

Flour Substitute From Coconut

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AT the present time there exists a great shortage of bottoms for both our exports and imports. Only the very essential materials could be assured of being shipped. Although the Philippines is capable of producing the products for foreign and domestic consumption, she can not be so sure that all these products can be brought at once to the countries that need them. The same case exists with regards to our imports. With this view in mind, there arise problems of producing the products which we could hardly secure from abroad under the present circumstances. If, producing these needed products would not be profitable, then the problem resolves on how we can produce substitute for them.

Among the necessary imports that would be difficult to secure in case of blockade is wheat flour. We import annually around 107 million kilos of flour valued at nine million pesos. The Philippines do not grow wheat from which we can manufacture wheat flour. A substitute for wheat flour in necessary if the local demand is to be supplied. Locally, there are several materials from which flour substitute can be made, such as casava, corn, camote, etc. Comparatively speaking, there is very little area devoted to the growing of these starch bearing materials, and before a large scale production of flour substitute from these materials can be made possible, an extensive agricultural development will also have to be made.

Flour from the Coconut

The coconut, termed appropriately as the Tree of Life can furnish us a good material from which a flour substitute can be derived. Although Filipino, Dutch, American, and English investigators have mentioned and studied coconut flour in their respective publications, its commercial possibilities have not been thoroughly discussed. Extensive work on the nutritive value of the constituents of fresh coconut meat have already been done. This has been compiled and explained by Miss Orosa of the Bureau of Plant Industry in her article in the September issue of this *Journal*. From the pilot plant in the Bureau of Science, coconut flour has been produced, and this has been used in conjunction with other local flour materials in making bread, cookies and cakes. Several investigators (1) in Ceylon and the East Indies proved that the flour produced from coconut meat is nutritious, and as a result, coconut flour is being incorporated in the daily diet. Basing on all these known experimental facts, it can be safely stated that coconut flour would make a good flour substitute. It is the purpose of this short article to discuss the manufacture of coconut flour.

Methods of Manufacture

The analysis of fresh coconut meat is shown in Table I. This table shows that, if the oil and the

water are taken out from the meat, the remaining residue will consist mostly of protein and carbohydrates, the primary constituents of flour. The above-mentioned Ceylon investigators prepared their coconut flour by pressing out the oil from desiccated coconut. The analysis of this flour is shown in column 2, Table I. The process of making flour by this method is costly because one has to make desiccated coconut first before he can make the coconut flour.

Table I—Comparative Analysis of Coconut and Wheat Flours

	1	2	3	4	5
	Fresh Coconut Meat	Ceylon Coco Flour (From desiccated coconut)	Roller-Expeller Coco Flour (Lava process)	Continuous Press Coco Flour (Lava process)	Wheat Flour (Ave)
Moisture	48.0	5.7	6.0	6.0	12.0
Ether Extract	35.5	7.2	5.0	6.0	1.0
Proteins	4.3	20.4	11.6	4.3	11.4
Crude Fiber	2.1	9.2	14.7	18.3	1.0
Carbohydrates etc.	9.0	52.1	60.3	64.4	74.1
Minerals	1.1	5.4	2.4	1.0	0.5

The new Lava process of making oil and coco-milk directly from fresh meat yields a coconut meat residue from which most of the oil has been extracted, and from which flour can easily be made. The making of flour from this residue may be accomplished by two methods. As was mentioned in a previous article, (2) the new process involves the extraction of the "gata" or liquid emulsion from the meat. This may be effected either by (1) roller press-expeller-hydraulic press process or by (2) a continuous roller press method. In the first method the ground meat is passed through a roller press to separate the liquid emulsion from the meat residue. At this stage most of the oil and sugars in the fresh meat are extracted. The "sapal" or meat residue is dried in a continuous drier of the type used in the preparation of desiccated coconut. The dried "sapal" is fed into an expeller in order to take out the remaining oil. From the expeller or hydraulic press the "sapal" is passed through a pulverizer which reduces the size of the particles to that of flour. Northcutt, in a patented process claimed that the dried coconut meat could be ground in a high speed hammer mill to produce a product which can be emulsified
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(1) Dr. Reginald Child, Director of Research, Coconut Research Scheme discussed the food value of the products obtained from the coconut Kernel in the July, 1939 issue of *Young Ceylon* (Coconut Number).

