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# ► Business analysis of RBD coconut oil



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### **Title:**

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August 2024

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The objective of developing a business analysis for refined, bleached, and deodorized (RBD) coconut oil is to gain a comprehensive understanding of the market dynamics, operational efficiencies, financial viability, and growth prospects inherent in

## 1. Market overview

Coconut oil is a widely used ingredient in various countries across the Asia-Pacific region, particularly in the food industry. Its unique composition helps to maintain good cholesterol levels in the body by containing low levels of unsaturated fatty acids, which minimise the risk of heart disease. Furthermore, coconut oil is used in the food industry as a dietary fat for the preparation of infant milk powder, confectionery and bakery products, ice cream, and filled milk. The expansion of the coconut oil market will be driven by the growing demand for coconut oil in various industries, including cosmetics, food, chemical, and personal care.

The following paragraphs provide further details regarding the principal applications of refined, bleached, and deodorised (RBD) coconut oil in a number of different industrial sectors.

### 1. Food industry

- **Cooking and baking:** RBD coconut oil is widely used for frying, sautéing, and baking due to its high smoke point and stable nature. It is a preferred oil for recipes requiring a neutral taste.
- **Margarine and shortening:** It's often used as a base for margarine and as a shortening in baked goods.
- **Confectionery:** It is used in the production of chocolates and other confectionery products due to its solidification properties at room temperature.

### 2. Cosmetics and personal care

- **Skin care:** RBD coconut oil is a common ingredient in lotions, moisturizers, and creams because of its emollient properties. It helps to soften and hydrate the skin.
- **Hair care:** It's used in shampoos, conditioners, and hair treatments to nourish and strengthen hair, promoting shine and preventing breakage.
- **Soaps and detergents:** The oil is a key ingredient in soaps and detergents, offering excellent lathering and cleansing properties.

### 3. Pharmaceuticals

- **Carrier oil:** RBD coconut oil is used as a carrier oil in various pharmaceutical formulations, including topical ointments and capsules, due to its stability and neutral characteristics.
- **Health supplements:** It is used in dietary supplements and nutraceuticals for its medium-chain triglycerides (MCTs), which are believed to offer various health benefits.

### 4. Industrial applications

- **Biofuels:** RBD coconut oil is used in the production of biodiesel and other biofuels, providing an eco-friendly alternative to fossil fuels. The utilisation of waste coconut oil for biodiesel production represents a sustainable and economically viable solution to the challenges of waste management and renewable energy. The conversion of waste oil into a valuable fuel contributes to environmental protection, energy security, and economic development.
- **Lubricants and Greases:** It is used in the manufacturing of industrial lubricants and greases due to its stability and lubricating properties.

### 5. Animal feed

- **Pet Food:** It is incorporated into pet foods and supplements to enhance nutritional value and provide energy.

### 6. Household products

- **Candles:** RBD coconut oil is used in candle making due to its clean-burning properties and ability to hold fragrances.
- **Cleaning products:** It is an ingredient in various household cleaning products for its cleaning and emulsifying properties.

These diverse applications demonstrate the versatility and utility of RBD coconut oil across different industries.

According to research by KBV Research with the title of Europe Coconut Oil Market, published in December 2021, The European Coconut Oil Market is expected to grow at a CAGR of 6.5% during the forecast period (2021 - 2027). While, a new report titled Global Coconut Oil Market, published by KBV Research in December 2021, The Global Coconut Oil Market size is expected to reach \$ 4,554.2 million by 2027, rising at a market growth of 7.2% CAGR during the forecast period.

## 2. The import requirements for coconut oil in the European Union Market.

### A. Import tariff

The coconut oil item is classified under HS code 151319, export from Timor-Leste the import tariff in Europe according to source of EU Access2Markets is 0%.

### B. Mandatory quality parameter set by European Commission for RBD cooking oil

The European Union (EU) has specific quality standard parameters for Refined, Bleached, and Deodorized (RBD) cooking oils regulated by the European Commission for Food Safety. These standards are outlined in various regulations and directives that aim to ensure the safety, quality, and authenticity of cooking oils. Here are the key quality standard parameters:

#### Key Quality parameters for RBD cooking oils in the EU:

1. Free fatty acids (FFA):
  - The FFA content should be very low, typically below 0.1%. High levels of FFA indicate poor quality and degradation of the oil.
2. Peroxide value:
  - This measures the extent of primary oxidation. The peroxide value should generally be less than 10 milliequivalents of active oxygen per kilogram for RBD oils.
3. Moisture content (MC):
  - The moisture content should be very low, usually less than 0.1%, to prevent microbial growth and ensure stability.
4. Colour:
  - RBD oils should be light in colour due to the refining process, which removes pigments. The Lovibond colour index or similar measurements are often used.
5. Odor and flavour:
  - RBD oils should be neutral in Odor and flavour, indicating that undesirable compounds have been effectively removed.
6. Smoke point:
  - The smoke point should be high, typically above 200°C, making the oil suitable for high-temperature cooking

