

Guatemala's health snacks for children

Dr Mario Molina

In Central America, as in many other parts of the world, there is considerable protein-calorie malnutrition as well as deficiencies in what are known as micro-nutrients, particularly iron and vitamin A.

These problems are more evident in rural areas and a high correlation exists between poverty and degree of malnutrition. It is widely accepted by workers in this field that the more pressing and difficult problems to solve are those related to calorie deficiency. If the diet has insufficient calories, valuable protein will be burned to provide energy rather than used for body tissue building. This has particularly serious implications for susceptible groups such as children.

Agriculturally it has been found that nutritionally desirable crops such as soya can be grown in many rural communities in Central America. However these crops do not form part of the traditional local diet of poor people and so their cultivation is not a common practice. The Institute of Nutrition for Central America and Panama (INCAP) decided to develop an appropriate village level technology that would use nutritionally desirable crops, such as soya and velvet beans, to make a safe, nutritional high calorie food that could be fed to children over six months old.

The right mix

It is well known that the proteins of cereals and legumes complement each other so that the nutritional value of the mixture is greater than either ingredient. Indeed many traditional diets such as rice and lentils, or maize and beans are based on this principle.

It was decided to explore the possibility of developing a cookie based on a cereal and legume mixture. The fact that the Central American rural population consumes a cookie-like

Soya Foods IN DEPTH

maize bread called tortilla, was felt would improve the likelihood of the new product's acceptability. In addition most villages have the technology already in place for making tortillas which could be used in the production process: wet-mills for grinding maize and wood heated ovens for baking.

After several trials, the process summarised in Figure 1 was adopted. The process worked well using either common maize, opaque-2 maize or sweet sorghum as the cereal, and either soya beans, velvet beans, chick peas, or cowpeas as the legumes. The use of soya beans was preferred, used at a ratio of 7 kg whole maize to 3 kg of soya bean. All raw material should be free from infestation and rancidity. The process used to prepare the whole soya bean and maize dough is based on that widely used in rural areas of Central America to prepare the maize dough for tortilla manufac-

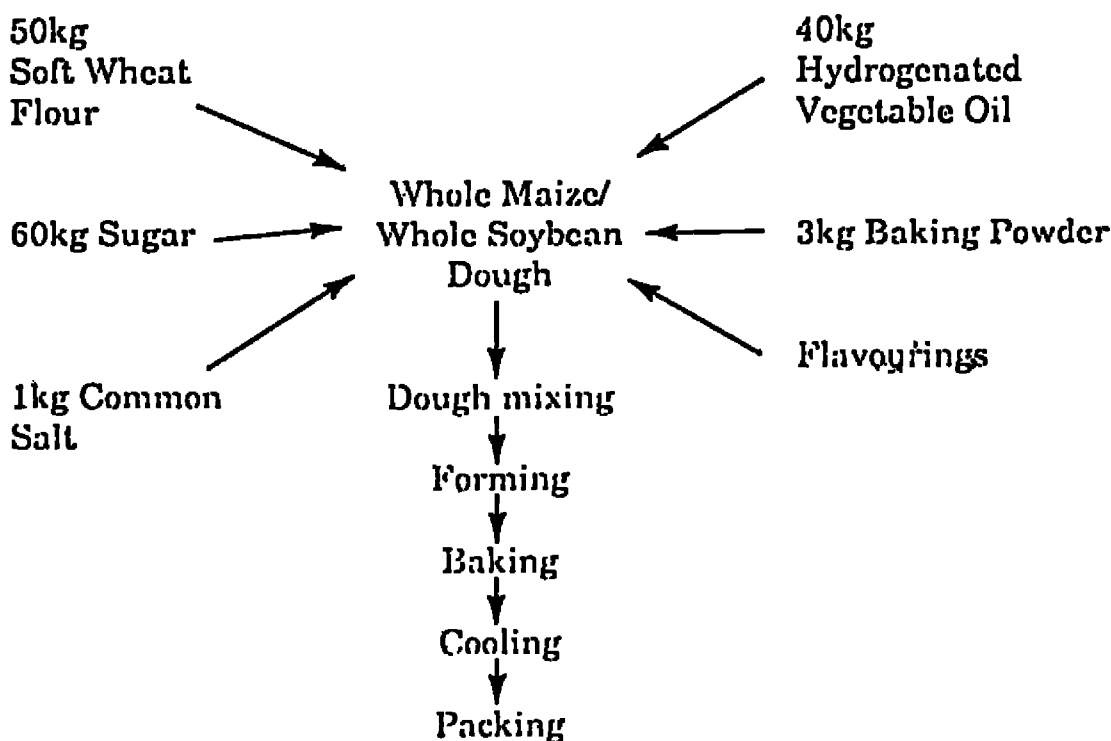
calcium hydroxide) is added to help the peeling operation. The cooking time was established to assure an easy peeling of the soya beans as well as the necessary gelatinisation of the maize starch to provide a good dough for baking.

