



Processing Coconut (*Cocos Nucifera* L.) into Virgin Coconut Oil Products: Cold-press Method

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Abstract

This article will describe the impact producing and using Virgin Coconut Oil can make on the life of people in a small village. It offers them work opportunities and a better income for the farmers, but it also helps them become healthier. It has a reason why people worldwide described the Coconut as the “fruit of life”. The method is a literature review and describes the processing of Virgin Coconut Oil located in Takalar, South Sulawesi, Indonesia. Sulalam's VCO has a good impact on body health and for maintaining health.

Abstrak

Penelitian ini akan menjelaskan dampak produksi dan penggunaan Minyak Kelapa Murni terhadap kehidupan masyarakat di desa kecil. Ini menawarkan mereka kesempatan kerja dan pendapatan yang lebih baik bagi para petani, tetapi juga membantu mereka menjadi lebih sehat. Inilah alasan mengapa orang di seluruh dunia menggambarkan Kelapa sebagai “buah kehidupan”. Metode yang digunakan adalah kajian literatur dan menjelaskan pengolahan Virgin Coconut Oil yang berlokasi di Takalar, Sulawesi Selatan, Indonesia. VCO Sulalam memberikan dampak yang baik bagi kesehatan tubuh dan untuk menjaga kesehatan.

Article History

Received 15 May 2023

Accepted 25 June 2023

Published 29 June 2023

Keywords

Coconut, *Cocos Nucifera* L., Cold-press Method, Product, Sulalam, Virgin Coconut Oil.

Kata-kata Kunci

Cocos Nucifera L., Kelapa, Metode Pengepresan Dingin, Minyak Kelapa Murni, Sulalam.

1. Introduction

With so many uses for every part of the coconut, there's no wonder why the coconut palm tree is known as “the tree of life.” A widely used fruit, the coconut is a staple food that has sustained many generations around the world. The coconut's meat, milk, water and oil contribute naturally toward health and beauty, and can often be found in many of these types of products, which makes this refreshing delicacy that much more intriguing.[1] Due to its hard stony covering, the Library of Congress botanically defines the coconut (*Cocos nucifera*) as a fibrous, one-seeded drupe fruit.[1]

However, the institution also affirms that when using loose definitions, the coconut can also be referred to as a nut and/or seed. The coconut has three layers: the smooth, greenish exocarp; the fibrous husk known as the mesocarp; and the hard-woody layer surrounding the actual flesh of the coconut, called the endocarp.

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Generally, most consumers recognize the coconut by its endocarp, as sold in many grocery stores. Quite suitably, this layer of the coconut has been referenced as “monkey face” because of the seed’s brown, hairy-looking texture accented by three germination pores that resemble two curious eyes and a small open mouth known as the “soft pore,” which is the pathway to obtaining coconut water. [1]

In 2020 Indonesia produces 17.13 million metric tons of coconut. Many of them are exported overseas. The majority of Coconut producers will be found in North Sulawesi. A tree can give to 75 pieces of fruit per year, and this will continue to a tree life of around 60 years. Every coconut fruit had three “holes”. These are the result of the 3 carpels in coconut flowers, and three carpels is typical of the family *Arecaceae* (Palms). Those having a tree-like form are called palm trees. Currently 181 genera with around 2,600 species are known, most of them restricted to tropical and subtropical climates.[2] Most palms are distinguished by their large, compound, evergreen leaves, known as fronds, arranged at the top of an unbranched stem. However, palms exhibit an enormous diversity in physical characteristics and inhabit nearly every type of habitat within their range, from rainforests to deserts.

