

MEDICINAL AND HEALTH PRODUCTS FROM COCONUT

By Dr. Tuley De Silva

Coconut based products have been in use from time immemorial for the promotion of health and treatment of ailments. Application of advanced scientific knowledge and technologies has contributed to the diversification of products thus creating new coconut based industries. Increasing awareness on environmental pollution, growing demand for naturals and the increase in cost of petroleum based chemicals further contributed to this activity. As the local and traditional uses of coconut continue even today, commercial production of new products demands a ready supply of raw materials which could be obtained by systematic cultivation of new and improved varieties of coconut.

The role of coconut oil as a major edible oil in developed countries diminished with the introduction of new vegetable oils and the hypothesis that saturated vegetable oils can contribute to heart ailments specifically due to high cholesterol levels and fat deposition in coronary vessels and the liver. This view was capitalized by other less saturated vegetable oil producers to capture the market thereby causing a decline in the demand for coconut oil. There is no authentic epidemiological evidence to the effect that people in coconut kernel and oil consuming countries have higher

risks of heart disease nor well proven experiments to support the hypothesis that coconut oil is a causative factor in coronary heart disease. Furthermore that coconut oil triglycerides are precursors of cholesterol production has not been specifically established under controlled clinical conditions. The relationship of the proportion and length of saturated fatty acid glycerides required for risk assessment has not been evaluated. Coconut oil is different to many vegetable oils in that the long chain fatty acid content of the oil is rather low. In fact it has a high proportion of short and medium chain fatty acids, which makes it more digestible as a fat source.

This set back and the lower demand for coconut oil was a blessing in disguise as more R&D work have been carried out for product diversification using modern technologies. These efforts lead to the production of industrially useful cocochemicals, which are competing with synthetic products as ingredients in the pharmaceutical, cosmetic and food industries. Although the market for these chemicals have not yet overtaken the conventional products, the prospects are quite bright, if dedicated research could be continued to develop new chemicals as substitutes for synthetics and leads for new drugs for specific ailments.

Coconut oil

Coconut oil has been used as an excipient in pharmaceutical and cosmetic formulations. In fact it is still in many pharmacopoeias including the British Pharmacopoeia (B.P.). It is being used as a base for ointments and a vehicle for oral and intra-muscular medicaments such as vitamins, hormones, antibiotics etc. In fact it is one of the few liquid saturated triglycerides available. An example is its use in coal tar and salicylic acid ointment still in the B.P. for use in scalp disorders.

A second monograph in the BP describes fractionated coconut oil as a mixture of triglycerides containing short and medium chain fatty acids (C₆, C₁₀). This is also sold under a number of proprietary names. An example is its use as a vehicle for oral preparations such as the calciferol solution. It is also used as a source of medium chain triglycerides in dietary preparations for patients with fat malabsorption syndromes.

Large amounts of coconut oil are being used in traditional medicinal and cosmetic preparations. Coconut oil is a base for the production of medicated oils in Ayurveda practiced in India, Sri Lanka and other Asian countries. Coconut oil is superior to other vegetable oils in dermal preparations in that it is non-irritating, soothing,

smooth to feel and easily absorbed. These are preparations in which fat-soluble active ingredients of plants are being extracted to the oil to be used as hair oil, skin

and medium chain lengths. The short chain acids can be fractionated into pure acids, the major being lauric and myristic acids, the derivatives of which find

coconut oil imparts certain important characteristics such as good lathering properties both in hard and saline waters, good keeping properties, detergent action good texture, hardness, whiteness in addition to being a good vehicle for the incorporation of colours, chemicals and other extracts. Hence its use is expected to increase with the growing demand for medicated soaps, shampoos and creams.



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preparations, massaging oils and for oral preparations. A large quantity of coconut oil is also being used as a component in the Jamu preparations in Indonesia.

Coconut Oil-based Products

Besides being used in margarine, hydrogenated coconut oil is used as a thickening agent in creams, ointments; and in the coating of sustained release tablets.

Fatty Acid Composition of Coconut Oil

Caprylic acid	(C-8)
Capric acid	(C-10)
Lauric acid	(C-12)
Myristic	(C-14)
Palmitic	(C-16)
Stearic	(C-18)
Oleic	(C-18)
Linoleic	(C-18)

Derivatives of coconut oil are being widely used as ingredients in many health care products and cosmetic formulations.

Hydrolysis of coconut oil yields fatty acids and glycerine. The main fatty acids so obtained are of short

applications in the pharmaceutical and cosmetic industries in germicidal, dispersible, bacteriostatic, foaming and cleansing preparations. These derivatives are useful in formulations, as they are safe, edible, less prone to oxidation due to the high degree of saturation, less oily and easy to rinse off.

