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The health and nutritional benefits of coconut oil have been recognized for centuries. However, in recent decades, many health organizations advise against the consumption of high amounts of coconut oil due to its high levels of saturated fat. In the 1980s, a conspiracy has been made to convince the public that coconut oil contributed to the increase in the rate of coronary heart disease (McNamara, 2010). However, recent evidences point out that coconut oil is not harmful to health.

Coconut oil contains medium chain fatty acids (MCFA)

Increased risk for cardiovascular disease is attributed to elevated levels of serum cholesterol, which in turn is due to increased intake of saturated fats. About 60 years back, it was found out that coconut oil contains saturated fatty acids. It was also experimentally proved that saturated fats will lead to atherosclerosis. So, people equated coconut oil with heart diseases. However, about 25 years back, it was proved that coconut oil, although contains saturated fatty acids, it is of a special variety called medium chain fatty acids (MCFA). After consumption, the medium chain fatty acids (present in coconut oil) directly enter into the blood stream and are metabolized immediately. On the other hand, long-chain fatty acids (LCFA) (of other oils) require the help of lipoproteins, which are eventually deposited into various organs, including heart vessels. Medium chain fatty acids are metabolized rapidly by the body for energy requirements(Guillot et al, 1993).

Coconut oil boosts immune system

Lauric acid has immune-boosting properties as evidenced by feeding coconut oil to laboratory animals (inhibition of interleukin-1). Both coconut oil and monolaurin were effective in significantly lowering the viral load for several patients. The microbial killing ability of monolaurin has been established. (Bergsson et al, 2001). Coconut oil has been found to inhibit Gram positive bacteria such as Streptococcus, Staphylococcus, Corynebacterium, Listeria and Clostridium.

Coconut oil reduces obesity and reduce appetite

In one study, rats were fed with either long chain or medium chain fats. The rats fed the medium chain fats gained 20% less weight. (Geliebter, 1983).One important property of coconut oil is that it is "thermogenic", that is,consuming it tends to increase energy expenditure compared to the same amount of calories from other fats (St-Onge, 2003). In another study, 15-30 grams of medium chain fats per day increased energy expenditure by 5%. (Dulloo et al, 1996).Many studies show that, compared to the same amount of calories from other fats, medium chain fatty acids increase feelings of fullness and lead to a reduction in calorie intake. (St-Onge, 2002). In another study of healthy men, eating a high amount of MCTs caused them to automatically eat fewer calories per day. (Van Wymelbeke et al, 1998). So coconut oil boosts fat burning (increases "calories out") and it also reduces the appetite (reduces "calories in").It is important to keep in mind that coconut oil is fat.Fat has

9 calories per gram and coconut oil is no exception. Therefore, if someone eating a fixed amount of calories and then add coconut oil on top of that, then it is likely to gain and not lose weight. Thus it is not adding fat calories to diet, it is to replace some of other cooking fats with coconut oil. (Tsuji et al, 2001).

Coconut oil as an anti-oxidant

The effect of feeding rats with fish oil or coconut oil diets was studied. Synthetic diets containing 15% (w/v) fish oil or coconut oil were used. The fish oil containing diet produced significant increase in lipid peroxidation products. But coconut oil was found to have antioxidants. (D'aquino et al, 1991). The virgin coconut oil (VCO) had the strongest scavenging effect on 1,1-diphenyl-2-picrylhydrazyl and the highest antioxidant activity based on the beta-carotene-linoleate bleaching method. (Marina et al, 2009). The anti-stress effect of VCO (dose of 10 ml/kg body weight) was evaluated. VCO was able to reduce immobility time and restore oxidative stress in mice post-swim test. Furthermore, mice treated with VCO were found to exhibit higher levels of brain antioxidants, lower levels of brain 5-hydroxytryptamine and reduced weight of the adrenal glands. Consequently, the serum cholesterol, triglyceride, glucose and corticosterone levels were also lower in VCO-treated mice. (Yeap, 2015).