Palms are among the best known and most extensively cultivated plant families. They have been important to humans throughout much of history. Many common products and foods are derived from palms. In contemporary times, palms are also widely used in landscaping, making them one of the most economically important plants. In many historical cultures, because of their importance as food, palms were symbols for such ideas as victory, peace, and fertility. For inhabitants of cooler climates today, palms symbolize the tropics and vacations

Coconut fruit has a very hard outer shelter and white meat beneath it, the part that is most commonly eaten. Below the white meat is a hollow center, the storage place for coconut milk. Coconuts are very useful to setup Social Entrepreneurship in small villages. Definitions of social entrepreneurship vary significantly, [3] but the driving factor is often considered to be a social vision.

The inspiration and motivation for that vision may have multiple sources: humanitarian, political, medical, academic,[4] religious[5], [6] and more. Munoz and Kimmitt said that social entrepreneurship is a part of social mission.[7] Austin, Stevenson and Wei-Skillern said that this program is increasing in nonprofit organization in several decades.[8]

The Author is working in South-East Asia and wants to setup a Social Entrepreneurship in an area with less working possibilities to bless the community. After research he decided to develop a method to make virgin coconut oil on the most environment friendly method. There are many producers of coconut oil and all produce coconut oil with different methods. Conventional coconut oil comes from dried coconut flesh, called copra. Copra is dried in a wood-fueled kiln, or in the sun, over a period of a few days. It is time-consuming, dirty, lonely, arduous, male-dominated, fuel-intensive, and low-paying work. Many farmers consider it a form of slavery.

Virgin Coconut Oil (DME) has numerous benefits like:[9]

- 1) Prevention of diseases like hypothyroidism H Pylorie infection psoriasis and atopic dermatis.
- 2) Improves the level of HDL cholesterol and lowers the LDL level.
- 3) Reduces obesity and controls diabetes.
- 4) Prevents dryness of the skin and serves as a good moisturizer
- 5) Prevents hair fall and occurrence of dandruff and arrests aging.
- 6) Improves hair growth and prevents sagging of skin.

This paper aims to determine the process of processing Virgin Coconut Oil with the cold press method. The benefits for health are many. Edible oils, preferably of plant origin, are rich sources of fatty acids and other lipophilic antioxidants to the body. Among these, oils derived from the coconut kernel (*Cocos nucifera*), which includes copra oil (CO), virgin coconut oil (VCO) and refined, bleached and deodorized (RBD) oil. Based on the mode of preparation, their composition and biological effects vary.[10]

2. Methods

2.1. Design Method

This article is based on daily-life experiences how to make Virgin Coconut Oil. In a place in South-East Asia, we start producing Virgin Coconut Oil mid-2018. We are still producing high quality Virgin Coconut Oil. The daily practice taught us how to improve the quality. Our Virgin Coconut Oil is tested by the ministry of health and can also be uses as a medicine for skin, hair growth and controls diabetes.

2.2. Data Collection

Data was collected by literature reviews sourced from books, national and international journals. VCO processing by cold-press method [11]. This method is used because it does not require hot temperatures, which can damage the content of polyphenolic antioxidants.[10] The benefits for body health are carried out using a Systematic Literature Review approach sourced from the international journal SCOPUS (Elsevier).[12]

3. Result and Discussion

3.1. Introduction to the world of virgin coconut oil

There are many kinds of coconut oil. We can divide them in two categories: 1) Refined (for example without smell) coconut oil; 2) Virgin coconut oil (VCO). Most of the coconut oil sold on the market is the refined one. After drying the meat is processed on a way which means a lot of all nutritional values will be lost during the process. We can call this method “RBD” which means: “Refined, bleached, and deodorized”. Producing with this process mostly ends with lesser quality of coconut oil. The benefits of making coconut oil with the “RBD” method are: It is easier to produce on large scale, you can use all qualities of coconuts, even the rotten fruit. Prices per liter are less cheap because of the non-selection of coconuts.[9], [13]

