

# COCONUT FLOUR

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## Introduction

Coconut flour is a unique product from coconut residue. As a by-product in the processing of coconut milk, coconut flour can provide not only value-added income to the entrepreneurs, but also a nutritious and a healthy source of dietary fiber for the consumers.

The production of coconut flour is an important technology

with the raw material for DCN which commands a higher price in the world market. The technological advances made in the field of alternative wet processing made possible the commercialization of the technology without competing with other products for the raw material. Being obtained from the by-product of coco milk processing, coconut flour is a good source of additional income instead of just using the residue as animal feed.



Fig. 1. Low-fat, High-fibre Coconut Flour

in meeting the challenges of feeding the ever-increasing world population especially in the developing countries. The production process is quite simple as it only involves proper selection and preparation of mature coconuts, defatting and pulverizing.

In the past, coconut flour processing was only possible via the dry process or the desiccated coconut (DCN) process. However, this has to compete

It is estimated that in the Philippines, manufacturers of cocomilk/cream powder products produce about 3,500 metric tonnes of coco residue annually in which 40% is used as food ingredient and the remaining 60% is used as feedstuff or thrown into waste. This volume does not include the coco residue by-products which are thrown away by nata de coco and

coconut jam processors and those produced for home use.

## Coconut Flour Research

Research activities on coconut flour was initiated by the Philippine Coconut Authority (PCA) in collaboration with the Women Inventors Association of the Philippines and the College of Food and Nutrition of the University of the Philippines. Currently, the PCA is pursuing the coconut flour research further by undertaking an optimization study of the production process in collaboration with the Sirawan Foods Corporation, a coconut milk exporter in Davao City, Philippines. It is envisaged that commercial production including market promotion will be done as soon as the optimization study is completed. Aside from coco flour, the process also actually produces superior quality oil which can be sold at a premium price for herbal products manufacture.

In recognition of the socio-economic and health benefits of the coconut flour production technology, the research project bagged the second prize as the Most Outstanding Creative Research Award during the 1998 National Inventor's Week in the Philippines, (Fig.2).

## Composition and Properties of Coconut Flour

Coconut flour has an off-white colour and is comparable



Fig. 2. PCA – Researchers Ms. Divina Bawalan and Ms. Dina Masa (2<sup>nd</sup> and 3<sup>rd</sup> from left) Bagged the Second Prize for Most Outstanding Creative Research Award during 1998 National Inventor's Week, Philippines.

with other cereal flours in the market in terms of energy, carbohydrates and fat content. It has a shelf-life of more than one year when stored at 20°C, 14 months at 30°C and 9 months at 40°C. Its most significant property is its high water absorption capacity which could be exploited in product formulations. It also contains a high percentage of dietary fiber (19.3%) which is beneficial to human health. Because coconut contains high dietary fiber, and since it is a low fat coconut product and a high energy food, it is a good ingredient for functional foods and nutraceuticals (Table 1).

### Uses of Coconut Flour

Coconut flour can be used as

fillers, bulking agents and substitute for wheat flour, rice flour and potato flour at certain

levels. It can combine well with chocolate and cinnamon - flavoured baked products as well

as cheese - flavoured and barbecue flavoured snack foods.

Coconut flour can be incorporated into various food products at certain levels of acceptability (Table 2).

### Health Benefits of Coconut Flour

As a source of dietary fiber, coconut flour provides a number of health benefits, especially in relation to coronary heart disease, cancer, diabetes and mineral absorption in the human body system. Researchers have indicated that coconut flour may

Table 2: Levels of Acceptability of Coconut Flour

<u>Baked Products</u>		<u>Snack Foods</u>	
Chocolate Chips	25%	Multigrain Chips	10%
Chocolate Crinkles	20%	Polvoron	40%
Oatmeal Cookies	25%	Kroepeck	8%
Pan de sal	5%		
Buns	10%	<u>Steamed Products</u>	
Cinnamon	10%	Puto	15%
Brownies	25%	Siomai	1%
Macaroons	25%		
Hotcake	15%	<u>Extruded Products</u>	
Muffins	15%	Canton Noodles	10%
Lemon Poppyseed Cookies	15%		

