

HEALTH AND NUTRITIONAL ASPECTS OF COCONUT OIL

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1. INTRODUCTION

Coconut (*Cocos nucifera L*) grown in about 93 countries in an area of 11.8 Million ha produces 10.9 million tonnes of copra equivalent. Coconut provides food, drink, medicine, health, shelter, aesthetics and wealth. Since every part of coconut is used for mankind, it is known as 'Tree of Life', 'Tree of Heaven', 'Natures' Super Market', 'Kalpavirksha'. One of the primary natural product produced from the dry fruit (copra) of coconut is coconut oil which has been used from time immemorial as food, food ingredient and functional foods, besides used in pharmaceuticals, nutraceuticals, cosmetics and industrial uses including bio fuel. It is known as 'Miracle Oil'.

2. NATURE OF COCONUT OIL

Coconut oil is a colourless to pale brownish yellow oil with a melting point ranging from 23⁰ to 26⁰ C. The glycerides of coconut oil are invariably a mixture of one, two or three fatty acids. Though coconut oil is known as triglyceride or lipid, also contains minor proportions of mono and diglycerides and has highest content of glycerol (13.5 % to 15.0 %). Glycerol is a carbohydrate with chemical composition similar to that of simple sugar. This implies that with coconut oil as a dietary fat, the actual intake of fatty substances is much less than that with same quantity of any other oil. Almost 70 % of saturated fatty acids present in coconut oil will exhibit dietary properties which are specific to the group of short and medium fatty acids. Coconut oil rich in fatty acids of 12 carbons or less is classified as Medium Chain Fatty Acids (MCFA). Coconut oil triglycerides are characterised by high laurate in the beta position (Clement, et al, 1965). The coconut oil has the lowest cholesterol amounts (5-24 parts per million) compared to palm kernel oil, sunflower oil, palm oil, soy oil, cottonseed oil, rapeseed oil and corn oil (table 1).

Coconut oil is more or less constant in composition irrespective of the country of origin. It has the highest saponification value (251 to 263) and the lower iodine value (8.0 to 9.6). Because of low iodine value it is classed as non drying oil.

Table 1	
Estimated amounts of cholesterol in vegetable oils and animal fats	
Oil/fat	Range (Parts per million)
Coconut	5-24
Palm kernel	9-40
Sunflower	8-44
Palm	13-19
Soy	20-35
Cottonseed	28-108
Rapeseed	25-80
Corn	18-95
Beef tallow	800-1400
Butter	2200-4100
Lard	3000-4000
<i>Source: Inform, Vol. 13, 2002</i>	

Coconut oil is an important component in imitation dairy products like filled cheese, coffee, whiteners, milk shake mix chocolate filled with milk; ice cream, desert topping, spray oil for crackers, cookies and cereals. It is used in these products not only because it resists oxidation, but also because it is bland in flavour. It is extremely stable on storage and possess a unique liquefying property that contribute to month feel of the food of which it is component.

3. COCONUT OIL FOR HEALTH AND NUTRITION

Historically, coconuts and their extracted oil have served man as important foods for thousands of years. The use of coconut oil for shortening was advertised in the United States in the popular cook books at the end of 19th century. Both the health promoting attributes of coconut oil and those functional properties useful to the homemaker were recognized 100 years ago. These attributes, in addition to some new attributes should be great interest to both producing as well as consuming countries (Enig, 2001).

Coconut oil has been a life saver for many people. The health and nutritional benefits derived from coconut oil is unique and compelling (Enig, 1996 and Dayrit., et al, 2001) had stated that medium chain triglyceride, a fraction of coconut oil has been identified as an important, medically efficacious food. Indeed, diet for critically ill children, premature infants and hospitalised patients use medium chain triglycerides as principle source of fat. Coconut oil when used in usual diets containing all classes of fat proves to be anticholesterogenic.

