested at the start. Patients were split into three groups: Turmeric group: 500 mg turmeric in milk, three times a day. Fenugreek group: 100 g fenugreek leaves with salad at each meal. Lemon group: 40 ml lemon juice mixed with mineral water, three times a day. All patients were told to avoid fatty foods and junk food, and to walk briskly for one hour daily. After two months, blood tests were repeated. Results: Turmeric lowered cholesterol, triglycerides, and LDL by about 16-20 mg/dl. Fenugreek lowered them by about 14-17 mg/dl. Lemon lowered them by about 10-15 mg/dl. None of these remedies increased "good" HDL cholesterol. Conclusion: Turmeric, fenugreek, and lemon can mildly lower bad fats in the blood, but they do not raise HDL cholesterol.

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Introduction

Atherosclerosis and LDL Heart problems like atherosclerosis happen when "bad cholesterol" (LDL) is taken up by immune cells called monocytes and macrophages [1]. In the liver, LDL is normally cleared by special receptors, but macrophages use a different system. Before macrophages can absorb LDL, it must be changed (oxidized) [2]. In patients with high cholesterol, oxidized LDL contains a lot of lysophosphatidylcholine, which damages blood vessels and reduces their ability to relax [3-7]. Conventional medicines such as statins, fibrates, niacin, and bile acid binding resins (BABRs) are used to lower blood fats [8]. However, they often cause side effects from unpleasant taste (BABRs) to serious problems like muscle damage (rhabdomyolysis) with statins and fibrates [9-11]. Because of these issues, many doctors are turning to herbal remedies. Medicinal plants like Turmeric (*Curcuma longa*), Fenugreek, and Lemon are now being studied as mild to moderate cholesterol-lowering agents [12].

- **Turmeric (Haldi):** Contains curcuminoids, turmerone, and other compounds. Curcumin reduces oxidation of LDL, helps

the liver clear cholesterol, increases cholesterol receptors, and boosts bile acid excretion. It also raises ABC transporters in macrophages, which push excess cholesterol back into the blood for the liver to process [13].

- **Fenugreek:** Rich in proteins, amino acids, flavonoids, saponins, vitamins, minerals, and fibers. Its steroidal saponins block cholesterol absorption and production. Fenugreek seed powder also reduces oxidative stress and improves antioxidant levels [14].
- **Lemon:** Contains flavonoids and flavanones that act as antioxidants. These compounds help stop lipid peroxidation, protecting blood vessels [15].

Antioxidant benefits Phenolic compounds in turmeric and flavonoids in lemon fight free radicals, scavenge harmful molecules, and bind metals [16]. Eating foods rich in these compounds is linked to lower risks of heart disease, stroke, cancer, and atherosclerosis [17-20]. Turmeric, fenugreek, and lemon are natural options that can lower cholesterol and protect blood vessels through antioxidant effects, though they work more mildly

compared to conventional drugs [21-25].

Patients & Methods

- **Place and time:** The study was done at Jinnah Hospital, Lahore, from January to May 2025, with approval from the hospital's ethics committee.
- **Sample size:** Ninety patients with high blood fats (ages 19-70) were included.
- **Consent:** Written consent was taken from all participants, and a special form was used to record their details.
- **Exclusion criteria:** Patients with high blood pressure, thyroid problems, diabetes, alcohol addiction, stomach ulcers, kidney, liver, or heart issues were not included.
- **Grouping:** Patients were divided into three groups of 30 each. Their starting blood tests (lipid profile, blood pressure, pulse) were recorded.
- **Lipid profile:** Blood fats (cholesterol, HDL, triglycerides) were measured after fasting for 12 hours. LDL cholesterol was calculated using Friedewald's formula.

Treatment plans:

- **Group I:** 500 mg turmeric (*Curcuma longa*) in milk, three times daily for two months.
- **Group II:** 100 g fenugreek leaves with salad at each meal, three times daily for two months.
- **Group III:** 40 ml lemon juice mixed with 40 ml mineral water, three times daily for two months.

All patients were told to avoid fatty/junk foods and walk briskly for one hour daily. Follow-ups were done every 15 days. After

two months, blood tests were repeated.

Statistical analysis: Results from day 0 and day 60 were compared using SPSS software. A paired t-test was applied. Changes with p-value <0.01 were considered significant, while p-value >0.05 was considered not significant.

