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The Healthy Benefit of Coconut oil –A Review

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Abstract

Coconut oil constitutes the most impartment source of dietary fat in many countries. But, of late the consumption of coconut oil has been linked with incidence of coronary Heart Diseases and sustained campaign against its use is going on. Coconut oil contains 92% of saturated fatty acids, most of them are medium chain fatty acids (MCFA). The clinical studies at New England Deaconess hospital showed that coconut oil is neutral in its effect on blood lipids and will not cause an increase in cholesterol or cardio vascular diseases. Coconut oil even increased HDL reducing the risk of coronary heart diseases. The lauric acids in coconut oil is converted into monolaurin in the human body and it kills viruses, many bacteria and protozoa . Capric acids in coconut oil kills all kinds of germs.Coconut oil is known to protect human begins against certain cancers also. A preliminary study on the effect of coconut oil on HIV+ AIDS gave very encouraging results with viral load dramatically reduced and immune system enhanced. A study conducted by the Biochemistry Department of the University of Kerala has found that coconut oil does not elevate blood total cholesterol, but increase blood HDL cholesterol.(good cholesterol).

Keywords: cholesterol, coconut oil, fatty acids, heart disease

INTRODUCTION

Coconut oil is an edible oil that has been consumed in tropical countries for thousands of years. A negative campaign against saturated fats in general, led to most food manufactures abandoning coconut oil in recent years. However, recently coconut oil was found to show no adverse effects on the health of the population (Thampan, 1988), while coconut possesses many health benefits due its fiber and nutritional content. It is the oil that makes it a truly remarkable food and medicine. Once mistakenly believed to be unhealthy because of its high saturated fat content, it is now known that the fat in coconut oil is unique and different from most all other fats possibly having many health giving properties, and now getting its long overdue recognition as a nutritious healthy food(Men Sink etal,2003) .The review covers composition and health benefits of coconut oil reported in the literature.

Composition of coconut oil

Energy - 3607 kj(862Kcal) FAT(100%) , Vitamin E(0.09 mg) Vitamin K (0.5 mg) ,Iron (0.04 mg)

Fatty acids can be classified into short –chain fatty acid (SCFA), medium- chain fatty acids (MCFA) and long – chain fatty acids (LCFA) depending upon the number of carbon atoms in the carbon and hydrogen chain.

The vast majority of this fats and oils from an animal or plant are composed of long chain fatty acids, while in coconut it is predominantly of MCFA, that are easily digested and absorbed. They put little strain on digested system and provide a quick source of energy necessary to promote healings (Gopalakrishanan *et.al.,* 2010)

Properties and Digestion of coconut oil

The various properties of coconut oil reported are: High resistance to oxidative rancidity,sharp melting behavior,effective heat transfer agent in frying, moisture barrier and in frying , loss to bakery items in spray oil use, carrier and protective agent for fat soluble vitamins , maximum glycerin content, easily saponifiable even in cold, germicidal and antimicrobial property, ready penetration into the skin and appreciable water absorbing property , low viscosity, pleasant aroma,easy washability, imparting hardness and lathering property to soaps, not leaving a smoky flame if used in open lamps, only slight changes on hydrogenation , blending well with other oils, easily hydrolyses , highest saponification value and lowest iodine value , desirable emulsifying property , non-drying oil and can be converted into bio-diesel (Rathinam et ta,2002).

The coconut oil enters the intestinal tract and completely broken down into fatty acids. They are absorbed immediately into the portal vein and sent directly to the liver. In the liver they are used as a source of food to produce energy. Therefore , they do not supply fat that collect in fat cells or in artery walls. They produce energy not body fat and not arterial plaque (Bruce Fife,).

