

# Coconut-Based Products: A Review of Their Traditional Uses, Health Benefits, and Industrial Applications.

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## Abstract

Coconut-based food products have been integral to traditional cuisines worldwide for centuries, offering a combination of unique flavors, nutritional benefits, and versatile culinary applications. This review delves into the traditional uses, health advantages, and industrial applications of coconut-based food products. Coconut-based foods have a rich history of traditional culinary practices in tropical regions, where coconut trees flourish. Coconut oil, milk, cream, and flesh are staples in various cuisines, adding richness, creaminess, and distinct coconut flavor to dishes ranging from curries to desserts. Additionally, coconut-derived ingredients like coconut flour and sugar have found their way into baked goods, confectioneries, and savory snacks, enhancing texture and taste while imparting a subtle coconut essence. Coconut-based

foods offer numerous health benefits attributed to their nutrient-rich composition. Coconut oil, revered for its medium-chain fatty acids, has been associated with improved heart health, weight management, and cognitive function. Coconut milk and cream are prized for their electrolyte content, aiding hydration and providing essential vitamins and minerals. Furthermore, coconut-based foods are often gluten-free, dairy-free, and

suitable for vegan diets, catering to diverse dietary preferences and restrictions. Moreover, coconut-based food products have gained traction in the industrial food sector due to their versatility and functional properties. Coconut oil serves as a stable cooking oil, frying medium, and ingredient in processed foods, while coconut milk and cream feature prominently in dairy alternatives and plant-based beverages. Additionally, coconut-based ingredients find applications in food manufacturing, flavoring, and food fortification, contributing to product innovation and market diversification. In conclusion, coconut-based food products epitomize a fusion of tradition, nutrition, and innovation, offering a wide array of culinary possibilities and health benefits. Understanding their traditional uses, nutritional profiles, and industrial applications underscores the enduring appeal and multifaceted utility of coconut in the global food industry.

**Keywords:** coconut-based food products, traditional uses, health benefits, culinary applications, industrial applications, coconut oil, coconut milk, coconut cream, coconut flour, coconut sugar

## Introduction

The need for functional drinks that provide both hydration and an energy boost is

growing in the rapidly evolving beverage sector.

A long-standing tropical beverage, coconut water (*Cocos nucifera* L.) has seen a steady rise in demand in recent years on the global market. In addition to its many historical applications, this cool liquid that is made from coconut fruit has lately been referred to as a "sport beverage" and has caught the interest of producers as a naturally occurring functional drink.

Coconut water has a low matter content (2% to 5% wet basis), mainly comprising sugars and minerals. [1]

When determining which coconut cultivars are suitable for producing coconut water, quality parameters such as the water to nut ratio, total soluble solids (TSS), total sugar per nut, and [reducing sugars / total sugars] ratio are useful markers. Based on these parameters, dwarf cultivars are the best choices for producing a delicious end product. Because coconut water has a typical flavor and a few unique qualities, its quality cannot be only attributed to its sugar and mineral content. While numerous writers have mentioned therapeutic applications or growth-promoting qualities, very few studies have explicitly stated which ingredients are in charge of these attributes.

Because of its distinctive qualities and abundance of vitamins, minerals, and fiber, coconuts have drawn the attention of health-conscious customers. Rich in medium-chain triglycerides (MCTs), coconut oil

Categories of Coconut-Based Products:

- **Food and Drinks:** This group comprises sugar, flour, milk, water, and coconut oil. The production, nutritional value, and culinary applications are covered in detail in this section.

- **Cosmetics & Skincare Products:** Due to its hydrating and anti-inflammatory qualities, coconut oil is a common component in cosmetics. This section examines the variety of personal care items made with coconut oil.

- **Industrial Uses:** Coconuts are used in the production of biofuels, coir goods, and environmentally friendly packaging materials in addition to food and cosmetics. This section looks at these creative applications and how they affect the environment.

Consumer demand for natural and sustainable products has fueled the explosive rise of the global market for products based on coconuts. This section examines market trends, such as the rise in the variety of coconut products available and the growing use of coconut ingredients across a range of industries. It also discusses the difficulties producing nations confront, like supply chains, and the effects their economy has on them. A healthy and nutrient-dense source of meat, water, milk, and oil is the coconut. The nutritional makeup of coconut water and coconut kernels is displayed in Table 1. In addition to its nutritional value, coconut is regarded as a "functional food" because of its other health advantages.