Results

When the data was analyzed using SPSS software, the following changes were observed:

- **Turmeric (*Curcuma longa*):** In 29 patients, triglycerides dropped by 20.01 mg/dl, total cholesterol by 16.10 mg/dl, and LDL cholesterol by 17.59 mg/dl. HDL cholesterol increased slightly by 3.70 mg/dl.
- **Fenugreek leaves:** In 28 patients, triglycerides decreased by 17.33 mg/dl, total cholesterol by 14.70 mg/dl, and LDL cholesterol by 17.06 mg/dl. HDL cholesterol rose by 3.55 mg/dl.
- **Lemon juice:** 29 patients in this group, reduced total cholesterol by 15.45 mg/dl, triglycerides by 10.13 mg/dl, and LDL cholesterol by 11.97 mg/dl. HDL cholesterol increased by 3.55 mg/dl.

All changes were checked for statistical significance, and the details are shown in the study's table.

Three tables are changed

Table 1: Showing Parameters Values Before and After Treatment with Their Statistical Significance in Group-1(N = 29) (*Curcuma Longa* or Haldi)

TC at day-0 271.87±1.04	TC at day-60 255.77±2.77	Difference in mg/dl 16.10	P-value= <0.001
TG at day-0 216.09±2.43	TG at day-60 196.08±2.45	20.01	P-value= <0.001
LDL-C at day-0 179.65±2.87	LDL-C at day-60 162.06±2.51	17.59	P-value= <0.001
HDL-C at day-0 37.95±1.45	HDL-C at day-60 41.65±1.91	3.70	P-value= <0.001

Table 2: Showing Parameters Values Before and After Treatment with Their Statistical Significance in Group-2 (N = 28) (*Fenugreek* or Methi)

TC at day-0 280.56±1.06	TC at day-60 255.77±2.77	Difference 14.70	P-value= <0.001
TG at day-0 224.87±1.55	TG at day-60 207.54±1.98	17.33	P-value= <0.001
LDL-C at day-0 213.13±2.78	LDL-C at day-60 196.07±1.56	17.06	P-value= <0.001
HDL-C at day-0 35.19±2.32	HDL-C at day-60 38.08±1.67	2.89	P-value= <0.001

Table 3: Showing Parameters Values Before and After Treatment with Their Statistical Significance in Group-3 (N = 29) (Lemon Water)

TC at day-0 258.21±2.12	TC at day-60 242.76±1.89	Difference 15.45	P-value= >0.05
TG at day-0 246.56±2.11	TG at day-60 236.43±2.43	10.13	P-value= >0.05
LDL-C at day-0 179.08±2.87	LDL-c at day-60 167.11±1.77	11.97	P-value= >0.05
LDL-C at day-0 179.08±2.87	LDL-c at day-60 167.11±1.77	11.97	P-value= >0.05
HDL-C at day-0 36.22±1.77	HDL-C at day-60 39.77±1.55	3.55	P-value= >0.05

Key: All values are written in mean and $\pm$ stands for standard error of mean. T-C= serum total cholesterol, TG= serum triglycerides, LDL-C= low density lipoprotein cholesterol, HDL-C= high density lipoprotein cholesterol. All parameters pre and post-treatment are measured in mg/d. n = sample size. P-value <0.01 stands for significant change, P-value >0.05 stands for non-significant change.

Discussion

Atherosclerosis develops when blood lipid (fat) levels are too high [26]. Keeping cholesterol and triglycerides within normal ranges is the best way to prevent these problems. In this study, lemon, turmeric (*Curcuma longa*), and fenugreek all showed significant reductions in total cholesterol (TC), triglycerides (TG), and LDL cholesterol. However, none of them had a strong effect on raising HDL (“good”) cholesterol. Other studies support these findings. Grewe DD et al proved 11.11 mg/dl reduction in TC and 18.09 mg/dl reduction in LDL-C when they used *Curcuma Longa* for 6 weeks. Luluv GT et al explained that pectin in these herbs helps remove cholesterol by increasing bile acid excretion. Flavonoids in fenugreek block cholesterol production, while turmeric prevents LDL oxidation and improves cholesterol clearance by the liver. Turmeric also boosts bile acid formation and increases transporters that push cholesterol out of macrophages, reducing plaque buildup [27-29]. Warah PL et al stated that fenugreek extracts are rich in antioxidants, which protect against oxidative stress. Lemon contains citric acid and flavonoids that act as antioxidants, lowering oxidative damage in the body [30-33]. These antioxidant properties are important because oxidative stress contributes to heart disease. Gotom CH et al proved same reduction as we in Fenugreek group of patients [34]. They proved 16.12 mg/dl reduction in TG and 19.03 mg/dl reduction in LDL cholesterol in 30 patients with hyperlipidemia in 12 weeks. Researchers like Fotosa MK et al have noted that obesity, high-fat diets, diabetes, and family history are major causes of high cholesterol worldwide, making it a leading cause of death. Lifestyle changes such as weight control, exercise, eating more fruits and vegetables, and avoiding fatty foods are essential [35,36]. In chronic cases, medications are often required, but they can cause side effects. This is why many people are turning to herbal remedies, which are safer and better tolerated. Fiqarrm MT et al proved significant reduction in TC, TG, LDL-C in 54 hyperlipidemic patients but they observed no rise in HDL-cholesterol when citrus limon was used for 2 months [37]. Many studies observed nonsignificant reduction in lipid parameters as study by Motovas et al proved 3.31 mg/dl, 5.06 mg/dl, and 3.91 mg/dl reduction in TC, TG, and LDL cholesterol in 12 hyperlipidemic young male patients when they used citrus limon for 1 month. Reasons for much difference in result may be related with short duration and small sample size in their study [38]. Overall, turmeric, fenugreek, and lemon are promising natural options for lowering cholesterol and triglycerides. They work mainly through antioxidant effects and by reducing LDL oxidation, but they do not significantly raise HDL cholesterol because that requires specific proteins to build HDL particles [39,40]. These herbs help lower “bad” cholesterol