Coconut oil and Heart disease

Scientist have recently discovered that coconut oil is a powerful new weapon against heart diseases. Non hydrogenated coconut oil tends to increase HDL cholesterol (good cholesterol) that helps protect against heart diseases. Total blood cholesterol (HDL& LDL) is

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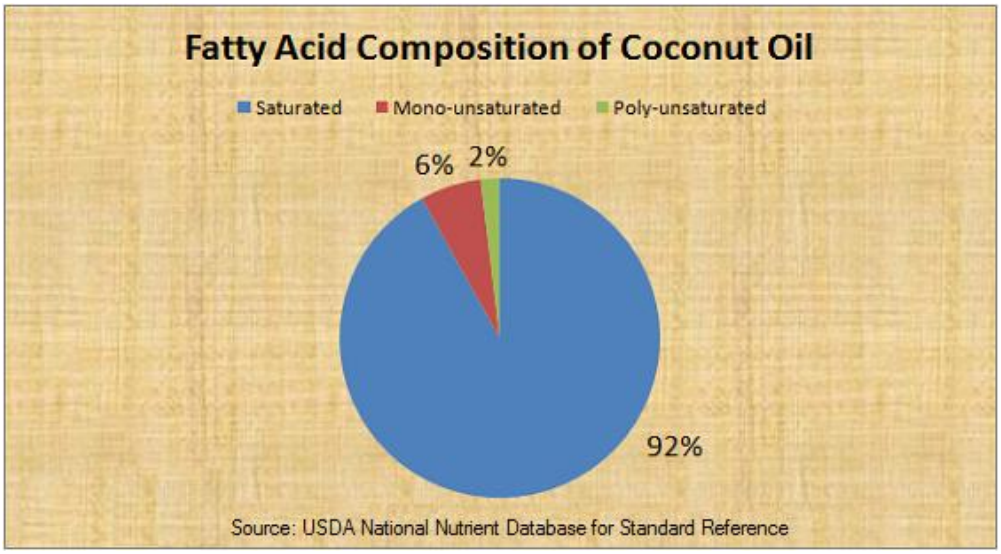
Fig 1.



a very inaccurate indicator of heart disease risk . Therefore the ratio of LDL / HDL is university recognized as a far more accurate indicator of Heart diseases risk. Consumption of coconut oil increases HDL, the cholesterol (LDL / HDL)ratio improves and thus decreases the risk of heart diseases. Coconut oil consumption was found to have many factors associated with a reduced risk of heart diseases . The improved cholesterol readings lower body fat deposition ,higher survival rates, reduced tendency to form blood clots, fewer uncontrolled free radicals in cells, low levels of blood and liver cholesterol ,higher antioxidants reserves in cells and lower incidence of heart diseases in population studies (Bruce Fife,2000).

Mendis and Kumarasunderam (1990) compared the effect of coconut oil and soybeans oil.The coconut oil resulted in reduced desirable lipoproteins. The role of coconut and coconut oil in coronary heart diseases (CHD) in Kerala state was studied and the result imply no specific role for coconut or coconut oil in the causation of CHD in the set of patients from Kerala examined. Many researchers have reported that coconut oil lowers cholesterol through stimulation of thyroid function. In this presence of adequate thyroid harmone, LDL cholesterol is converted into anti- aging steroids, precyneoloue and progesterone which are required to

Table 1. Fatty acid composition (%) of coconut and other vegetable oils

Vegetable oils	MCFA	LCFA	Vegetable oils	MCFA	LCFA
Coconut	81.5	18.5	Groundnut	-	100
Sunflower	-	100	Palm	1.3	98.7
Safflower	0.3	99.7	Soybeans	-	100
Sesame	-	100	-	-	-

Table 2. . Cholesterol content of different foods

Food	Cholesterol	Food	Cholesterol
Palm oil	18 ppm	Egg	5000 ppm
Soybean oil	28 ppm	Butter	3150 ppm
Corn oil	50 ppm	Cheese	1100 ppm
Coconut oil	0-14 ppm	-	-

prevent heart diseases, obesity, cancer (Lim Sylianco,1987).