3.1. INCREASES DIGESTIBILITY AND CONTROL DIABETICS

It is medicinally used in special food preparations for those who suffer digestive disorders and have trouble in digesting fats. Considerably, more is known about digestibility of coconut oil in men. It is nearly completely absorbed as are most other natural dietary fat (Lang westing and Holmes, 1917), (Hoagland and Snider, 1943 ; Thomasson, 1956). For the same reason, it is also used in infant formulations for the treatment of malnutrition. The absorption of calcium and magnesium and also amino acids has been found to increase when infants are fed with diet containing coconut oil. Coconut oil has been used to enhance absorption of Ca and Mg when deficiency of these nutrients exist. For those who get older, coconut oil is useful for slowing down the degenerative process by improving mineral absorption. Coconut oil also helps to supply energy to cells (because it is easily absorbed without the need of enzymes) as well as improve insulin serration and utilisation of blood glucose (Garfinkel, M., et al. 1992). Those people with diabetes would greatly benefit by adding coconut oil to daily diet.

3.2 HELPS TO REDUCE WEIGHT

MCFA do not circulate in blood stream like other fats but sent directly to the liver where they are immediately converted into energy – just like a carbohydrate. So when coconut oil is consumed the body immediately, make energy rather than body fat. The weight loss effect of coconut oil has been proved by many researchers.

3.3 IMPROVE CARDIO VASCULAR HEALTH

No topic related to coconut oil has been given more prominence than its relation to cholesterol metabolism in animals (Hans Kaunitz, 1996). It has been claimed that the inhabitants of Thailand have low rate of heart attacks and strokes although coconut oil is their leading dietary fat (Pollack, 1952). In a study on two groups of Polynesians, it was found that the group eating 89 % of their fat as coconut oil has lower blood pressure values than those eating 7 %. Heart attack was not observed in either group. There were of course many other differences between the groups (Hunter, 1962). In another study on Polynesians, it was found that Pukapukans consuming large amount of coconut oil had lower serum cholesterol level and lower incidence of arteriosclerosis than Maoris (and Europeans) who consumed an European type of diet (Shotland et al, 1969). Wickramanayake (1996) had said that a prolonged daily intake of coconut fat, in quantities of 50 g or less produces a sustained rise in blood cholesterol and or increased ahezogenesis had not been demonstrated. He further indicated that in 1952, the International Bank for Reconstruction and Development estimated Sri Lankan consumption to be 1300 nuts per head per year (equivalent about 48 g coconut fat / day). Whereas, the Central Bank report of 1981 estimates per capita consumption of 990 nuts / year (or less than 34 g coconut fat per day). Any increase in Ischaemie Heart Disease can not be due to increased coconut consumption. In a study at Philippines, 10 medical students tested diets consisting of different levels of animal fat and coconut oil. When the ratio of animal fat and coconut oil at ratio of 1 : 1, 1 : 2, 1 : 3 no significant change in

cholesterol but when animal fat level increased total calories reached 40 % and blood cholesterol increased. This study had indicated that not only did coconut had no effect

on cholesterol levels, it even reduced the cholesterol elevating effects of animal fat. A review of epidemiological and experimental data regarding coconut eating populations show that the dietary coconut oil does not lead to high blood cholesterol or coronary heart disease (Kaunitz and Daya, 1992). When native people change their diet and give up eating coconut oil in favour of polyunsaturated vegetable oils their risk of heart disease had shown to increase (Mendis and Kumara Sundaram, 1996; Kurup and Rayamihan, 1994).

