

# Virgin Coconut Oil (VCO) Processed Products with No Heating Method Using a Squeezer and Without a Squeezer

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**Abstract.** *The purpose of this activity is to provide training to the farming community in processing coconut products by making Virgin Coconut Oil (VCO) with the help of an electric coconut squeezing machine and without using a coconut squeezing machine. The method used in this activity is the manufacture of VCO without heating first, the results of coconut milk are obtained through squeezing using an electric squeezer (P1) and without an electric squeezer (P0). Based on the results obtained, the use of the electric squeezer cannot produce VCO after being allowed to stand for ± 48 hours, only two layers are formed, namely the water layer and the blondo layer, while without using an electric squeezer machine it can form 2 layers, namely the blondo layer and the water layer within ± 24 hours then let stand for ± 24 hours again has formed three layers of water layers, blondo coating and VCO coating. Based on this experiment, VCO produced from manually squeezed coconut milk with a volume of 4.5 L is able to produce VCO as much as 25-30 ml.*

**Keywords:** *Processed Coconut, Virgin Coconut Oil, coconut milk press, without heating*

## 1. INTRODUCTION

Coconut fruit is a raw material for copra, has an oil content ranging from 60 – 65% while fresh fruit flesh has an oil content of about 43%. Coconut oil consists of glycerides which are compounds between glycerin and fatty acids. The fatty acid content of coconut is estimated to contain 91% saturated fatty acids and about 9% unsaturated fatty acids (Side *et al.*, 2023). The composition of fatty acids in coconut oil is influenced by several factors, namely: type, age and habitat of the coconut fruit used to make the oil. In addition, the high and low fatty acids in the oil can also be caused by how the processing and storage process of the oil itself. Different processing processes can cause different fatty acid compositions due to the possibility of fatty acid damage (possibly due to heat, the presence of microorganisms, etc.) (Hamid *et al.*, (2020).

The nutritional content of coconuts themselves is very much, so that coconuts can be processed into several processed products for consumption. The part of coconut that is widely used is the fruit part

(meat, water, shell) for consumption, medicine and others. The coconut plant itself is known as the tree of life because almost all parts of the plant can be used and have economic value. One of the processed food and pharmaceutical products that use coconut is Virgin Coconut Oil (VCO), this product is one type of vegetable oil that is very popular in the world (Ardiansyah *et al.*, 2023) VCO is one of the best vegetable oils, contains lauric fatty acids that support the human immune system, coconut oil contains high saturated fatty acids including caproic acid (C6), caprylic acid (C8), capric acid (C10), lauric acid (C12), myristic acid (C14), palmitic acid (16) and stearate acid (C18) and about 90% is C12. Currently, the demand for VCO is increasing among the community because the process contains few chemicals and heating (Stroher *et al.*, 2020; Jermwongruttanachai *et al.*, 2024).

VCO is usually extracted by mechanical approach in the absence of heating, purification and bleaching or deodorization which allows increased retention of antioxidant activity. This oil has a

characteristic coconut aroma that is natural, fresh, colorless and deposit-free. VCO is also used as an ingredient in some cosmetics (Negi *et al.*, 2024) In producing VCO there are several techniques, but one of the most effective techniques is without heating, because the heating process can reduce the important ingredients contained in VCO. If it must use heating, it is required to use low heat setting, constant stirring, regular temperature checks (Kamila *et al.*, 2022) VCO is a feeding oil and fat produced without changing the oil, obtained only by mechanical treatment and minimal heat discharging. VCO is obtained from old but still fresh coconut flesh which is processed without heating, without the addition of any chemicals, processed in a simple way so that high-quality virgin coconut oil is obtained. The advantages of this VCO are clear, colorless, not easily rancid and last up to two years (Nivya *et al.*, 2023; Laila *et al.*, 2024) VCO has good prospects in terms of commercial, where this processed coconut product can be of selling value and increase revenue. The obstacles experienced during the manufacture of this VCO are still not precise processes and tools used, one of which is the coconut milk squeeze machine. Based on results from Aziz *et al.*, (2021) The obstacles faced in developing VCO products include coconut milk squeezing, so a useful squeezer tool is needed to speed up the coconut milk squeeze process and can improve the VCO squeeze process.

The coconut milk squeezer used in this activity is a manual squeezer or hydraulic coconut milk squeeze, hydraulic coconut milk squeeze is a machine used to squeeze coconut milk in a large capacity in an easier and more practical way. This type of coconut milk squeezer is used in the process of squeezing coconut milk using manual methods by pressing through hydraulic power in a machine. The purpose of this activity is to determine the results of coconut milk obtained from an electric coconut milk squeezer with a manual squeezer in its ability to form three layers, including: water layer, blondo layer and VCO oil layer.

