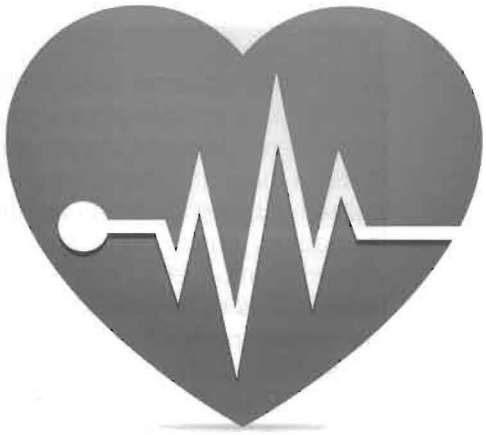
Cardioprotective properties of **Coconut oil**



T Rajamohan
Director, Coconut Research & Development Centre
Sangamam, East Pattom,Thiruvananthapuram - 695004,
Kerala, India. E-mail : tr.mohan @yahoo.co.in

Coronary heart disease (CHD) resulting from atherosclerosis has become the major cause of death in many countries. Several epidemiological studies showed that the risk of CHD raises progressively with high concentrations of total cholesterol or low density lipoprotein (LDL) cholesterol, but there is an inverse correlation with high density lipoprotein (HDL) cholesterol. In addition, high triglyceride levels are associated with heart disease. Beyond the lipid parameters provided by the lipoprotein profile , several additional components of lipoprotein system have been identified. It is well established that dietary factors, particularly dietary fat have a significant effect on serum lipids and cardiovascular disease.

Coconut and its extracted oil are important dietary factors in many parts of the world. From time immemorial, people of Kerala have been using coconut oil for cooking apart from the use of coconut kernel. But, being a saturated fatty acid rich oil it is unfortunately maligned as hypercholesterolemic compared with polyunsaturated fatty acid rich oils. Infact, the habitual consumption of coconut oil has no specific role in the occurance of CHD, because the nature of fatty acids present in dietary oils have a role in modulating hepatic lipid metabolism. Among the saturated fatty acids, coconut oil stands out for having one of the highest saturated fatty acid contents (92%). Fatty acids undergo different metabolic fates depending on the chain length and degree of saturation. It is important to note that, saturated fatty acids present in coconut oil are mostly composed of medium chain fatty acids, mainly lauric acid (C12:0) . Nearly 62% of the fatty acids are composed of medium chain saturated fatty acids (C8:0 , C10 :0 and C12:0). About 30% is composed of long chain saturated fatty acids and 8% is composed of long chain unsaturated fatty acids. There are studies which suggest that fatty acids of 12 carbon or less enter the mitochondria independently of the carnitine

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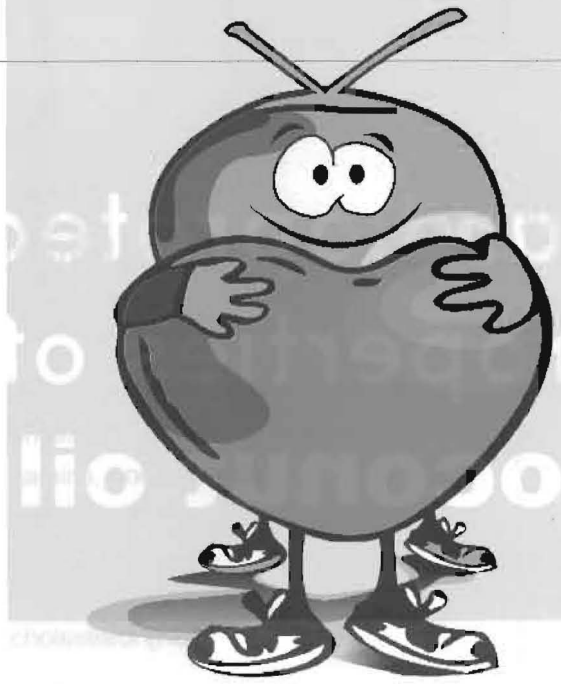
system and undergo preferential oxidation by both mitochondrial and peroxisomal pathways compared to monounsaturated and polyunsaturated fatty acids. The result of this accelerated metabolic conversion is that instead of being stored as fat, the calories contained in medium chain triglycerides are very efficiently converted into fuel for immediate use by organs and tissues. This observation suggest the possibility that the consumption of medium chain triglyceride rich coconut oil could be useful for controlling body weight and fat deposition (obesity). It has been reported that obesity raises cholesterol and triglyceride levels, lowers HDL cholesterol and raises blood pressure in many people .

Several animal and human studies indicate that due to the specific composition of the saturated fatty acids, coconut oil consumption does not affect blood cholesterol negatively, but it affects them positively. Studies carried out by us in the Department of Biochemistry, University of Kerala during 1992-1995 as part of a research project funded by Coconut Development Board, Government of India revealed that consumption of coconut oil does not unfavourably alter blood cholesterol levels. A total number of 258 human volunteers (163 females and 95 males) ranging in age from 18-65 years participated in this study. Average daily consumption of coconut kernel of these subjects was 55.8g/head/day. The average free oil consumption was 15.4g/head/day. Thus the average coconut oil consumption (free oil + oil derived from kernel) was 38g/head/day. The results of the human study indicate that consumption of coconut oil did not elevate blood total cholesterol or LDL cholesterol. It did not elevate the LDL cholesterol / HDL cholesterol ratio and lowered the triglyceride levels. Consumption of coconut kernel along with coconut oil, as is the invariable practice in the Kerala population produced lower total cholesterol and higher HDL cholesterol, lowered the LDLcholesterol/HDL cholesterol ratio and decreased the triglyceride levels. Apart from coconut oil, kernel contains 5% protein and 7% dietary fiber. Studies indicate that the beneficial effects of coconut kernel is mainly due to the coconut fiber and coconut protein present in it. These observations clearly indicate that coconut and coconut oil consumption as part of a normal diet has no deleterious effect with respect to serum lipids.

