New Ways of Utilizing Soy in Human Diets in Latin America[1]

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ABSTRACT

Two simple, practical processes for the preparation of diverse products from soybeans for use by needy groups in Mexico and Latin America are described.

[1]One of 13 papers presented in the symposium, "Soy Protein," at the AOCS Spring Meeting, Mexico City, April 1974.

INTRODUCTION

We cannot directly apply research made in Mexico to all Latin American countries. If it is true that most of the Latin American countries have similar problems, they cannot be solved in the same manner. The ways people cook and their traditional dishes are different. Therefore, if we want to help them, we need to know them better.

Much has been said on the benefits of soy in solving the world problems of malnutrition. It is recognized as a complement to diets, principally in the countries of the third world. Nevertheless, various problems have been encountered when introducing it. Two of the main ones are the natural rejection of new products and the difficulty of acquiring them.

The idea of solving the problem of malnutrition considering the factors of acceptance and availability is fine; however, much attention has been given to the first but not to the latter. At first this might sound wrong, but if we think of the people having the availability benefits of soybean technology, we arrive at the conclusion that we have not yet reached the people who really have malnutrition and who really need this benefit. This paper will discuss this latter topic.

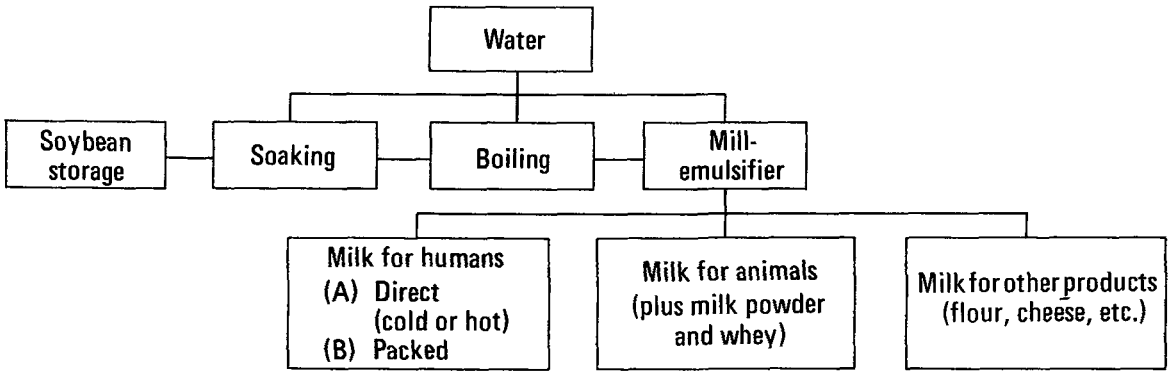

FIG. 1. Flow chart for first process.

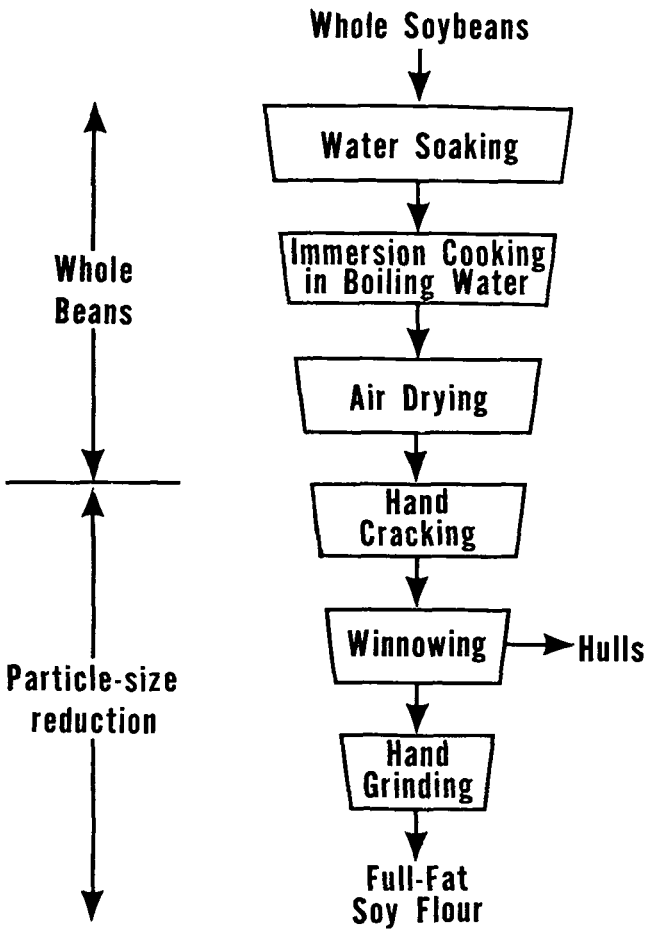

FIG. 2. Flow chart of a simple method for preparing a full-fat soybean flour.