Hegde (2009) reported that Polynesian islanders who were taking almost 80% of their total calorie intake per day from coconut tree in the distant past never had heart attacks and they lived to very old age. Sabitha and Vasudevan (2010) reported that consumption of coconut oil may not contribute to the risk for CAD. Natural, non hydrogenated coconut oil tends to increases HDL cholesterol, the good cholesterol that protects against heart diseases.

Coconut oil contains a large proportion of lauric acid , that raises blood cholesterol level by increasing the amount of high- density lipoprotein cholesterol that is also found in significant amount in breast milk

Table 3. Fatty acid composition of coconut oil

Fatty acid	Per cent	Fatty acid	Per cent
caproic	0.5	palmitic	8.5
caprylic	6.5	Stearic	2.0
carric	6.0	oleic	6.0
lauric	49.5	linoleic	1.5
myristic	19.5	-	-

Table 4. Effect of coconut and sunflower oil on cholesterol

Oil	Cholesterol (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	Triglyceride (mg/dl)
Coconut oil	203	46	124	143
Sunflower oil	196	44	118	140

(Mensink,2003). Coconut oil feeding produced significantly higher HDL when compared to sunflower oil feeding in rats (Host mark et al 1980). Total issue cholesterol accumulation for animals on sunflower diet was 6 times greater than on coconut oil diet and twice that of soya beans oil diet (Award 1981) .

Vasudhaven (2009) reported that there was no statistically significant difference in cholesterol, HDL or LDL levels in coconut oil consuming population *versus* sunflower oil consuming population (Table 4).

Anuradha and Raji Sugumar (2009) reported that in a study conducted with one hundred adolescent girls consuming coconut oil and other oil in their diet for six month period, this total cholesterol level had been significantly reduced with coconut oil than with other vegetable oil. (Table 5)

Kaunitz and Dayrit (1992) have reviewed that the " available population studies show that dietary coconut oil does not lead to high serum cholesterol nor to high coronary heart disease mortality or morbidity". They noted that in 1989 Mendis *et. al.,* reported undesirable lipid changes when young adult Sri Lankan males were changed from their normal diets by the substitution of corn oil for their customary coconut oil (Table 6). Although the total serum cholesterol decreased 18.7 per cent from 179.6 to 146.0 mg / dl and the LDL cholesterol decreased 23.8 per cent from 131.6 to 100.3 mg / dl, the HDL cholesterol decreased 41.4 per cent from 43.4 to 25.4 mg / dl (putting the HDL values below the acceptable lower limit) and LDL / HDL ratio increased 30 per cent from 3.0 to 3.9.The later two changes would be considered quite undesirable.

Sundaram *et al* (1994) indicated a favorable alteration in serum lipoprotein balance was achieved when coconut oil was included in a whole food diet at 5 per cent of energy (Table 7).

Table 5 Total cholesterol levels (mg / dl) in different oils

Oil	Initial	Final	Reduction
Other oils	208	193	15
Coconut oil	208	173	35

Table 6. Changes in the lipid charges when substituting corn oil for coconut oil

Total cholesterol	+ 18.7%,,	LDL cholesterol	- 23.8%
HDL cholesterol	- 41.4%	LDL / HDL ratio	+ 30%

Table 7. Effect of coconut oil diet on serum cholesterol

	Baseline	Diet	% change
Total cholesterol	166.7 mg	170.0 mg	+1.9%
LDL cholesterol	105.2 mg	104.4 mg	-0.1%
HDL cholesterol	42.0 mg	45.6 mg	+6.3%
LDL-C / HDL-C	2.45	2.39	-2.4%

Ng et al (1991) fed 75 per cent of the fat ration as coconut oil (24 per cent of energy) to 83 adult normocholesterolemics (61 males and 22 females). Relative to baseline values, the highest values on the experimental diet for total cholesterol increased to 17 per cent (169.6 to 198.4 mg / dl), HDL cholesterol increased to 21.4 per cent (44.3 to 53.8 mg / dl), and the LDL-C / HDL-C ratio decreased to 3.6 per cent (2.51 to 2.42).