7. Trace metals:
  - Levels of trace metals like iron and copper should be minimal, as they can catalyse oxidation. Specific limits are set to ensure stability.
8. Additives and contaminants:
  - RBD oils must comply with EU regulations on allowable additives and contaminants, including limits on pesticide residues, heavy metals, and other potentially harmful substances. Regulation (EC) No 1831/2003 sets maximum levels for certain contaminants in foodstuffs.
- C. Regulatory compliance:
  - Labelling: Oils must be properly labelled with nutritional information, country of origin, and any allergens in compliance with Regulation (EU) No 1169/2011 on the provision of food information to consumers.
  - Safety regulations: Compliance with general food law including Regulation (EC) No 178/2002, which lays down the general principles and requirements of food law, establishes the European Food Safety Authority, and lays down procedures in matters of food safety.

These standards ensure that RBD cooking oils in the EU are safe, high-quality, and meet consumer expectations for both health and culinary use. For precise and detailed regulatory information, consulting the specific EU regulations and directives is recommended.

### 3. Recommendations to establish RBD cooking oil factory

Considering market demand and the quality standards established by the EU Commission, it is recommended to establish an RBD cooking oil factory utilizing the physical refining process instead of the chemical refining process.

The advantages of producing cooking oil using the physical refining process compared to the chemical refining process include:

#### 1. Environmental benefits:

- Reduced chemical use: Physical refining does not require the use of chemicals like phosphoric acid, which reduces the environmental impact.
- Less waste: The process generates fewer hazardous waste products, making it more environmentally friendly.

#### 2. Quality of oil:

- Better nutritional profile: Physical refining helps retain more natural nutrients and antioxidants in the oil, resulting in a healthier product.
- Improved Flavor and Aroma: The absence of harsh chemicals preserves the natural flavor and aroma of the coconut oil.

#### 3. Cost-effectiveness:

- Lower operating Costs: Physical refining can be less expensive in terms of operational costs since it avoids the need for chemicals and the associated handling and disposal costs.
- Energy efficiency: The process may consume less energy compared to chemical refining, leading to cost savings.
- Physical refining, combined with pre-treatment of the raw material (coconut meat), eliminates the need for the degumming step. This approach reduces both process and consumable costs.

#### 4. Simplicity and safety:

- Simpler process: Physical refining involves fewer steps and is generally simpler to operate and control.
- Safer for workers: The absence of harmful chemicals creates a safer working environment for employees.

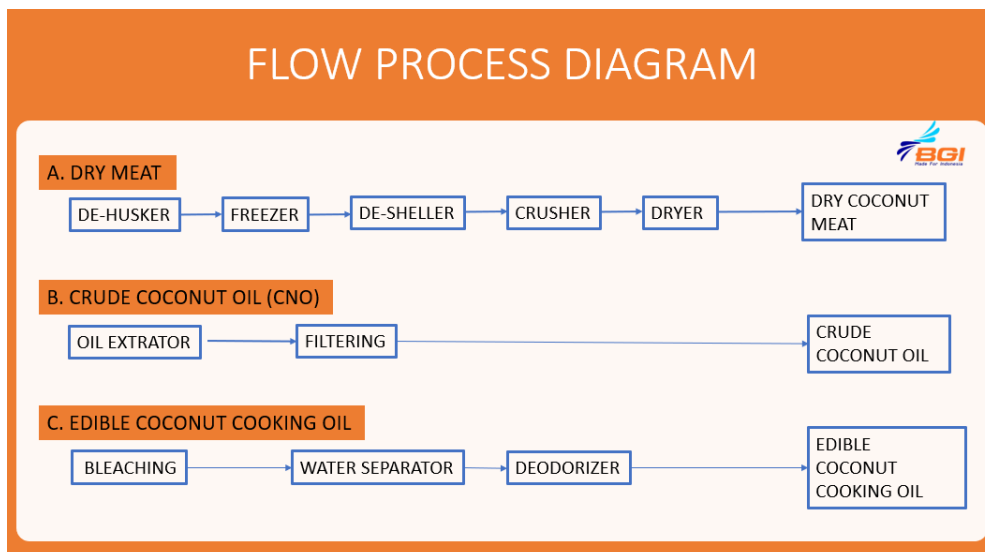
#### 5. Product consistency:

- Consistent quality: Physical refining produces a more consistent quality of oil, as the process is less variable than chemical refining.

Overall, physical refining of coconut oil is often preferred for its environmental, health, and economic benefits, as well as its ability to produce high-quality cooking oil that meets the standards quality of European market.