CLASSIFYING GROUPS

We focused our research on the development of processes and products adequate to the needy groups in Mexico. To carry out this research, it was necessary to identify the people we wanted to help. Therefore, we started by classifying the different groups existing in Mexico as follows: high and middle classes and lower class which is composed of those living in the city and those living in rural areas. Those living in rural areas can be divided further into those with some facilities, such as roads, electricity, etc., and those not having these facilities.

Most of the soy products on the Mexican market are not available to the lower classes, even at their low cost. We might think of making them available through governmental programs, but this does not generally work. These programs focus on giving the products free of charge; they are not directed toward making people economically self-sufficient. Also, one asks, how much do these types of programs cost, and how long can they survive? I agree that we now have successful governmental programs based upon

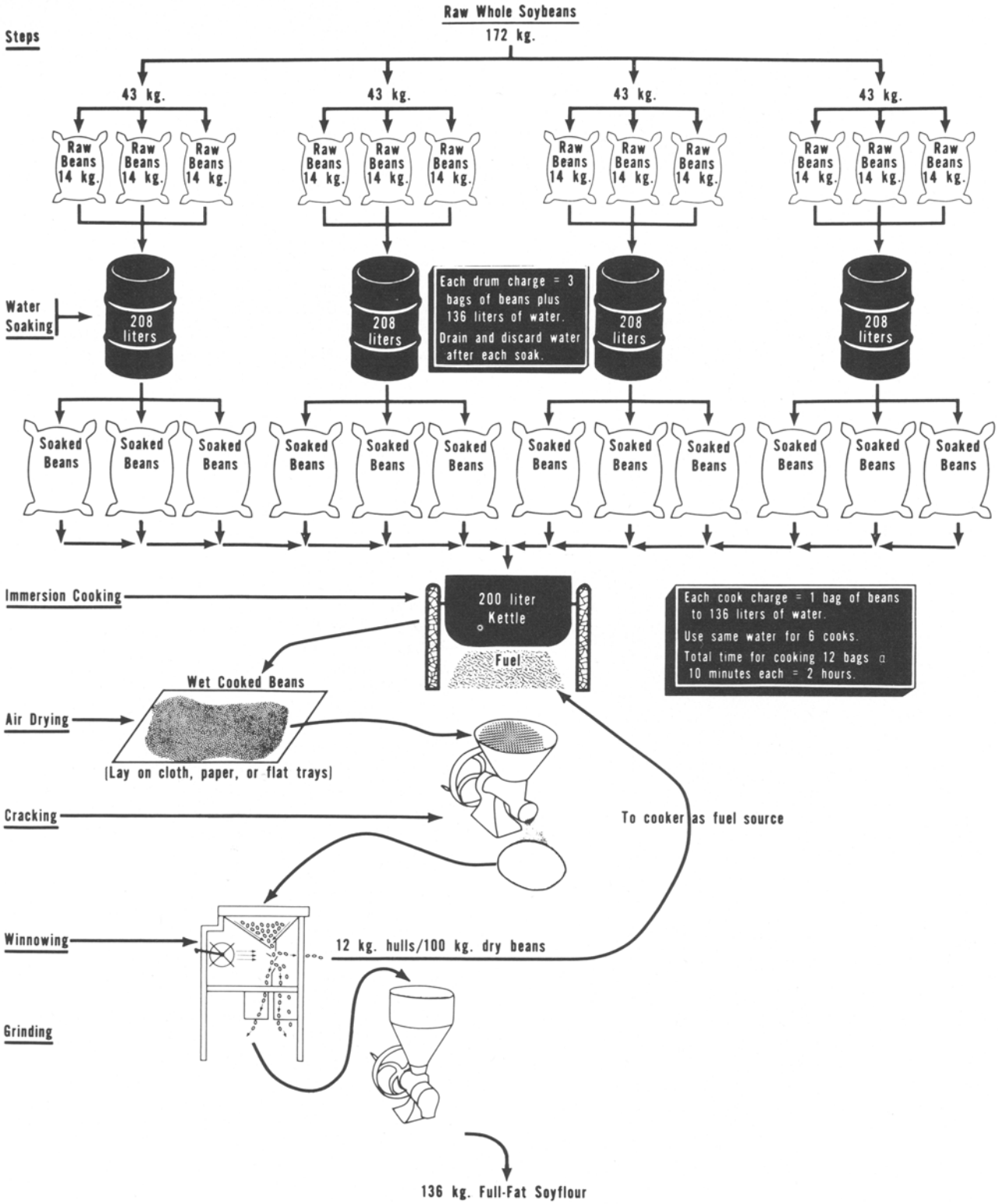

FIG. 3. Flow chart showing amounts for producing 136 kg (300 lb) of soybean flour/day.

free products, but they only reach special groups. Therefore, this research developed in the Chemistry Department of the National University of Mexico was based upon processes that can be economically self-sufficient and, of course, directed to solve the problems of the needy classes of Mexico.