Dr. Ian Prior and his colleagues showed that, island populations that eat very high amounts of saturated fat coconut oil showed no sign of heart disease. But when they migrate to New Zealand and began eating less coconut oil and less saturated fat but more poly unsaturated fats, the incidence of heart disease and other illness greatly increased (Prior et al, 1981). Numerous studies clearly demonstrated that coconut oil has a neutral effect on cholesterol levels (Hashim et al, 1959; Bray et al, 1980; Geliebter, 1983; Baba, 1982; Greenberger and Skillman, 1969 and Fino, 1963). Enig (2001) while reviewing the health and nutritional benefits from coconut oil has stated that some studies reported thirty and more years ago should have cleared coconut oil of any implication in the development of heart disease (Frantz and Carey, 1961; Halden and Lieb, 1961; Hashim, et al., 1959; Ahrens, et al., 1957 and Bierenbaum, et al., 1967). Ng, et al., 1991 fed 15 % of the fat ration as coconut oil (24 % energy) to 83 adult normocholesteroleemics (61 males, 22 females). Relative to baseline values, the highest value of total cholesterol increased 17 %, HDL cholesterol increased 21.4 % and LDL/HDL ratio decreased 3.6 %. Those who blindly state that all saturated fats are unhealthy or coconut oil consumption leads to heart disease are ignorant of facts. There is no evidence to support the notion that saturated fat in coconut oil is harmful (Enig, 1993). Indeed there is strong evidence now that coconut oil can help to prevent heart disease (Enig, 1999).

3.4 IMMUNE SYSTEM SUPPORT

Polyunsaturated oils put a heavy strains on the immune system. They cause the immune system to shift into feverish activity while at the same time interfering with its ability to form protective compounds. Antioxidants are quickly used up fighting free radicals produced by unsaturated oils. When antioxidants such as Vit. A, C, and E becomes depleted, the immune system slow down becomes effective. Vegetable oils produce an over all depressive effect on immune system. Coconut oil on the other hand supports immune system. It causes no stress. The coconut oil is non toxic to body so does not burden immune system. Saturated fats are very stable and do not oxidize easily, so antioxidants are not used up. Sixty three percent of coconut oil is composed of antimicrostrial MCFA, and therefore can be powerful all with the immune system in fight against microscopic invaders. Coconut oil is ideal for immune suppressed individuals. For this reason, it is now being studied as a treatment for HIV / AIDS patients whose immune systems are severely compromised.

3.5 PROTECTION AGAINST DISEASE

Coconut oil may be useful in preventing a wide assortment of diseases. Because of its unique metabolic properties, it can help shed unwanted weight, thus reducing risk of many health problem associated with obesity. Since 1950, it is used to treat mal-absorption problems in adults and infants.

3.6 INHIBIT INDUCTION OF CARCINOGENIC PROPERTIES

Dr. Robert L. Wickremasinghe, head of Serology division of the Medical Research Institute, Sri Lanka reported that coconut oil may even posses anti carcinogenic properties. Studies have shown that coconut oil inhibits the induction of carcinogenic agents of colon as well as mammary tumours in test animal (Brod et al, 1998). Kabara (2000) had indicated that in a 50 year review made during 1987, showed the anticancer effect of coconut oil. In chemically induced cancers of colon and breast, coconut oil was by far more protective than unsaturated oil. For example 32 % of corn oil users got colon cancer whereas only 3 % of coconut oil eaters got the cancer. Lim – Sylianco (1987) has reviewed 50 years literature showing anti carcinogenic effect from dietary coconut oil.

3.7 REDUCE DEGENERATIVE DISEASE

The biggest advantage of using coconut oil is that it can displace the use of hydrogenated and processed vegetable oils that are known to be involved in the development of numerous diseases as well as premature aging. While coconut oil may not prevent or cure all these conditions directly, it can limit the amount of potentially toxic hydrogenated and polyunsaturated oil in our bodies thus reduce chances of suffering prematurely from degenerative disease.

3.8 ANTI MICROBIOL

Coconut oil with 48 % lauric acid (an 12 chain saturated fat), 7 % capric acid (an 10 chain saturated fat), 8 % caprylic acid (an 8 chain saturated fat) and 5 % caproic acid (an 6 chain saturated fat) which makes up triglyceride molecule, form antimicrobial properties of coconut oil. These are generally absent from all other vegetable and animal fat except butter. Human breast milk and milk of other mammals contain MCFA. These fatty acids protect the new born baby from harmful germs. For years MCFA have been added to infant formula as protection because it supplies easily digestible nutrients. A mother who consumes coconut oil will have more MCFA in her milk to help protect and nourish her baby. That babies make from lauric acid, they get from their mothers milk. The monoglyceride monolaurin is the substance that keeps the enfants from getting viral or bacterial or protozoal infections. Until just recently, this important benefit has been largely overloaded by medical and nutritional community.