and triglycerides through antioxidant and bile acid mechanisms, but they don’t raise “good” cholesterol. They are useful for mild cases and prevention, but not strong enough alone for chronic or severe hyperlipidemia [41].

Conclusion: It was concluded from this study that all of these three herbs reduce bad cholesterol (TC, TG, LDL-C) significantly but do not raise HDL-cholesterol significantly when used for remarkable period of time.

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References

1. Bouwens LC (2011) The chemistry of tea flavonoids. *Crit Rev Food Sci* 37: 693-704.
2. Wiseman SA (2012) A single dose of tea with or without milk increases plasma antioxidant activity in humans. *Ind J Nutr* 54: 87-92.
3. Sanders TA, Wiseman H (2015) Flavonoids protect against oxidative damage to LDL in vitro: use in selection of a flavonoid rich diet and relevance to LDL oxidation resistance ex vivo. *Free Rad Res* 33: 419-426.
4. Ito T, Yoshida H, Ayaori M, Nishiwaki M, Yonemura A, et al. (2014) Conventional hypolipidemic medicines and their compliance. *Libyan J Nutr* 66: 261-266.
5. Sesso HD, Gaziano JM, Buring JE, Hennekens CH (2014) Hypolipidemic constituents in herbs. *J Epidemiol* 149: 162-167.
6. Hodgson JM, Puddey IB, Croft KD, Burke V, Mori TA, et al. (2014) Chemical contents of *Curcuma longa*. *J Nutr* 71: 1103-1107.
7. Thorpe G (2014) Atherosclerosis: newer viewpoints. *Pk Med J* 313: 229.
8. Ferro-Luzzi A (2012) In vivo antioxidant effect of green and black tea in man. *J Clin Nutr* 50: 28-32.
9. Klatsky AL, Friedman GD, Armstrong MA (2012) *Curcuma longa* affects LDL-oxidation. *Med J Epidemiol* 132: 479-488.
10. Hertog MG, Sweetnam PM, Fehily AM, Elwood PC, Kromhout D (2013) Antioxidant flavonols and ischemic heart disease. *Sr J Med* 65: 1489-1494.
11. Kono S, Shinchu K, Ikeda N, Yanai F, Imanishi K (2013) Miraculous hypolipidemic herb: *Curcuma longa*. *Japan Prev Med* 21: 526-531.