### 4. Calculation of machine investment and economic analysis

The following calculations are based on data from conditions in Indonesia, including factors such as electrical power cost, labour costs, raw material costs, packaging costs, and the type of coconut used.



Source: BGI

## A. Calculation of machine investment

INPUT :		10,000 BUTIR/ 8 HOUR	
Assumption :		1 butir kelapa = 1,5 kg	15,000 kg kelapa butir

No	Mesin	Capacity input	@	Spesification	electrical power consumption per day (Kwh)	Price	Qty	Sum	Keterangan
A. DRY MEAT FACTORY									
1	Dehusker	10,000	butir/ 8 hour	Dimension : 170 x 50 x 150 cm	80	Rp 125,000,000	2	Rp 250,000,000	5 unit mesin
2	Freezer	10,000	butir/ day	Container 40 feet	240	Rp 180,000,000	2	Rp 360,000,000	
3	Dewatering coconut water	10,000	butir/ 8 hour	vacuum pump and nozzle	40	Rp 6,000,000	5	Rp 30,000,000	
4	Storage coconut water	2,500	kg/ day	3000 litre, stainless steel 304, pump	1,5	Rp 820,000,000			
5	Cutter and de-sheller	10,000	butir/ 5 hour	Circular saw with rotary	20	Rp 30,000,000	4	Rp 120,000,000	
6	Crusher Coconut Meat (CM)	4,500	kg/ 5 hour	Dimension : 50 x 10 x 70, SS 304	100	Rp 160,000,000	2	Rp 320,000,000	4 unit mesin
7	Dryer CM	4,500	kg/ 5 hour	Rotary vertical bed dryer	100	Rp 150,000,000	2	Rp 300,000,000	2 unit mesin
8	Storage CM	2,250	kg/ 8 hour	3000 kg					1 unit
B. CNO FACTORY									
1	Oil extractor from CM	2,250	kg/ 5 hour	Hydrolic press 3 bar, intermittent	100	Rp 150,000,000	4	Rp 600,000,000	4 unit mesin
2	Filtering Machine	1,350	kg/ 4 hour	Filter press continue	20	Rp 160,000,000	1	Rp 160,000,000	1 unit mesin
3	Crude Coconut Oil (CNO) Storage	1,350	kg/ 8 hour	Stainless Steel (SS)304, nozel nitrogen, pump	1,5	Rp 120,000,000	1	Rp 120,000,000	1 unit
4	Nitrogen generator	2,000	litre/ hour	Kemurnian Nitrogen : 95% - 99.5%	1,6	Rp 30,000,000	1	Rp 30,000,000	
C. REFINERY FACTORY									
1	Bleaching	1,350	kg/ 4 hour	70 C, vacuum, stainless STEEL 304	40	Rp 350,000,000	1	Rp 350,000,000	
2	Water separator	400	kg/ 4 hour	centrifugal	12	Rp 90,000,000	1	Rp 90,000,000	
3	Deodorizer	1,350	kg/ 3 hour	150 C, vacuum, ss 304	15	Rp 225,000,000	1	Rp 225,000,000	
D. UTILITY AND INFRASTRUCTURE									
1	Piping	400 liter udara perjam		Stainless 304, 1 inch, valve, pressure gauge		Rp 175,000,000	1	Rp 175,000,000	
2	Electrical			Kabel NYY, NYM. MERK SUPREME		Rp 160,000,000	1	Rp 160,000,000	
3	Thermal Oil Heater Biomass			100 kcal	80	Rp 280,000,000	1	Rp 280,000,000	
4	Heat exchanger			sheel and tube & blower	80	Rp 110,000,000	1	Rp 110,000,000	
5	Steam boiler biomass		100 kg steam perh	5 bar	40	Rp 260,000,000	1	Rp 260,000,000	
5	Gas emission treatment			2 stage		Rp 45,000,000	1	Rp 45,000,000	
6	Packing machine	1,467	litre/ 2 hour	food grade, standing pouch feeling. Automatic	40	Rp 240,000,000	1	Rp 240,000,000	
						MACHINE INVESTMENT	Rp	4,225,000,000	

Please note I attached separate file for the excel machine investment calculation.

## B. Economic analysis

Please note I attached separate file for the excel economic analysis calculation.