Coconut oil enhanced tissue uptake of tomato carotenoids to a greater degree than safflower oil. (Conlon et al, 2012). Increased activities of catalase, superoxide dismutase, glutathione peroxidase and glutathione reductase in the liver, heart and kidneys were increased by VCO consumption. (Arunima et al, 2013).

Coconut oil is good for kidneys

One study was carried out to evaluate the remedial effects of virgin coconut oil (VCO) on renal dysfunction in diabetic rats. VCO was found to be effective in preventing renal damage in diabetic patients. (Akinnuga et al, 2014).

Lipid profile in normal persons consuming coconut oil

Continuing these previous observations by other research workers, at Amrita Institute of Medical Sciences, Kochi, we have analysed serum from persons, consuming coconut oil or sunflower oil. 70 normal, healthy subjects were taken as controls and 70 subjects with Type 2 diabetes were recruited in patient group. Each group was further subdivided into two subgroups of 35 subjects each, consuming coconut oil and sunflower oil respectively as cooking medium. Trigycerides, LDL and VLDL cholesterol levels were high in the diabetic subjects compared to the controls. But, no pronounced changes for these parameters were observed between the subgroups (coconut oil vs. sunflower oil) (Sabitha et al 2009).This study was extended to analyse serum from 302 normal healthy persons, out of which 152 were consuming coconut oil and 150 were using sunflower oil for the past 2 years or more. There was no statistically significant difference in the cholesterol, HDL or LDL levels in coconut oil consuming population versus sunflower oil consuming population. Thus plasma fatty acid composition reflected no changes with dietary fat source.

Lipid profile in coconut oil consumers with heart disease

At Amrita Institute of Medical Sciences, lipid profile was analysed in 76 coronary artery disease patients, out of which 41 were used to take coconut oil and 35 were used to take sunflower oil. There was no statistically significant difference in the cholesterol, HDL or LDL levels in coconut oil consuming patients versus sunflower oil consuming patients. Plasma fatty acid composition reflected no changes with dietary fat source. *(Sabitha et al, 2009).It is also shown that coconut oil consumption does not alter the HDL /LDL ratio of cholesterol in human beings (Sabitha et al, 2014).*

Coconut oil and lipid Oxidative stress

Serum lipid values did not show significant variation between animals fed coconut oil or sunflower oil Lipid peroxidation was found to be higher in sunflower oil fed rabbits, compared to controls or coconut oil fed rabbits. Coconut oil intake did not cause hyper cholesterolemia or oxidative stress in rabbits (Sabitha et al, 2010).

Fatty acid composition of atheromatous plaques

In another study conducted at Amrita Institute of Medical Sciences, 71 samples of plaques (from diseased coronary arteries) were analysed. Out of these patients, 48 persons were using coconut oil and 23 persons were using sunflower oil routinely. Surprisingly, the fatty acid content of the plaque did not show any difference between coconut oil consumers versus sunflower oil consumers. In both coconut oil consumers and sunflower oil consumers, the major substances present in the plaques were saturated fatty acids; palmitic acid (46%) and stearic acid (33%)

> Coconut oil, within normal limits, neither decrease nor increase cholesterol levels. Coconut oil does not affect serum cholesterol, it produces very little free radicals, is rapidly absorbed, rapidly oxidized, is not deposited and helps in resisting invading micro-organisms.

of total lipids. Lauric acid (fatty acid present in coconut oil) was only 3.5% of the total content of plaques in both coconut oil consumers and sunflower oil consumers. (Palazhi et al, 2012). Thus the causation for plaques in coronary artery is not intake of coconut oil. This clearly shows that coconut oil does not have an effect to produce plaque or heart disease.