Because of its high potassium and mineral content, coconut water is regarded a sports drink even in its unadulterated state. More minerals like salt, potassium, phosphorus, chlorides, magnesium, ascorbic acids, vitamins B, and sugars are present in this nutrient-dense drink. Amino acids like cystine, arginine, and alanine are also abundant in it. Lauric acid, which has 12 carbons, makes up almost half of the fatty acids in coconut oil. Coconut water is also used to treat elderly and pediatric gastroenteritis patients as an oral rehydration solution. (Kumar and Nadasabapathy 2013; Campos et al. 1996) Cytokinins are a class of phytohormones that are one of the beneficial ingredients in coconut water (Kende and Zeevaart 1997).

**Table 1.** Nutritional composition of fresh coconut kernel and coconut water

Constituents	Kernel	Water
Energy(kcal)	354	19
Carbohydrates(g)	24.23	3.71
Sugars (g)	6.23	2.61
Dietary fiber(g)	9	1.1
Fat(g)	33.49	0.2
Protein(g)	3.33	0.72
Water(g)	47	95
Thiamine (vit. B <sub>1</sub> )(mg)	0.066	0.03
Riboflavin (vit. B <sub>2</sub> )(mg)	0.02	0.05
Niacin (vit. B <sub>3</sub> )(mg)	0.54	0.001
Vitamin B <sub>6</sub> (mg)	0.05	0.02
Vitamin C(mg)	3.3	2.4
Calcium(mg)	14	24
Iron(mg)	2.43	0.29
Magnesium(mg)	32	25
Phosphorus(mg)	113	20
Potassium(mg)	356	200

Source: USDA

## Coconut Based Products

There are many uses for coconut-based goods in the food, health, and industrial sectors. They are made from different portions of the coconut tree (*Cocos nucifera*). These goods take advantage of the nutritive, practical, and sustainable qualities of coconuts. [3]Here is a summary of a few well-known coconut-based items, along with information about them and their uses:

### 1. Coconut Water

Clear liquid found inside young, green coconuts. It's naturally refreshing and contains easily digested carbohydrates and electrolytes. Applications: Hydration, sports drinks, health beverages.

### 2. Coconut Milk

It is made by shredding and combining water with the white interior flesh of mature coconuts. After that, the mixture is filtered to create a thick, creamy liquid. Uses: Baking and cooking; dairy milk substitute; soup and curry base; vegan goods.

### 3. Coconut Oil

Extracted from the meat of the coconut. Virgin (unrefined) or refined can be used. Virgin coconut oil is well-known for both its fragrance and possible health advantages. Applications include high-

temperature cooking, skin and hair care items, dietary supplements, and aromatherapy with carrier oil.[4]

### 4. Coconut Flour

A powder made of dried coconut meat that is tender and fine. It's rich in fiber, protein, and good fats and free of gluten. Applications: thickening agent, fiber supplement, and gluten-free baking.

### 5. Coconut Sugar

A natural sugar derived from the coconut palm tree's sap. Minerals and antioxidants that are present in the coconut palm are still present in it. Uses: As a substitute for refined sugar in baking and beverages.

### 6. Desiccated Coconut

In addition to its texture and flavor, dried coconut meat that has been shredded or flakes is frequently used in baking and cooking. Applications: Yogurt or oatmeal toppings, desserts, granola and energy bar ingredients.

### 7. Coconut Vinegar

It is made from fermenting coconut water or the sap of the coconut tree. It has a slightly milder taste than other vinegars. Applications: Salad dressings, marinades, health tonics.

### 8. Coconut Aminos

A sauce made from the fermented sap of the coconut palm, with sea salt added. It's a soy-free alternative to soy sauce. Applications: Cooking, seasoning, dipping sauce.

### 9. Coconut Butter

Pureed meat of mature coconuts, resulting in a creamy, butter-like consistency. Applications: Spreads, baking, smoothies, and as a vegan alternative to dairy butter.

### 10. Activated Coconut Charcoal

It is made by burning coconut shells at very high temperatures to create a highly adsorbent form of charcoal. Applications: Detoxification, water filtration, emergency toxin removal, skincare products.

## 11. Coir

Fiber from the husk of the coconut, known for its durability and moisture retention. Applications: Ropes, mats, brushes, and as a growing medium in gardening and hydroponics.

