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VIRGIN COCONUT OIL PROCESSING

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'Our Business is Industry…"

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VIRGIN COCONUT OIL

Virgin Coconut Oil is the oil obtained from the fresh, mature kernel of the coconut by mechanical or natural means, with or without the use of heat, without undergoing chemical refining, bleaching or deodorizing, and which does not lead to the alteration of the nature of the oil. Virgin coconut oil is an oil which is suitable for consumption without the need for further processing.

Virgin coconut oil (VCO) is relatively stable and less susceptible to peroxidation since it is composed mainly of medium chain tryglycerides (MCTs). The saturated fatty acids in VCO are distinct from animal fats, the latter consisting mainly of long chain saturated fatty acids.

GENERAL CHARACTERISTICS

The product is popularly known as Virgin Coconut Oil (VCO). It is a water-clear oil derived from matured coconuts using the Modified Wet Process developed by the Food Processing Division (FPD) of the Industrial Technology Development Institute (ITDI). VCO obtained using this method retains the characteristic nutty aroma of pure coconut oil sans the off-odor due to rancidity and the burnt flavor due to application of high temperature. The process assures that it is free from any chemicals (both added and by-product of the process) and has a very low moisture content ensuring its stability and long shelf-life.

USES

Virgin Coconut Oil has numerous uses in foods, cosmetics and pharmaceuticals preparations. Its high lauric acid content helps prevent bacterial, viral and fungal infections. Its ability to preserve the body's anti-oxidant reserves also helps keep skin soft and smooth.

BENEFITS

As Medicine and Pharmaceuticals (numerous claims and testimonials)

- Supports the immune system function
- Helps prevent bacterial, viral and fungal infections
- Reduces risk of cancer/heart diseases
- Enhances the body's resistance against SARS
- Improves digestion and nutrient absorption

As Dietary Oil

- It helps in weight management
- Improve energy levels

As Cosmetics

- Helps protect and keep skin soft and smooth
- Helps heal all kinds of sores and injuries of the skin

MANUFACTURING PROCESS

1. **Raw Material Selection**
   Good quality, de-husked, mature coconuts, are selected for processing. De-husked nuts of good quality are usually dark brown in color and with depressed 'eye'. De-husked nuts with cracks are rejected as it may be spoiled and rancid.

2. **Splitting/Cracking**
   De-husked nut is split open manually in two using a heavy type kitchen knife or a stainless steel flat bar. Splitting is done along the 'equator' of the nut producing two half kernels. The coconut water is collected into containers for proper disposal or further processing. (*Coconut water can be used in vinegar making by the traditional method or by using the ITDI acetator process for accelerated vinegar production*).

3. **Grating**
   The coconut meat inside the half kernel is grated with the use of a motorized grater. The half kernel is pushed towards the rotating blade of the grater to produce the grated meat. Grated coconut meat is collected in a container. *(Waste material like coco shell could be converted to charcoal/activated carbon).*

4. **Milk Extraction**

   Milk extraction is done by using a screw-type milk extractor. Grated coconut meat is fed to the extractor and the whole milk is collected to a container. The pressed meal is pressed two (2) to three (3) times to increase the yield of milk extraction. Normally, the yield is from 55-60% of milk based on the weight of grated meat using the screw-type extractor. *(The pressed meal or 'sapal', the residue after the extraction of milk from the grated meat can be used as animal feed and food snack).*

5. **Cream Separation by Centrifuge**

   Whole coconut milk with an added water (4x to 5x its volume) is passed to a three-way centrifuge to separate it into skim milk (the watery portion) and coconut cream (the oily portion). This step ensures high purity of VCO by removing unwanted components of the milk (e.g., sugars, soluble proteins). *(Powdered skimmed milk may be obtained from the first separated skimmed milk by using a spray drier).*

6. **Heating**

   Using a steam jacketed kettle, the coconut cream is subjected to heating (up to 90° - 95°C) to produce the crude virgin coconut oil. Heating is stopped when the oil has separated and clarified with minimum bubbles observed.