The following outlines the economic advantages of operating a coconut oil factory using the physical refining process:

- Revenue stream: In addition to the edible cooking oil itself, we will generate additional revenue as follows:
  - Coconut pulp/residue
  - Coconut shell
  - Liquid smoke
  - Coconut charcoal
- Circular economy (sustainability)
  - From one production cycle with the same costs incurred, we can obtain additional revenue
  - The waste produced during the process can be re-used for other applications, contributing to a circular economy
  - Physical refining does not require the use of chemicals like phosphoric acid, which reduces the environmental impact
  - Less Waste: The process generates fewer hazardous waste products, making it more environmentally friendly
  - Cost-Effectiveness: Lower Operating Costs (no need chemical and the associated handling and disposal costs), Energy Efficiency

Safer for Workers: The absence of harmful chemicals creates a safer working environment for employees

## 5. Supply chain

Understanding the supply chain in the RBD (Refined, Bleached, and Deodorized) coconut oil industry is crucial for several reasons:

1. **Raw material sourcing:**  
Coconut oil production starts with sourcing coconuts. Understanding the supply chain helps in identifying reliable suppliers of high-quality coconuts at competitive prices. This ensures a consistent and sustainable supply of raw materials for production.
2. **Quality control:**  
By understanding the supply chain, producers can implement quality control measures at various stages, from coconut sourcing to final product distribution. This includes ensuring that coconuts meet quality standards, monitoring production processes, and conducting quality checks on finished products.
3. **Cost management:**  
The supply chain significantly impacts production costs. By understanding the supply chain, businesses can identify opportunities to optimize costs, such as negotiating better prices with suppliers, streamlining logistics, and minimizing waste in production processes.
4. **Risk Management:**  
Understanding the supply chain helps in identifying and mitigating risks that may affect production and supply. This includes risks such as supply disruptions, fluctuations in raw material prices, geopolitical factors affecting sourcing regions, and regulatory changes impacting import/export processes.
5. **Traceability and compliance:**  
With increasing consumer demand for transparency and ethical sourcing, traceability throughout the supply chain is essential. Understanding the supply chain enables businesses to track the origin of raw materials, ensure compliance with sustainability standards, and demonstrate responsible sourcing practices to consumers and regulatory authorities.
6. **Supplier relationships:**  
Building strong relationships with suppliers is critical for a smooth supply chain operation. Understanding the supply chain helps in identifying key suppliers, fostering collaboration, and addressing any issues or challenges that may arise.
7. **Competitive advantage:**  
A well-managed and efficient supply chain can provide a competitive advantage by enabling businesses to deliver products to market faster, at lower costs, and with higher quality. Understanding the supply chain helps in identifying areas for improvement and innovation to stay ahead of competitors.

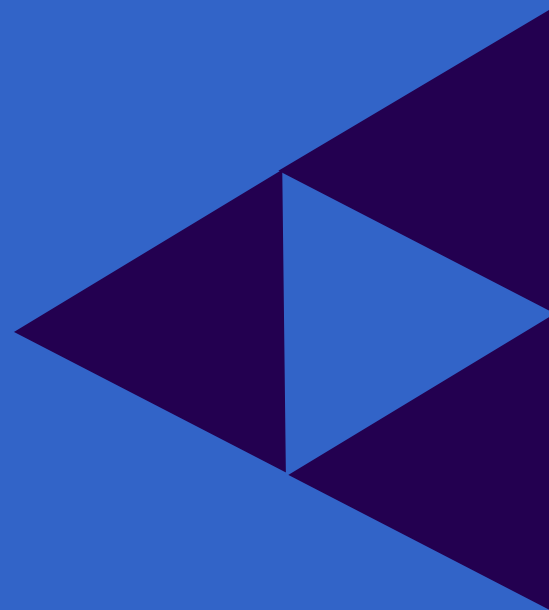
Overall, understanding the supply chain in the RBD coconut oil industry is essential for ensuring efficient operations, maintaining product quality, managing costs, mitigating risks, and staying competitive in the market.

## 6. Cost Analysis

1. **Raw Materials:**
  - Calculate the cost of purchasing coconuts for oil extraction.
  - Consider other materials such as chemicals for refining and bleaching.
2. **Labor Cost:**
  - Determine the number of workers required for each stage of production.
  - Estimate monthly wages and benefits for production staff.
3. **Equipment and Machinery:**
  - Research and budget for the necessary extraction, refining, and packaging machinery.
  - Consider maintenance costs and depreciation over the equipment's useful life.
4. **Utilities:**
  - Estimate monthly costs for electricity, water, and other utilities used in the production process.
5. **Transportation:**
  - Calculate transportation costs for raw materials and finished products.
  - Consider logistics and distribution expenses.
6. **Overhead Expenses:**
  - Include overhead costs such as rent, insurance, administrative expenses, and marketing costs.




## The International Labour Organization

The International Labour Organization (ILO) is the UN agency for the world of work. It was founded in 1919 as part of the Treaty of Versailles that ended World War I, to reflect the principle that universal and lasting peace can only be achieved if it is built on social justice. The ILO is the only 'tripartite' United Nations agency that brings together representatives of governments, employers and workers to shape policies and programmes for social justice and decent working and living conditions for all women and men. For this it was awarded the Nobel Peace Prize in 1969. The ILO is also responsible for drawing up and overseeing international labour standards (Conventions and Recommendations). This unique arrangement gives the organization an edge in incorporating 'real world' knowledge about employment and work into its activities.



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