## 2. RESEARCH METHODS

This research was carried out in April 2024, the object used in this study was old fresh coconuts (*Cocos nucifera* L) obtained in Telaga Tujuh Village, Labuhan Deli District, Deli Serdang Regency, North Sumatra. The tools used in this activity are electric measuring machines and manual coconut milk squeezing machines.

1. Dehusking is the process of peeling coconut fibers
2. Deshelling is the stripping of epidermis from coconuts
3. Peeling to take coconut meat
4. Making Coconut Milk Cream

The prepared coconut fruit is cleaned of fibers, shredded using an electric coconut sizing machine. The grated coconut is then added water in a ratio of 2: 1 (2 coconuts: 1 liter of water) then kneaded manually then squeezed using a manual squeeze machine (P0) and squeezed coconut milk using an electric coconut milk squeeze machine (P1). Coconut milk produced from manual squeezing or by using an electric squeezer as much as 4.5 L produced from 2 coconuts.

The coconut milk obtained will be placed in a closed / plastic container and allowed to stand for 24 hours until 2 layers are formed. The top layer is called cream and the bottom layer is called skim (coconut milk), then coconut milk cream is taken to be continued in making VCO.

### 5. Making VCO from Coconut Milk Cream

The coconut milk mixture that has separated between coconut milk cream and skim will be removed from the skim / coconut water while the coconut milk cream is measured in volume produced and transferred into a new container / plastic. The results of coconut milk cream are allowed to stand for 36 hours to help three layers, namely: water layer, blondo layer and oil layer.

### 6. VCO Retrieval

Take the oil formed on the top layer of coconut milk cream that has been formed, then filter using filter paper / tissue to obtain a clean oil liquid and ready to be packaged.

## 3. RESULTS AND DISCUSSION

The results obtained in this experiment, can be seen the difference between the formation of VCO derived from coconut milk through a manual squeeze process (P0) with coconut milk produced using an electric coconut milk squeeze machine (P1). This difference can be seen when coconut milk cream is allowed to stand for 36 hours, coconut milk cream produced by squeezing coconut milk using a manual machine only produces 261 mL while coconut milk cream produced using an electric squeezer as much as 975 mL.

Table 1. Produced coconut milk cream

Treatment	Volume of initial coconut milk (L)	Volume of Coconut Milk Cream (mL)
P0	4,5 L	261 mL
P1	4,5 L	975 mL

Squeeze done manually has a considerable influence on the success of the formation of VCO, squeezing aims to remove all nutritional content, especially the oil contained in coconut flesh grains. In general, coconut oil processing is divided into two systems, namely dry or copra system and wet processing or separation of oil from coconut milk (Arsana *et al.*, 2017). Wet processing can only be done using coconut milk and breaking the emulsion.

The emulsion breakdown is rather difficult to perform due to the high stability of coconut milk. Destabilization can be done by three mechanisms, namely the principle of centrifugation process that separates between liquids, which have different specific gravity using centrifugal force, The second stage is flocculation or clustering in which the oil phase moves as a group that does not involve the rupture of the interfacial film that normally surrounds each globule and therefore does not change the original globule. The final stage, coalescence is the most critical stage in destabilization. During this stage, the interfacial area is damaged; The globules unite and reduce the interfacial area. The wet process seems to be more desirable due to the free use of chemical solutions, making it more environmentally friendly than solution extraction. This method is also much simpler, which can be done at home by anyone interested in producing their own natural oils (Mariana *et al.* 2009).



The use of electric squeezers does not succeed in forming a layer of coconut milk cream consisting of a layer of oil, blondo layer and water layer, this is because the use of this machine reduces the stirring process which is one of the important processes in making VCO. Stirring can destabilize proteins by denatured so that their solubility levels are reduced causing proteins to coagulate and eventually precipitate, so that the oil and water layers can separate. The inner layer of the hydrophobic protein molecule is turned outward, while the outer hydrophilic part folds inward and the protein coagulates (Aziz *et al.*, 2021).

#### 4. CONCLUSION

VCO is a feeding oil and fat produced without changing the oil, obtained only by mechanical treatment and minimal heat discharging. VCO is obtained from old but still fresh coconut flesh which is processed without heating, without the addition of any chemicals, processed in a simple way so that high-quality virgin coconut oil is obtained. The process of making VCO starts from the formation of coconut milk cream to the formation of a layer of pure coconut oil from the coconut milk cream. The use of an electric coconut milk squeezer with a manual coconut milk squeeze machine has a

different influence on the formation of a pure oil layer from coconut milk cream. The coconut milk solution derived from the electric squeezer does not form 3 layers like coconut milk that comes from manual tool squeezing, the layers are pure oil layer (VCO), blondo apisan and water layer. This is because the use of an electric coconut milk squeezer does not involve a stirring process, stirring is able to eliminate the stability of the protein so that the solubility level is reduced causing the protein to coagulate and settle, so that the oil and water layers can separate.

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