Rathinam *et al* (2002) reported that a study conducted by the Biochemistry Department of the University of Kerala has found that coconut oil:-

· Does not elevate blood total cholesterol

· increases blood HDL cholesterol

· consumed along with coconut kernel, lowers blood cholesterol

· does not elevate LDL cholesterol ratio

· decreases serum triglycerides

Healing properties of coconut oil

Coconut oil is antiviral, antifungal and antibacterial. It attacks and kills viruses that have ipid (fatty) coating , such as herpes ,HIV, hepatitis C, the flu. It kills the bacteria that cause pneumonia, sore throats, dental cavities , urinary tract infections, food poisoning and many more bacterial infections. It kills this fungal / yeast infections that cause Candia, ringworm, athletes food, thrush. etc.,

The lauric acid in coconut oil is used by the body to make the same disease- fighting fatty acid derivatives monolaurin that babies make from the lauric acid they get from their mothers' milk. The monoglyceride monolaurin is the substance that keeps infants from getting viral or bacterial or protozoal infections. Until just recently ,this important benefit has been largely overlooked by the medical and nutrition community (Enig,1995).

Hair care

Coconut Oil is one of the best natural nutrition for hair. It helps in healthy growth of hair providing them a shiny

complexion. Regular massage of the head with coconut oil ensures that your scalp is free of dandruff, lice, and lice eggs, even if your scalp is dry.

Skin care

Coconut oil is excellent massage oil for the skin as well. It acts as an effective moisturizer on all types of skin including dry skin. The benefit of coconut oil on the skin is comparable to that of mineral oil. Further, unlike mineral oil, there is no chance of having any adverse side effects on the skin with the application of coconut oil. Coconut oil therefore is a safe solution for preventing dryness and flaking of skin.

Weight Loss

Coconut oil is very useful in reducing weight. It contains short and medium-chain fatty acids that help in taking off excessive weight. It is also easy to digest and it helps in healthy functioning of the thyroid and enzymes systems. Further, it increases the body metabolism by removing stress on pancreases, thereby burning out more energy and helping obese and overweight people reduce their weight. Hence, people living in tropical coastal areas, who eat coconut oil daily as their primary cooking oil, are normally not fat, obese or overweight.

Immunity

Coconut oil is also good for the immune system. It strengthens the immune system as it contains antimicrobial lipids, lauric acid, capric acid and caprylic acid which have antifungal, antibacterial and antiviral properties. The human body converts lauric acid into monolaurin which is claimed to help in dealing viruses and bacteria causing diseases such as herpes, influenza, cytomegalovirus, and even HIV. It helps in fighting harmful bacteria such as *Listeria monocytogenes* and *Heliobacter pylori*, and harmful protozoa such as *Giardia lamblia*.

Conclusion

The observations and other evidences suggested that coconut oil is more beneficial to human as a dietary fat than the natural or hydrogenated unsaturated vegetables oils. The incidence of coronary heart disease could better linked with the consumption of cholesterol food of animal origin, (Dipak *et.al.,*2008)

Coconut oil, is used as a cooking oil, hair oil, massage oil and industrial oil. Coconut oil is dominated by saturated fats, having high percentage of lauric oil. The peculiarity in the composition of the fatty acids of coconut oil is of special significance and therefore it is widely used in various industrial applications.

Properties of coconut oil

The various properties of coconut oil are summarized below:

- High resistance to oxidative rancidity
- Sharp melting behavior
- Effective heat transfer agent in frying
- Provides moisture barrier and in frying
- loss to bakery items in spray oil use
- Carrier and protective agent for fat soluble vitamins
- Maximum glycerin content
- Easily saponifiable even in cold
- Germicidal and antimicrobial property
- Ready penetration into the skin and appreciable water absorbing property
- Low viscosity
- Pleasant aroma
- Easy washability
- Imparts hardness and lathering property to soaps
- Does not leave a smoky flame if used in open lamps
- Only slight changes on hydrogenation
- Blends well with other oils
- Easily hydrolyses
- Highest saponification value and lowest iodine value
- Desirable emulsifying property
- Non-drying oil
- Can be converted into bio-diesel

Coconut oil contains short and medium chain fatty acids which are important components present in natural sebum and good food for hair. Medium chain triglycerides are generally used as acclusive agents because of their lower evaporative loss of water from the skin.