Good quality virgin coconut oil is not refined after the drying process. It had to be cold-pressed, and it is not allowed to heat the meat above 55 degrees Celsius. If you want to produce more liters a day the easiest method is to accelerate the process by using more heat. The consequence is you lost a lot of nutrients. Another problem is that a lot of companies don't take care with the use of pesticides and additives to keep the oil long lasting. The ‘term” virgin is not deposited, everyone can use it, this made it hard to select the real good quality of Virgin Coconut Oil. [13]

3.2. Method of producing Virgin Coconut Oil

After some talking's with *Kokonutpacific* in Australia,[14] we decided to buy their equipment to start a small virgin coconut plant in South-East Asia. We rent a small plant in a village with no working opportunities and offered four workers a job. The

first step was to learn the process of making virgin coconut oil and to find small suppliers of coconuts. We decided to buy only coconuts who had been picked from the trees four to six weeks ago. Young coconuts are not suitable to use for making coconut oil. We don't want to buy from big distributors of coconuts, but straight from some small farmers who had 10 till 100 coconut trees. A local guy helps us and arranges continuous supply of coconuts from the villages around our plant. We decided to start on small scale and don't want to produce big amounts of lesser quality coconut oil. Beside that we make an agreement, all profits of our coconut oil will be reinvested in the village of our plant.



Figure 1. Coconut raw material (*Cocos nucifera*)

We want to buy only badges coconuts till 500 pieces. This guarantees the quality of the coconuts. Our local guy arranged a weekly delivery of the coconuts. Prices depends on the seasons; we want to pay a normal price because this helps the small farmers. This makes our coconut a little more expensive but guarantees a long-lasting relation with the local community. We also made the deal only to buy the unbroken shelves. When a shelf is broken, the meat is spoiled and not useable. A second thing is that small farmers don't use pesticides.

3.3. Producing method

A day starts will counting and selecting coconuts. After that the nuts had to be "husked". This is the method to crack the nut to get out coconuts of his shell. We prefer to buy husked coconuts; it is easier to see their quality without husk. The first step is to clean the outside of the coconut. Workers use a parang, a kind of a knife, to clean and to open the nuts. The water will be collected in a bucket and is drinkable till three hours of collecting. When the nuts are split in two pieces, we select them. Nuts with mold will be thrown away and are not useable. After selecting the two pieces of every nut will be washed.

The next step is to grate the pieces. We have a special machine for grading. An experienced worker can grate a coconut in less than 30 seconds. The flesh will be collected in buckets.



Figure 2. Special machine for grading

DME uses special developed tables with a heating system below the tables. They heat by burning the shelves of the coconuts. This is a fast method to dry the flesh, but this is also a method who destroys the environment with the pollution of the burnt shelves. We decided to dry on the tables in the sun. Workers are continuous working to turn around the flesh. This process takes on sunny days one till two hours.



Figure 3. Drying in the sun



Figure 4. Dried in a dehydrator

After drying in the sun, all meat will be dried in a dehydrator. This is a kind of an oven; the difference is that the temperature inside never reaches 50 degrees Celsius. This guarantees that nutrients will stay in the flesh. This process takes another hour. Workers can check the flesh by weigh the flesh before the drying process starts and after. There had to be a loss of around 40% before the flesh is ready to press. Experienced workers know exactly when the flesh is ready and don't need to weigh the flesh.

When the flesh is ready for the pressing process, the flesh will be collected in a small pipe with a lot of holes. Every pipe can be filled with around 3.5 kilo of flesh. The pipe will be set in the press and immediately coconut oil will be streamed out of the press. One pipe contains around 700 ml of fresh virgin coconut oil.



Figure 5. The pressing process

The coconut oil needs to be filtered a few times. This is because some small fibers in the oil. We use some special paper for that. After that the coconut oil will be collected in big jerrycans to settle for about one week. After one week we filter again, and the virgin coconut oil is ready to be bottled in jars. As you see, this process is not useful for mass-production. But because of all small steps, the quality of the virgin coconut oil is extraordinary. The rest product can be used for making cake's or used as a healthy meal for animals like pigs, and chickens (Fig. 6). The VCO product is named Sulalam and is packaged in hygienic bottles (Fig. 7).