The maize-soya bean dough, which contains about 50% water, is obtained by wet-milling the cooked, whole, peeled grains in the common disc mills which are to be found in almost every village where tortillas are eaten. This dough can be used to prepare a highly nutritious maize-soya gruel (atole), which can be fed to babies, or for the production of nutritionally improved cookies.

When making cookies, the dough is mixed with about half its weight of soft wheat flour to give a final mixture containing some 15% of soya beans. After mixing in the wheat flour, sugar, salt, and baking powder, the flavouring is added. Finally the hydrogenated vegetable oil is incorporated as a last ingredient. All mixing in the rural bakeries is done by hand.

After the dough is ready, it is spread on the moulding tables, which are constructed locally. These are designed 1 cm deep so that after the dough is evenly spread by hand with the wooden roll an even 1 cm dough sheet is obtained. The dough can then be cut on the moulding tables either using circular or square metal cutters. These cutters are also made locally: the recommended sizes being 6.1cm if round and 5.4 cm if square. With these

Figure 1 Processing of health snacks



dimensions the final cookie weight of 28g (approx 1 oz) is assured.

The moulded cookies are then placed on greased metal trays and baked in a wood-fired oven at approximately 175° C (350°F) for about 10 minutes to obtain the final creamy coloured cookies. The bakers ensure that the cookie is the correct colour by comparing the product with a photo provided by INCAP. The colour is considered important to limit browning and therefore prevent loss of the essential amino acid lysine, in the final product.

The chemical/nutritional characteristics of the cookie product are shown in Table 1, and reveal an improvement in protein content and quality as well as calorific density. The cost of each cookie is two US cents.

The nutritionally improved cookie has now been accepted as part of

the Guatemalan Government's school snack programme and approximately 1.3 million Guatemalan school children receive one cookie per day. Several contracts and sub-contracts have been given to rural bakeries both to assure national coverage as well as lowering distribution costs. The technology required by the process means that this product can be

Table 1 Typical Chemical and Nutritional Characteristics of the Cookie.

<u>Component</u>	<u>Average Content %</u>
Water	8.05
Protein (N x 6.25)	7.19
Fat	20.11
Ash	1.72
Crude fibre	0.75
Nitrogen free extract	62.18

manufactured locally in remote areas. The governments of other Central American countries are showing considerable interest in introducing the cookie into their own school feeding programmes. INCAP is now examining the possibility of fortifying the cookie with vitamins and minerals.

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From BOOKSHELF

dominate the market accounting for over 95% of sales. Sales of specialist vegetarian food products such as ready meals, Quorn products, burgers and grills, and soya products amounted to an estimated £308 million in 1992 representing less than 5% of the total vegetarian food market. One of the most important trends in the vegetarian food indus-

try in recent years has been the increasing involvement of the major mainstream food manufacturers in the supply of vegetarian foods, often at the expense of the specialist suppliers. The Report reviews market trends and shares, production and trade, packaging, retailing and advertising, as well as new product activity and manufacturer activities.

IN MEMORIAM ALEXANDER T BONKOWSKI

We are sad to inform readers of the recent death of Alexander T Bonkowski who worked for ADM in the United States for many years. Originally a Polish butcher and sausage manufacturer,

Al Bonkowski, was a long term member of the ADM Protein Specialities Division. Based at the Lakeview Technical Centre in Decatur, Al became very well known and respected around the world by the meat industry as he gave 'hands-on' technical assistance to meat manufacturers. Using his vast practical experience, this technical assistance helped many companies overcome the problems they faced.

He was often invited to speak at seminars and conferences at which he proved himself to be always up-to-date with current theories in meat science, and able to relate these theories to practical applications.

During extended periods of working in Japan, Al also developed an understanding for the seafood industry and so was able to advise surimi product manufacturers on the most effective ways to incorporate isolated soy proteins in their products.

In recent years illness prevented Al from keeping up his exhausting travel schedule but, supported by his Lakeview colleagues, he continued working with the Research Group until his death.

Respected by both his customers and competitors,
Al will be sadly missed.

● VEGETABLE DISHES: 2ND SUPPLEMENT TO McCANCE AND WIDDOWSON'S THE COMPOSITION OF FOODS

B Holland, A A Welch, D H Buss (Eds) Royal Society of Chemistry (1992) Soft cover vii +242 pages (ISBN 0 85186 396 5) price £24.50. Available from Turpin Distribution Services Ltd, Blackhorse Road, Letchworth, Herts SG6 1HN (tel: +44/462 672555, fax: +44/462 480947)

Vegetable Dishes is a unique publication being the only comprehensive source of compositional data on this food group available in the UK. It contains over 340 vegetable-based dishes and provides information on 53 nutrients per food.

The extensive selection of foods covers popular vegetable dishes, vegetarian and vegan foods such as pulse and nut-based dishes, manufactured ready meals and dishes consumed by ethnic populations in the UK.

Recipes have been collected from a wide variety of sources for dishes as consumed in the home. Supplementary sections give recipe ingredients and cooking methods, alternative dish names and an alphabetical index of ingredients.