MCFA found in coconut oil have been shown in laboratory experiments to be effective in destroying viruses that cause influenza, measles, herpes, mononucleosis, hepatitis C and AIDS; bacteria which can cause stomach ulcers, throat infections, pneumonia, sinusitis, ear ache, rheumatic fever, dental cavities, food poisoning, urinary tract infections, meningitis, gonorrhoea and toxic shock syndrome; fungi and yeast which leads to ringworm, candida and thrush and parasites which can cause intestinal infections such as giardiasis. Several researchers and hospitals are currently patenting formulations derived from MCFA in coconut oil for this purpose (Enig, 1999).

3.9 BODY LOTION / COSMETICS

Coconut oil has a natural creamy texture comes from vegetable source, it is used in cosmetics. Whether applied topically or internally, coconut oil helps to keep skin young, healthy and free of disease. Polynesian women are famed for their beautiful skin, even though they are exposed everyday to hot blistering sun and the chafing of the ocean breeze. Coconut oil has been used by them to make the skin soft and smooth.

Virgin coconut oil is used to make natural soaps and other health products and is said to promote luxurious hair growth and protect the skin from bacterial and viral infection. In Ayurvedic medicine, coconut oil is said to nourish the body and increases strength while application of coconut oil to the skin is said to help fixation of vitamin D in the body. The cosmetic applications of coconut oil include:

- **Hair and Skin Oil :**
Coconut oil mixed with herbal oils and different scents is used as hair oil and is preferred because of its low viscosity. Without chemical modification, it promotes emolliency; gloss lubricity and adhesion and is said to prevent dandruff. Different preparations of coconut oil are also used to protect the skin from bacterial, protozoal and other infections in body and baby oils.
- **In Natural Shampoo :**
Coconut oil is used to prepare natural shampoos, in which the extract of amla fruit and soapnut powder are sometimes incorporated to add value.
- **Herbal / Medicinal oils :**
Coconut oil with various herbs/medicinal plants is used for preparing medicated oils such as skin and massage oils. Some people use coconut oil with lime for healing wounds.
- **Scent- making :**
Caproic acid, capric acid and caprylic acid obtained from coconut oil are mixed with methyl alcohol, ethyl alcohol, isopropyl alcohol, butyl alcohol and their esters and utilised in scents as well as food products.

- **Beauty Care Products :**

Coconut oil has a high level of myristic acid which, in combination with isopropyl myristate. This is used in many beauty products as an additive. Coconut oil lauric acid is also used in toothpaste.

4. HOW MUCH COCONUT OIL AN ADULT NEEDS

Based on the percapita intake of coconut oil in 1985 as reported by Kaunitz (1992), the percapita intake of lauric acid can be approximated for those major producing countries such as Philippines (7.3 gram), Sri Lanka (4.9 gram), Indonesia (4.7 gram) and Singapore (2.8 gram). In coconut growing areas of Indis ie. Kerala, it ranges from 12 to 20 gram / day (Eraly, 1995) and the average for the rest of the country is half a gram. An average high of 68 gram of lauric acid consumption was reported by Prior., et al. (1981) for the Tokelau Islands. The change in the food habits have changed the situation considerably. In countries like USA, there is very little lauric acid in foods. This situation needs positive change.

Though researchers have yet to give satisfactory answer, keeping in view of available information, an adult would need about 12 to 24 grams of lauric acid a day. This would be available from 2 – 4 tablespoons of coconut oil. Growing children probably need the same amounts as adults.

5. CONCLUSION

Coconut oil has been called the healthiest dietary oil in earth. It is being used for thousands of years by Pacific Islanders and in Asia. It is a marvellous oil gifted by nature from a perennial palm tree. It is known for its nutrition, health and medicines to cure various diseases. It keeps the body shiny without wrinkling and fit to work. If anybody not using coconut oil, for their daily cooking and body care needs, they are missing out one of the natures most amazing health products.