Figure 6. Coconut shell waste and grated coconut



Figure 7. Product of Sulalam's VCO

3.4. Trends in Food Science and Technology

There is a lot of rumor about coconut oil in the world. The big industries cannot make virgin coconut oil in the way we developed the process. They are the big money makers and want to produce coconut oil in huge amounts. That is one of the reasons that there are many articles and research who are explaining the bad side of Virgin Coconut Oil. On the other side: there are also a lot of articles writing about the prevention and treatment for disease with Virgin Coconut Oil. One article is describing the dietary prospects of coconut oil for the prevention and treatment of Alzheimer's disease. [15] Another article describing the health effects of coconut oil and find out that coconut oil has several unique characteristics that may be responsible for its health outcomes. It also declares that coconut oil consumption significantly increases the serum total-, LDL- and HDL-cholesterol levels. [16] A total of seven papers were selected for inclusion in this review, consisting of three MA and one SR on cardiometabolic health, one SR on oral health, and one SR and one MA each on skin health. Coconut oil significantly increases serum total cholesterol, low-density- and high-density- lipoprotein cholesterol levels compared to poly- and mono-unsaturated oils. Limited studies showed that topical use of coconut oil helps in the prevention and treatment of atopic dermatitis and oil pulling for the prevention of dental caries. All four studies on cardiometabolic health and the SR on oral health had a high score in the quality assessment, SR with MA on skin health fulfilled high-quality scoring whereas the SR on the same topic had a low-quality scoring. [16]

Very interesting is the article which describes how Virgin Coconut Oil is effective in lowering C-reactive protein levels among suspect and probable cases of COVID-19. A 28-day randomized, double-blind and controlled trial aimed to determine whether virgin coconut oil (VCO) could be used as an adjunct prophylaxis to prevent the progression of symptoms among suspect or probable cases of COVID-19 (n = 63 adults) in isolation facilities. The participants received either a standardized meal (control) or a standardized meal mixed with a predefined dosage of VCO. For day 1 to 3, the addition of VCO was 0.6 mL per kilogram body weight (BW) and was increased to 1.2 mL/kg BW for day 4 to 28. As a result, participants in the intervention group showed a significant decline in the C-reactive protein (CRP) level, with the mean CRP level normalized to ≤ 5 mg/dL on the 14th day of the intervention. [17] VCO is an antibacterial against *Staphylococcus aureus*. [18] Coconut oil consumption can increase serum total-, LDL-and HDL-cholesterol levels. [16] VCO as a functional food oil. [16] VCO as functional food oil. [19] VCO can be used as cooking oil to eat cholesterol

Authors concluded that VCO, as an adjunct therapy, may be effective for a faster recovery from COVID-19 infection. [20] Virgin Coconut Oil was supplied by giving 30 ml-50 ml Virgin Coconut Oil per day as a food supplement for 4 weeks. We offered many people in a village Virgin Coconut Oil, all are feeling better after a 4-week therapy by adding Virgin Coconut Oil to their daily meals.

4. Conclusions

Producing Virgin Coconut Oil gives people in a village much more opportunities for their daily life. The families with some coconut trees get a better price for the harvest. We offer work to some families and the distribution of high-quality Virgin Coconut Oil helps people for their daily fight to become healthier. Hopefully further research on bigger scale will follow in future.

Acknowledgements

We thank the Sulalam's VCO Foundation and all the donors involved.

Author Contributions

P.D conceived and designed the experiments; P.D, H.F performed the experiments; I.W analysed the data; All authors prepared the original draft; H.F, I.W reviewed, and edited the manuscript final manuscript.

Funding

Not applicable.

Institutional Review Board Statement

Not applicable.

Data Availability Statement

Not applicable.

Conflicts of Interest

All authors declare no conflict of interest, financial or otherwise.

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