C. P. Jansen made a comprehensive study on the nutritive value of coconut presscake and his findings which were published in *Mededeelingen Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indie* (1920) pp. 1-21, showed that the presscake can be used as human food in case of emergency

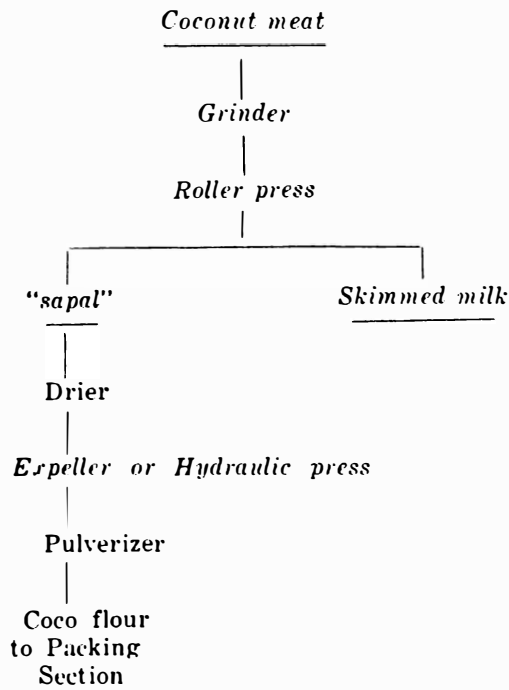
(2) The Commercial Possibility of the Lava Process—From the Standpoint of Machinery and Equipment by P. E. Torres, *Coconut Journal*, March, 1941.

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easily in water. The analysis of the coconut flour obtained by the roller-expeller method is shown in column 3, Table I.

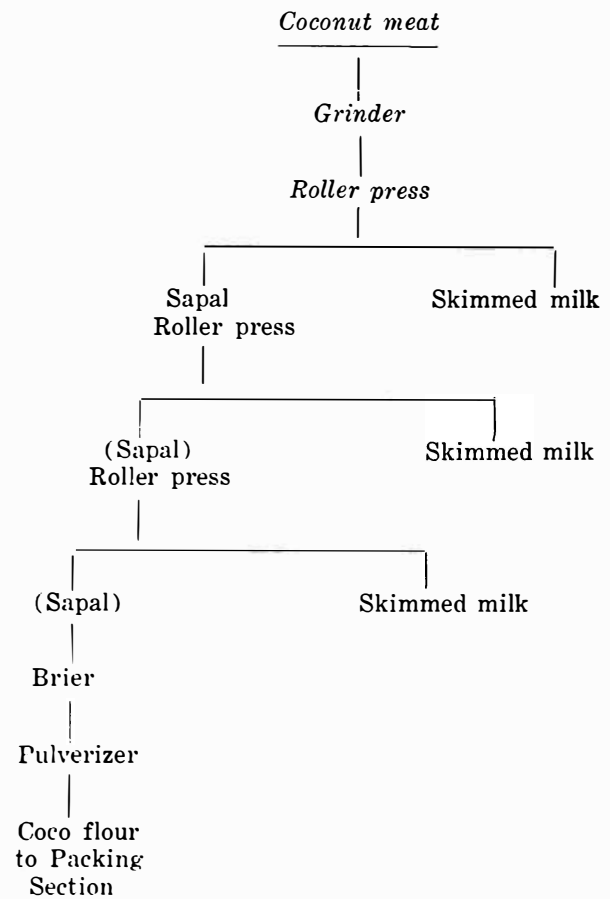
In the continuous roller press method, the fresh coconut meat is passed through a set of rollers to achieve the maximum extraction of oil. The meat residue from these rollers is dried in a continuous drier and then ground to flour particle size in a pulverizer. The analysis of this flour is shown in column 4, Table I. Flowsheet in Fig. I illustrate the two methods.

(Fig. 1—Flowsheets Showing the Methods of Coconut Flour Manufacture)



Increasing Coconut Income

The manufacture of coconut flour is one way by which the income from coconuts can be increased. Whereas, the meat residue from the copra method of oil manufacture has been sold as fertilizer and cattle feed, the coconut flour from either of the two methods mentioned above will be sold as human food, thereby commanding a better price. Furthermore, unlike the ordinary copra cake, we need not seek a foreign market to dispose of the coconut flour, as it will replace wheat flour in its uses. We cannot overlook the fact that in the near future we will have to find ways to replace our dwindling stock of imported materials. When that time comes, the coconut flour will be of great help in relieving the difficult situation caused by the shortage of foreign flour.



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Creo que si fabricásemos vasitos con ese derivado del coco, para ser vendidos a precios populares en nuestro mercado, los muchos vasos de cristal que han roto mis niños podrían ser sustituidos con *lo nuestro*, que es más fuerte y duradero. Hasta el agua refrescante que da el *buco* que bebemos en la época de calor, bien presentada, conservada y preparada por un gran establecimiento de bebidas refrescantes como la Magnolia, encontraría una selecta parroquia, aparte de la gente del pueblo.

Esto ya va resultando un poco largo, amigos, y deseo dar punto final a este sermón sobre el evangelio del coco y sus accesorios, recordando de nuevo la frase humorística puesta por el novelista Sinclair

en boca de un fabricante de carne en conservas de Chicago, para subrayar la eficiencia de los métodos industriales: "Aquí no desperdiciamos ni el chillido de un cerdo que va al matadero."

Si pudieramos decir lo mismo con el tiempo en lo que se refiere a la industria cocalera, el Estado, convertido hoy en empresario por la Corporación Nacional del Coco, verá recompensados sus afanes, asegurando el porvenir de las novecientas mil familias que dependen de esa industria lucrativa.