The derivatives are used in major industrial applications as viscosity enhancers, foam stabilisers, surfactants, emulsifiers, detergents, plasticisers, in ethical and proprietary drug formulations.

The derivatives used in oral preparations have the added advantage of being of low calorific value. The resistance of these to oxidation contributes to a longer shelf life. Another use of modified coconut fat is as a base for suppositories as an alternative to presently used cocoa butter.

Medicated Soaps

There is a growing demand for soaps containing natural compounds, other oils or plant extracts with medicinal properties. All these soaps can have coconut oil as the base as

Glycerine

The main by-product of soap is glycerine, which has wide industrial applications. Apart from its major use in the production of explosives and paints, it is used in pharmaceutical formulations such as toothpaste, lubricants and medicinal products such as syrups, linctuses and even in the production of some semisynthetic drugs. Esters of polyglycerols are also used as solubilisers and emulsifiers.

Health Foods

Fats are an important constituent of a balanced diet. Coconut oil is a liquid at room temperatures in tropical countries and is a fat in temperate countries due to its high melting point. Because of the short chain fatty acids, coconut fat has high digestibility as a fat source. Hence it is sometimes incorporated into powdered infant foods and in low calorie diet products.

Skim Milk

The liquid left after the removal of the fat from coconut oil contains proteins rich in nutritive value and after spray drying can be used as a protein source in beverages and desserts.

Coconut protein

The water-soluble fraction of coconut proteins can be obtained by several methods. Ultrafiltration of coconut milk gives a good product containing around 60 % protein after



ACTIVATED CARBON

spray drying. This protein has a good aminoacid balance for infant nutrition and can therefore be added to milk and other products as a protein supplement. Vegetable proteins are gaining acceptance in preference to animal proteins for enrichment of food products.

Coconut water

Mature coconuts contain sterile water consisting of micro, amounts of minerals, aminoacids, vitamins, growth promoting substances and some sugar. Coconut water is a rich medium for microbial growth and hence is prone to contamination. Hence it is presently discarded due to difficulties in collection but collection of water as a by-product in the manufacture, of desiccated coconut could be possible if handled aseptically. There is a potential for using the coconut water to produce a refreshing beverage and for the production of nutritive health foods such as Nata de coco. More R&D have to be done in order to formulate a stable beverage with good keeping qualities. It could be made to be isotonic with body fluids to be used as an intravenous fluid.

Coconut water is also a rich base for the growth of useful micro organisms. Already the production of Nata de coco has been commercialised and there is potential for the growth of

industrially useful yeast. Yeast can also be used in pharmaceutical industry for the production of vitamin supplements.

Activated carbon

Activated carbon obtained from coconut shells has very good adsorbent properties due to the large surface area available. The commercial product varies widely in characteristics depending on the method of manufacture, and could be used for different purposes such as adsorption of gases or in liquid media for the adsorption of toxic substances, colouring matter, odours, etc. Technical grades are used in purification of water to be made portable and as decolorizing agents in the pharmaceutical and food industries. Its use as an adsorbent to remove toxic gases from being discharged to the environment is expanding rapidly due to the global concerns on environment pollution.

Activated carbon is still an official product in the pharmacopoeias and is used for the adsorption of gases in the treatment of flatulence and intestinal distension. It is also used as a suspension in water as first aid treatment of poisoning by alkaloids and other poisonous substances. Use of activated carbon as a decolourising and deodorizing agent in refining vegetable oils,

syrops and glycerine and other pharmaceuticals and as an adsorbent in gas masks, air purification systems for removal of toxic vapours will increase thereby creating a demand for activated carbon from coconut shells.

Nutraceuticals

Relaxed regulations in the developed countries have opened up markets for a new class of products named Nutraceuticals. These are mainly health foods containing vitamin supplements, immunostimulants, adaptogens and other preparations that could contribute to rejuvenation and antiageing. Activity directed research on Coccochemical derivatives with special properties could contribute towards the discovery of high value products that could be used as nutraceuticals. This market is still open to developing countries as products from natural plant raw materials can be produced at a lower cost.

New drugs

A new drug is produced after research for long periods (up to 20 years) and at a cost of millions of dollars (25m). The success rate for this type of discovery is very low but once a new drug is found, the profit margins could cover all expenses on research and make profits for further investment on R&D. New drugs are needed for ailments for which good ethical drugs are presently not available such as asthma, arthritis, hypercholestemia and skin ailments in addition to the deadly diseases such as cancer and aids. Leads that have been found from coconut chemicals as prospective anticholesteremic agents, if continued up to clinical trials should result in making coconut a very valuable raw material for the future. Commitment of governments of coconut producing countries and the provision of sufficient funds and manpower are vital if high value drugs are to be developed from coconut chemicals. □

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