	Potato Flour	Oat Flour	Cassava Starch	Corn Grit	Green Peas	Coco Flour
Moisture (%)	7.29	7.92	11.96	12.57	9.85	2.80
Crude Fat(%)	0.75	8.14	0.14	0.75	0.52	10.23
Protein (%)	9.54	14.09	0.54	6.30	26.88	13.41
Carbohydrates (%)	79.15	68.27	87.18	79.97	59.80	58.67
Food Energy (cal/100 g)	362	403	352	352	351	422
Crude Fiber(%)	1.48	1.07	0.10	0.58	2.62	19.30

reduce the concentration of cholesterol in the blood. The dietary fiber in coconut flour may play the role of binding the bile acids, thus, reducing their absorption and diverting more cholesterol into bile acid production.

Coconut flour may also play a role in the prevention of colon or rectum cancer. It is suggested that the dietary fiber of coconut flour can bind with the bile acids in the large intestines, colon or rectum and may be excreted in the feces. This prevents the



Fig 3. Baked Products and Snack Foods with Coconut Flour

growth of tumors. Studies reveal that consumption of high-fiber coconut flour increased fecal bulk and lowered the serum cholesterol of the animals under study.

### Marketing Aspects and Potentials

A market study on the utilization and acceptability of coconut flour was conducted in Metro-Manila, Philippines and the results revealed its versatility as a bulking agent, as filler in flavouring ingredients and as substitute for cereal flours in multigrain snack foods and breakfast cereals. Samples of coconut flour were distributed to various food manufacturers in Metro Manila. The R & D and Production Managers of these companies were then interviewed. The study revealed that the main factors influencing the use and acceptability of coconut flour were the price of the material itself and the quality of the product.

At a selling price range of ₱ 12.00 to ₱ 20.00 per kilo, coconut flour is very competitive with other cereals flour in the market (US\$1 = ₱ 38.00). Assuming an average price of ₱ 16.00 per kilo of coconut flour

and at 5 to 25 percent substitution of imported wheat flour, it is likely that the cost of baked products such as breads, cakes, cookies and other snack foods could be reduced.

The manufacturers of coconut milk and the producers of nata de coco, coco jam and ice cream can also make use of the coconut flour production technology for maximum income from the residue. The additional income should enable the producers to price their nata de coco, coconut milk and coco jam at competitive levels.

Studies have indicated that the greatest revenue or benefit from coconut flour and oil production can be achieved if coconut flour will be used as a substitute for imported cereals such as potato flour, wheat flour and corn flour while the oil is used in the manufacture of coconut based herbal products.

Considering the current level of utilization in baked and snack foods, there is still a large market potential to be filled-in by coconut flour both within the Philippines and in the export market. Domestically, the demand for coconut flour is projected at 42,000 metric tonnes

annually based on 5 to 25 percent utilization in food products. The amount of available supply is estimated at 3,500 metric tonnes based on the surveyed raw material from processors of coconut milk/cream products and other sources.

In 1997 the Philippine wheat imports amounted to 2.25 million metric tonnes. If at least 5 percent coco flour can be substituted with wheat flour estimated at 112,538 metric tonnes, an average of ₱1.5B or US\$38,500,000 annually in foreign exchange could be conserved by the country.

The coconut flour production technology offers entrepreneurial minded individuals the opportunity to go into production of high value diversified products right in the coconut producing provinces. The production of good quality coconut milk/powder, nata de coco and the eventual processing of residue into coconut flour and virgin coconut oil will generate employment and livelihood opportunities in these areas. As the high value virgin oil and coconut flour give increased income to processors, the coconut farmers will undoubtedly also stand to benefit from a higher selling price of coconuts.

Being a health food and a competitively priced product, there is no doubt that coconut flour will find its way in both the local and export markets. As a way to diversify the economic uses of coconut, the production and marketing of coconut flour will undoubtedly contribute to the revitalization of the coconut industry. □

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