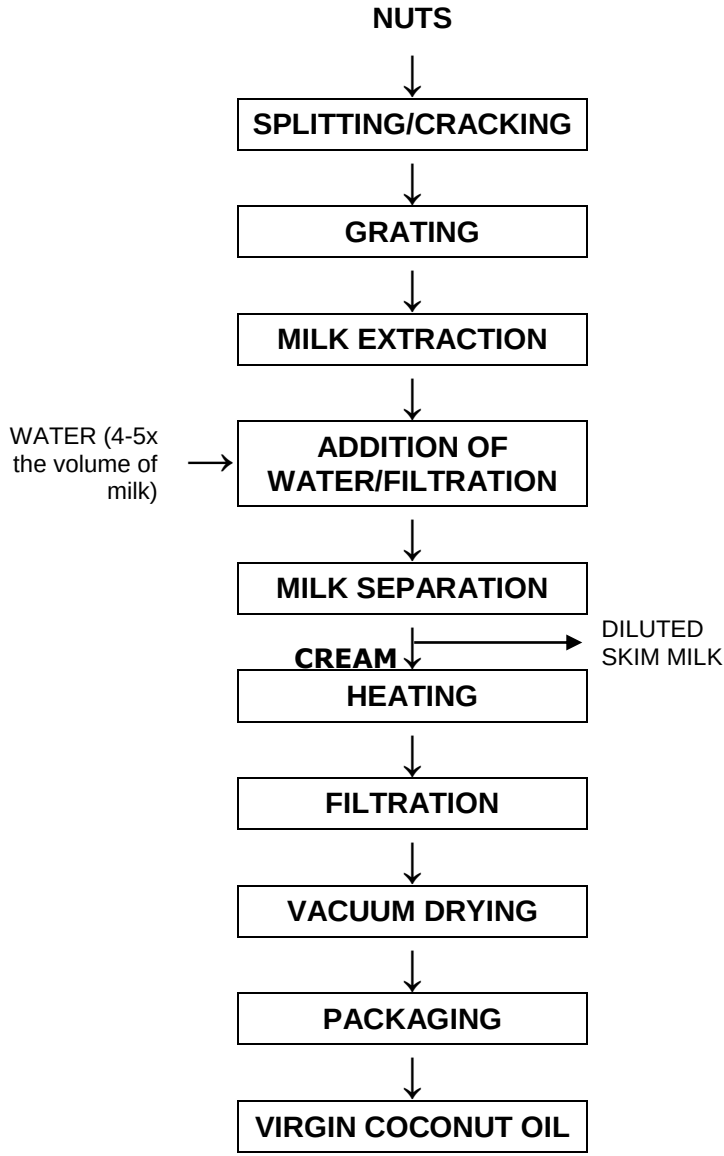
7. **Filtration**

   The crude virgin coconut oil is further processed by filtration using a forced (air pressure) batch filter to obtain a water clear oil. Filter aid is used in the filtration equipment and a small amount (<0.1%) of activated carbon is added (optional) to the oil prior to filtration.

8. **Vacuum Drying**
   The filtered oil is further dried under vacuum without heating. This process will remove moisture in oil that cannot be evaporated in the heating step.

9. **Packaging**
   The final virgin coconut oil is packed into glass or HDPE bottles and labeled accordingly. Bottled products are then placed into boxes for delivery to the market.

PROCESS FLOW



PLANT SIZE AND PRODUCTION SCHEDULE

The minimum units of processing equipment are shown in table below. This module can process 500 nuts/8-hr shift producing 25-30li of VCO (625li – 750li/mo.). This is equivalent to about 30,000 – 36,000 bottles (250 mL) per year.

VCO EQUIPMENT for 500 nuts per shift (8-hour)

NO.	QTY	EQUIPMENT	SPECIFICATIONS	CAPACITY	COST
1	2	Coconut grater	½ Hp motor with heavy duty stand	100 nuts per hour	20,000
2	1	Milk extractor	2 Hp, screw-type, stainless steel	Equivalent to 150-200 nuts per hour	145,000
3	1	Centrifuge	¼ Hp, 3-way cream separator (Imported, local dealer)	200 li/hr	165,000
4	1	Jacketed kettle	Double jacketed, LPG heated, 60-li capacity, SS inside vessel, MS jacket, tilting type	60 li/batch	95,000
5	1	Oil filter	Air pressure filter, 30-liter tank, stainless steel, with air compressor	20 li/batch	45,000
6	1	Filling tank	120-li capacity, stainless steel, 2-nozzle, manual filling	100 li/batch	35,000
7	1	Vacuum dryer	30-liter tank, stainless steel, with vacuum pump	20 li/batch	90,000
				TOTAL PhP	**595,000**

SUPPLIERS

1. **Industrial Research Foundation**
   Contact person: Ms. Lyn Gonzaga
   Telephone no.: 896-0488

2. **Boston Home Inc. (centrifuge)**
   Contact person: Benjie Sales
   Telephone nos.: (02) 412-3726 / 414-0915
   Fax no.: (02) 415-0130
   e-mail address: boston@info.com.ph

3. **Saints & Branch Corp. (bottles)**
   545 Franciscan St., Sta. Ana
   Sunvalley, Parañaque City
   Telephone nos.: 821-5325 / 821-5328

4. **K&K Chemical Industries, Inc.**
   1979 Commonwealth Ave., Quezon City
   Telephone nos.: 932-9858 / 932-9869 / 931-2491

5. **Induplex, Inc. (perlite filter aid)**
   Rm. 703 South Center Tower
   2206 Market St., Madrigal Business Park
   Alabang, Muntinlupa City
   Telephone nos.: 807-6802 to 05