References

Anuradha,S and V. Rajikumar, 2009. Impact of coconut oil replacement in diet among obese adolescent girls. *Indian Coconut Journal*, 14-16

Award ,A.B. Effect of dietary lipid on composition and glucose utilization by rat adipose tissue. *J. Nutrition III:* 34-39

Bruce Fife, N.D. *the doctor's prescription for Healthy living*. Freedom Press, Inc. Wilmington

Bruce Fife, N.D. 2000, *The healing miracle* of coconut oil. *Piccadilly books. Stile Health wise* publication, Colorado springs, co,1-46

Dipak, Arpita Ghosh, C. Manojkumar and K. Samsudeen, 2008. A Simpler approach to understand coronary heart diseases, fat facts and its correction with consumption of coconut oil. *Indian coconut Journal*,2008. 15-19

Enig G. Mary, 1995. *Health and Nutritional Benefits from coconut oil and its Advantages over competing oils*. Coconut Development Board, publication.1995.

Gopala krishana, A.G, Gaurav Raj, Ajit sing Bhatnagar , Prasanth kumar P.K. and Preeti chandrasekaran, 2010. Coconut oil. Chemistry, production and its application-A Review. *Indian coconut Journal*. 15-27

Host marks A.T., Spydevold. O and Eilerteen E. Plasma lipid concentration and liver output of lipo proteins in rats fed coconut fat or sunflower oil. *Artery*.7: 367-383

Hegde, B.M, 2009. Coconut the best food for human beings health and longevity. *Indian coconut journal*. P 17-18

Kabara, J.J.Health oils from the tree of life (Nutrition and health aspects of coconut oil).

Kiran Patil.,Health Benefit of Coconut Oil

Lim Sylianco C.Y.1987, Anticarcinogenic effects of coconut oil, phillip.*J. Coconut studies*. 12(2) 89-102

Mendis S. and R. Kumara Sundaram, 1990. The effect of daily consumption of coconut fat and soya bean fat. *Brit.J.Nutr*. 63: 547-52

Mendis S, Wissler RW, Bridenstine RT, podbielski FJ, 1989. The effects of replacing coconut oil with corn oil on human serum lipid profiles and platelet derived factors active in anterogenesis. *Nutrient Reports International* 40: No.4:

Mensink, R.P. Zock, P.L. Kester A.D, Katan, 2003. *Am. J.Clin. Nutr*. 77 (5): 1146-55

Ng TKW, Hassan K, Lim JB, Lye Ms, Ishak R. 1991. Nonhypercholo-sterolemic effects of a palm- oil diet in Malaysian volunteers. *Am.J.Clin.Nutr.*, 53: 1015S-1020S.

Rathinam, P., Sreekumar Poduval and T.B. Nandakumar, 2002. *Coconut products*. Coconut development Board publications. 29-32, Cochin.

Sabitha, P. and D. M. Vasudevan, 2010. Lipid profile and antioxidant enzymes in coconut oil. Consumers. *Indian coconut journal*. 3-6

Sundram K. Hays KC, Siru Oh, 1994. Dietary palmitic acid results in lower serum cholesterol than does a lauric- myristic acid combination in normolipemic humans. *Am.J.Clin.Nutr.,* 59:846:

Thampan , P.K., 1988. *Glimpses of coconut industry in india*. Coconut development Board, Cochin.

Vasudevan D. M., 2009. Coronary artery diseases an overview and the role of coconut oil in hypercholesterolemia. *Indian coconut journal*. 2-16