## 12. Industrial and Environmental Applications

- **Biofuel:** Coconut oil can be converted into biodiesel.
- **Eco-friendly Packaging:** Innovations include using coconut shells and coir for biodegradable pots, utensils, and other packaging solutions.
- **Water Purification:** Activated coconut charcoal is used in water purification systems for its ability to adsorb impurities.

## Value Added Products made from Coconut and its By Products.

- **Coconut Water Concentrate:** A more shelf-stable version of coconut water, concentrated through evaporation or freeze-drying. It requires rehydration before consumption and is used in beverages and food products.
- **Flavored Coconut Water:** Infused with natural fruit extracts or essences, this offers a variety of tastes while maintaining the hydration benefits of plain coconut water.[5]
- **Coconut Milk Yogurt:** A dairy-free alternative to traditional yogurt, made by fermenting coconut milk with live cultures. It caters to vegan diets and those with dairy intolerance.
- **Coconut Cream Ice Cream:** Utilizing coconut cream as a base, this dairy-free ice cream offers a creamy texture and is often sweetened with coconut sugar or other natural sweeteners.
- **Coconut-Based Cheese:** Dairy-free cheese alternatives made from coconut oil and milk, designed to mimic the meltability and texture of dairy cheeses.

## Challenges in Coconut Industry

Although having a great deal of potential to produce a variety of goods with added value, the coconut business faces a number of obstacles that could compromise its profitability, productivity, and sustainability. These difficulties include social, economic, and environmental aspects. In order for the sector to grow and for the people that depend on coconut production to succeed, these concerns must be resolved.[6] Below is a summary of the main obstacles that the coconut industry and its value-added product production must overcome:

1. **Trees getting older and producing less**  
Older trees are a common feature in coconut plantations, and they produce less than younger trees.

Replanting old trees with new ones is frequently sluggish because of lack of funding, ignorance, or inadequate government assistance, which lowers productivity overall.

2. **Diseases and Infestations of Pests**  
Numerous pests and illnesses, including the deadly yellowing disease and the Coconut Rhinoceros Beetle, can affect coconut palms. These problems have the potential to destroy crops, drastically lowering production and degrading produce quality. While they might be expensive and labor-intensive, effective management and control techniques are crucial.

3. **Environmental and Climate Change Factors**

With increasing sea levels, shifting precipitation patterns, and a rise in the frequency of extreme weather events like typhoons and droughts, climate change poses a serious danger to the production of coconuts. Reduced yields, heightened susceptibility to pests and diseases, and the loss of plantation areas are possible outcomes of these changes, particularly in low-lying coastal regions.

4. **Problems with Supply Chain and Logistics**

The coconut industry frequently involves intricate supply systems that are prone to interruptions and inefficiencies. The majority of coconut growers are smallholder farmers, who may have trouble

reaching markets, which could result in inefficiencies and higher expenses. In addition, more processing is needed to produce value-added products, and insufficient infrastructure and technology may make this difficult.

#### 5. Market Fluctuations and Price Volatility

Demand and supply fluctuations, competition from similar products, and worldwide market trends can all have a significant impact on the price of coconut products. It might be difficult for producers to forecast income and plan investments in upgrades or expansions due to price volatility.

#### 6. Environmental and Sustainability Issues

There have been instances where the growth of coconut farms has resulted in biodiversity loss and deforestation. Furthermore, in order to maintain long-term viability, the growing demand for items derived from coconuts must be balanced with sustainable methods. It is essential to guarantee ecologically sustainable methods are used at every stage of the supply chain, from farming to processing.

#### 7. Innovation and Technological Gaps

In the coconut industry, there is frequently a limited adoption of contemporary agricultural technologies and techniques. The creation of new value-added products, productivity gains, and product quality

advancements are hampered by this disparity. Research and development spending is crucial for both fostering innovation and tackling issues facing the sector.

#### 8. Policy and Regulatory Restraints

The coconut sector may face obstacles to its expansion and development due to inadequate regulations and regulatory frameworks. The progress of the sector depends on supportive policies like financing for research and development, incentives for sustainable practices, and better market access.

## Conclusion

Governments, industry stakeholders, and communities must work together to address these issues if the coconut sector is to be successful and sustainable in the future. Adopting sustainable farming methods, making investments in R&D, increasing the effectiveness of the supply chain, and expanding smallholder farmers' access to markets are some of the solutions. Overcoming these obstacles would enable the coconut sector to flourish, supporting millions of people and offering a wide variety of value-added coconut goods to the world market.

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