Studies on patients having coronary artery disease

A clinical study was conducted to investigate the impact of cooking oil media (coconut oil and sunflower oil) in patients with established coronary artery disease (CAD). Patients with stable CAD on standard medical care were assigned to receive coconut oil (Group I) or sunflower oil (Group II) as cooking media for 2 years. Serum, lipids, Lipoprotein a, apo B/A-1 ratio, antioxidants, flow-mediated vasodilation, and cardiovascular events were assessed at 3 months, 6 months, 1 year, and 2 years. Hundred patients in each arm completed 2 years with 98% follow-up. There was no statistically significant difference in the biochemical, vascular function and in cardiovascular events after 2 years. Thus, coconut oil did not change the lipid-related cardiovascular risk factors and events in those receiving standard medical care. (Vijayakumar et al, 2016).

Coconut Oil is removed from the Naughty List

The US government has finally accepted that "cholesterol" is not a nutrient of concern. Cholesterol and coconut oil were now removed from their warnings to stay away to avoid heart disease and clogged arteries.

This means eggs, butter, nuts, coconut oil etc. have now been classified as "safe" and have been officially removed from the "nutrients of concern" list.

The US Department of Agriculture, stated in its findings for 2015: "Previously, the Dietary Guidelines for Americans recommended that cholesterol intake be limited to no more than 300 mg/day. The 2015 official version will not bring forward this recommendation because available evidence shows no appreciable relationship between consumption of dietary cholesterol and serum (blood) cholesterol.

Summary

The general advice given by physicians against the use of coconut oil needs re-evaluation. This mis-information arose, when long chain saturated fatty acids (LCSFA) were shown to increase cholesterol level. Since coconut oil also contains saturated fatty acids, people equated them with LCSFA. Now it is known that coconut oil contains medium chain fatty acids (MCFA). Metabolisms of LCFA and MCFA are drastically different. Coconut oil, within normal limits,

neither decrease nor increase cholesterol levels. The advantages of coconut oil are: it does not affect serum cholesterol (neutral); it produces very little free radicals, as opposed to other oils (beneficial); it is rapidly absorbed, rapidly oxidized and is not deposited (beneficial) and it helps in resisting invading micro-organisms.

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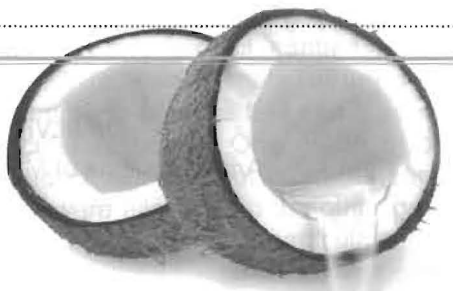
Coconut Oil and Cholesterol

Coconut oil is mainly composed of medium - chain fatty acids (63%). Medium chain fatty acids are burned almost immediately for energy production, and so they are not converted into body fat or cholesterol to the degree other fats are.

Coconut oil, with very low content of polyunsaturated fatty acid, is very stable and resistant to oxidation, and is an excellent cooking oil. It does not release free radicals. On the other hand, the polyunsaturated fats easily generate free radicals, which damage our cells. Since coconut oil is naturally saturated (>90%), it does not need hydrogenation. Hence products have no trans fatty acids, which are formed by partial hydrogenation of polyunsaturated fats, which lead to high blood cholesterol, high low - density lipoproteins (LDL) and low high – density lipoproteins (HDL). The ratio of good to bad cholesterol [HDL (High Density Lipoprotein) / LDL (Low density Lipoprotein)] is universally accepted as an accurate indicator of heart disease risk.

Natural, non hydrogenated coconut oil tends to increase HDL and therefore protects the heart.



Coconut oil in a Nuts shell

- Edible in raw form
- High resistance to oxidative rancidity
- Effective heart transfer agent in frying
- Ideal for deep frying
- Carrier and protective agent for fat - soluble vitamins.
- Easily digestible
- Ideal energy source in baby foods.
- Contains Vitamin E
- Increases the friendly HDL.
- Reduces fat accumulation in the body
- Easily metabolized
- Helps maintain healthy ratio of omega 6 to omega 3 fatty acids when consumed as a part of diet.
- Inhibitory effect against certain chemical carcinogens.