FIRST PROCESS

The first process, based upon milk, is directed at helping the governmental feeding programs with a process starting from the raw material and obtaining total utilization. The equipment was developed by Manuel Rojo Castillo, general manager, Secado Artificial, S.A. A milk product with characteristics similar to that of milk, is obtained but with one-third of the cost of milk sold on the market today. This process also has the advantage of being a compact unit with a low construction cost and easy adaptability in institutions or centers in the city or provinces. We thought that the equipment installed in the provinces could be used to produce milk not just for humans but also for calves which usually are killed in Mexico because of the high cost of maintenance. This should help the meat problem we now have in this country.

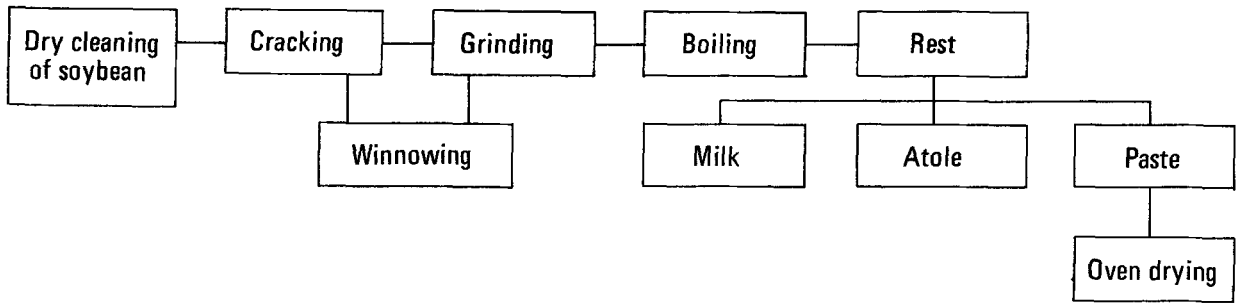

FIG. 4. Flow chart of modified USDA process.

TABLE I

Yield and Protein Analysis of Basic Products[a]

Product	Yield	Protein (%)
Milk	6 – 7 liter	4
"Atole'	2 – 3 liter	8
Paste	2 – 3 kg	18

[a]From 1 kg soybean, adding ca. 9 liters water in the boiling process.

The process diagram is shown in Figure 1. This is one of the processes we know to produce milk from soybean. Here again what is important for us are the advantages mentioned before related to the type of equipment used.

SECOND PROCESS

The second process was based upon the one developed at the USDA laboratory in Peoria, Ill. The process and equipment were geared to village use. The process was introduced in Mexico by the United Nations Children Fund, but it did not work as expected. The failure was mainly due to the fact that the process was directed to obtain flour, and the drying system recommended was not good for general Mexican conditions. The idea and principles were excellent in helping needy people, however, and we wanted it to be used in our country. Figures 2 and 3 show the process developed by the USDA. Figure 4 shows our modified process.

To modify the original process we considered the following: (A) knowledge of the traditional regional diets; (B) knowledge of the original tools used for cooking; (C) knowledge of the regional natural resources; and (D) development of the processes to incorporate soybean or other products of high nutritional value, i.e. regional products, based upon the three factors mentioned above (Figure 4 shows just the process to incorporate soybean into the diet).

It is important to mention that, if we want to help the needy people through economically self-sufficient programs, we need to consider the education of the people in growing soybean. Otherwise, the raw material always must be supplied. The basic equipment used in the USDA process is: (A) cracker, (B) winnower, and (C) grinder. The process was developed to be used manually or electrically.

By controlling the time to the shortest possible period between the cracking or grinding processes and the boiling process, we can decrease the beany flavor characteristic of soybean to a minimum. To make a beverage even more acceptable to the people, the milk can be boiled with natural aromatic products, such as cinnamon, vanilla, cacao, etc.

The heavy liquid can be used as "atole" or a soup containing vegetables, such as potatoes, carrots, onions, etc., indigenous to the region.

The paste can be used as human or animal food. Humans can eat it as cereal combined with the fruits of the region. It also can be dried in the traditional ovens to make cookies or ground again to make a powder to be combined with corn or wheat. In this way, it can be preserved a long time.

Also, the people can use the milk to make cheese. Here again we needed to think of a primitive process for producing the curd through acidity or heat. This can be accomplished by using the citrus fruits of the region. To preserve the cheese longer, we can add salt, making an aged cheese similar to the one widely used in Mexico called "cotija." This type of cheese can last for three or more months without decomposition.

The yield and protein analysis of the basic products from 1 kg soybean, adding ca. 9 liters water in the boiling process, is shown in Table I.

We have mentioned some of the products we have made, but hundreds more can be produced. It can be done by knowing what the people need and what they have. We are working on the development of processes to have the right products to increase the nutritional value of the diets in the different regions of Mexico.

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