There has been growing evidence that in addition to hyperlipidemia , lipid oxidation is an important risk factor for cardiovascular disease. Dietary oxidised



oils increase the concentration of lipid peroxidation products and reduce the antioxidant status. Lipid peroxidation products namely malondialdehyde (MDA), conjugated dienes and hydroperoxides are markers to assess the rate of lipid oxidation . It is well established that saturated fatty acids are less susceptible to lipid peroxidation when compared to unsaturated fatty acids. The resistance of edible oils and fats against oxidation depends on their fatty acid pattern and on the composition of the unsaponifiable matter. Unsaponifiable components present in edible oils include tocopherols, polyphenols, carotenes, phytosterols, hydrocarbons and other minor components. Animal and human studies indicate that consumption of coconut oil causes less lipid oxidation and higher antioxidant protection. Human studies carried out by us revealed that compared to groundnut oil consumption, coconut oil consumption results in lower levels of lipid peroxidation products (MDA and conjugated dienes) and higher levels of antioxidants (beta - Carotene, Vitamin A and Vitamin C). Oxidised lipids may have atherogenic properties which promotes oxidation of LDL cholesterol. Recent investigations suggest that oxidation of LDL in the artery wall increases its atherogenecity. Antioxidants such as Vitamin A, beta- Carotene and Vitamin C help to control oxidative damage. Dietary oils used for cooking are always heated in air and this results

in oxidative changes. The temperature and duration of heating, the extent of aeration and the degree of unsaturation of oil influence the extent to which the changes takes place. As part of a modern life style , increased consumption of fried foods has dramatically increased in recent years. The frying conditions including elevated temperature as well as repeated heating that prevail in restaurants have added to the ill effects of the fried foods. During frying, oil is heated to elevated temperatures. When oils are heated to elevated temperatures in presence of air, the oil undergoes chemical reactions such as hydrolysis, oxidation and polymerisation. There are reports that the dietary ingestion of thermally oxidised Polyunsaturated fatty acid rich cooking oils promotes the induction, development and progression of cardiovascular diseases. Since, coconut oil is composed of mostly saturated fatty acids, it is less susceptible to heat induced oxidative decomposition. The adverse effects of oxidized dietary oils in humans and experimental animals include increased blood clotting, elevation of total cholesterol and free fatty acids, thrombocytopenia and enhanced platelet aggregation. It is important to note that, dietary consumption of saturated fats has been regularly cited as major factor in the pathogenesis of atherosclerosis and coronary heart disease. However, it is now generally recognized that the replacement of saturated fatty acids by vegetable oils containing high levels of unsaturated fatty acids may also render individuals susceptible to cardiovascular disease. Studies using repeatedly heated culinary oils showed that there was significant alteration in platelet functions in cholesterol fed rats. (Chinu Chacko and Rajamohan, 2011). Coconut oil, mustard oil and sunflower oil, each representative of saturated, monounsaturated and polyunsaturated fatty acid rich oils were used for this study. Test oils were heated at 210°C for 15 hrs (3hrs/day for 5 days). Rats were fed 15% fresh/heated oils and 1% cholesterol along with the synthetic diet for 6 weeks. Chemical analysis revealed that the degree of oxidative deterioration is more in heated oils compared to unheated oils, but the effects were lower in heated coconut oil. Heated coconut oil fed group showed lower tendency towards hyperlipidemia, lipid peroxidation, platelet function alterations and blood clotting among heated oil fed groups. From these observations, it is clear that dietary oils repeatedly heated at elevated temperature results in significant alterations in platelet function compared to unheated oils and the deleterious effects were less in heated coconut oil compared to heated mustard oil and sunflower oil. ■

BENEFITS of COCONUT MILK

1 IMPROVES HEART HEALTH

Coconuts are one of the best sources of lauric acid – 50 percent of the fat in coconuts is lauric acid – a protective type of fatty acid linked with improved cholesterol levels and heart health. Coconut fat helps promote a decrease in (bad) LDL cholesterol and rise in (good) HDL cholesterol. Also, coconut milk helps lower blood pressure and keep blood vessels flexible, elastic and free from plaque buildup.

2 BUILDS MUSCLE AND HELPS LOSE FAT

Medium-chain triglycerides (MCT) fatty acids found in coconut milk increase energy expenditure and help enhance physical performance. Because coconut milk is high in healthy fats, it also helps fill you up and prevent overeating or snacking throughout the day.

3 PROVIDES ELECTROLYTES AND PREVENTS FATIGUE

Although coconut water is a higher source of electrolytes, coconut milk also provides important minerals needed to maintain blood volume, regulate heart health, and prevent dehydration or diarrhea. Coconut milk also contains the types of MCTs that are easily used by your brain for energy.

4 HELPFUL FOR LOSING WEIGHT

According to a study, consumption of a diet rich in MCTs results in greater loss of fat compared with long-chain fatty acids, perhaps due to increased energy expenditure and fat oxidation observed with MCT intake.

5 HELPS IMPROVE DIGESTION AND RELIEVE CONSTIPATION

Coconut milk nourishes the digestive lining due to its electrolytes and healthy fats, improving gut health and preventing conditions like IBS.