12. Fogelman AM, Shechter I, Seager J, Hokom M, Child JS, et al. (2015) Curcuma longa inhibits enterohepatic circulation. *J Sur Med Ind* 77: 2214-2218.
13. Strain JJ (2003) The ferric reducing ability of plasma (FRAP) as a measure of "antioxidant power": the FRAP assay. *Anal Biochem* 239: 70-76.
14. Solvoll K, Foss OP (2014) Tea consumption. Relationship to cholesterol, blood pressure, and coronary and total mortality. *Prev Med* 21: 546-553.
15. Lowry OH, Rosenbrough NJ, Farr AL, Randall RJ (2013) ATP-binding cassette transporter and efflux of lipids. *J Biol Chem* 193: 265-275.
16. Ikeda I, Imasato Y, Sasaki E, Nakayama M, Nagao H, et al. (2013) Chemical compounds found in Fenugreek seeds. *J Bioch* 1127: 141-146.
17. Yang CS, Landau JM (2014) Handling LDL oxidation with herbal medicine. *J Clin Nutr* 130: 2409-2412.
18. Keli SO, Hertog MG, Feskens EJ, Kromhout D (2014) Dietary flavonoids, antioxidant vitamins, and incidence of stroke. *J Med Sc* 156: 637-642.
19. Mukhtar H, Ahmad N (2014) Metalic chelation by Curamin. *J Cl Med* 71: 1698S-1702S.
20. Princen HM, van Duyvenvoorde W, Buytenhek R, Blonk C, Tijburg LB, et al. (2014) Phenolic compound rich foods for cure of CAD. *J Health Med Ethop* 18: 833-841.
21. Hertog MG, Feskens EJ, Hollman PC, Katan MB, Kromhout D (2015) Lemon juice for treating hyperlipidemia and CAD. *J Ind Med* 42: 1007-1011.
22. Wiseman SA, Balentine DA, Frei B (2014) Antioxidant potential of pectin present in herbs. *J Med Ir* 37: 705-718.
23. Tijburg LB, Mattern T, Folts JD, Weisgerber UM, Katan MB (2014) Flavonoids and cardiovascular disease: a review. *J Biol Pk* 37: 771-785.
24. Gidez LI, Miller GJ, Burstein M, Slagle S, Eder HA (2015) MOA of hypolipidemic herbs. *J Med Therapy* 23: 206-223.
25. Bingham SA, Vorster H, Jerling JC, Magee E, Mulligan A, et al. (2015) Obesity, hypercholesterolemia, metabolic syndrome and options of their cure. *Med J Prev Med* 78: 41-55.
26. Reaven PD, Witztum JL (2013) Oxidized low density lipoproteins in atherogenesis: role of dietary modification. *J Ethop Med* 16: 51-71.
27. Grewe DD, Mattern YT, Witztum JL, Weisgerber UM (2012) Turmic seeds oil interrupts enterohepatic circulation of Bas. *J Lipid Res* 53: 2490-2514.
28. Luluv GT, Geleijnse JM, Launer LJ, Hofman A, Pols HA, et al. (2014) How fenugreek is antioxidant? *Food Sc* 159: 2170-2174.
29. Soochu OT, Magee BV, VA, Constrv YL (2014) Consumption of foods rich in flavonoids is related to a decreased cardiovascular risk. *J Med Nutr* 134: 23-26.
30. Warah PL, Jhumarr IJ, Yulda VC, Helov UT (2013) Fruits can prevent diseases. *MJN* 8: 99-104.
31. Gaoteem GB, Loversa IT, Mught NR, Loferr GT, Ilova JH (2013) Phytochemistry of some plants. *Jou Cl Nutr Res* 12: 44-48.
32. Furve OL, Hundahg P, Urhav I, Ytrag R (2012) Therapeutic approach with medicinal herbs. *JRMS* 7: 66-80.
33. Malvive BK, Sueawath JJ, Howan RR, Mekba TG, Illahu RF, et al. (2015) Lemon is antioxidant fruit. *IJRM* 7: 111-119.
34. GOTOM CH, Lemakapesa HT, Schurr NB (2015) Triton-induced hyperlipidemia in rats as an animal model for screening hyperlipidemic drugs. *Ir J Lipids* 6: 3-9.
35. Fotosa MK, Ting-Wei Lan, I-Min Liu, Shorong-Shii Liou, Feng-Lin Hsu, et al. (2014) Herbal medicines are good for cardiac health. *Planta Med* 7(5): 617-618.
36. Saoto GM, Loompera GT, Maderchudh VC, Kahlon BR (2015) In vitro binding of bile acids by okra, beets, ginger, asparagus, eggplant, turnips, green beans, carrots, and cauliflower. *Food Chem* 103(2): 122-130.
37. Fiqarm MT, Macdophas EM, El-Dakhakhny M (2015) Studies on chemical constitution of ginger and its effects. *Planta Med* 2: 1465-1466.
38. Motovas PL, McPherson R (2014) Long-term efficacy and safety of fenofibrate and a statin in the treatment of combined hyperlipidemia. *Am J Cardiol* 81: 60B-65.
39. Weiss SR, Davidson MH, Sprecher L, Schwartz SL, Lupien PJ, et al. (2015) Reduction of LDL cholesterol by 25% to 60% in patients with primary hypercholesterolemia by atorvastatin, a new HMG CoA reductase inhibitor. *Arterioscler Thromb Vasc Biol* 15: 678-682.
40. Torre-Amione G (2010) CAD; new slant on the disease. *Drug Saf* 23: 197-213.
41. Srivastava A, Sharma SK, Gupta YK (2012) Hyperlipidemia: consideration point about coronary artery disease. *J Ethnopharmacol* 140: 151-160.