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THE DESIGN OF NUTRITIONAL FOOD PRODUCTS

FOR A DEVELOPING COUNTRY

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ABSTRACT

A systematic methodology was developed for designing food products for the Philippines.

This was the initial stage of an investigation at Massey University into the application of quantitative product development techniques to the food industry in developing countries. A study of economic, nutritional and food industry conditions indicated that Taiwan, Korea and the Philippines best satisfied the conditions necessary for the use of product development in the food industry. The Philippines was chosen for this first investigation and the quantitative study was on the selection of raw materials in formulation according to their nutritional properties.

The selection of raw materials in the product development was made quantitative by use of linear programming. A linear programming model was developed to select, from a list of one hundred and seventy raw materials indigenous to the Philippines, a raw material mixture capable of satisfying twenty-six nutrient requirements as well as several interrelationships between nutrients, at a minimum cost. In the development of this model, investigations were made on the effects of altering nutritional requirements, raw material costs and compositional data and also the variety of raw materials. The linear programming model was found particularly useful for investigating the effects of changes in the nutritional requirements and in raw material costs, but rather unpredictable for changes in raw materials. The precision of the model was much greater than could be expected of the nutritional composition data.

The mixture of raw materials selected to meet the Philippine nutritional requirements was developed, using the product development system, to an acceptable canned meat-loaf-type product. This product

was selected, from a number of systematically generated product ideas, by a critical evaluation method, based on information on processed food eating patterns, food processing facilities and processed food distribution systems, obtained during a visit to the Philippines in 1973. This product was designed to be manufactured in large meat processing plants in the Philippines and distributed to the small stores throughout the country.

The linear programming model was also used to guide the design of a food product enriched with chemical nutrients and capable of rapid introduction to Philippine diets to supplement the basic rice meal. The linear programming technique provided quantitative data for evaluation of the feasibility of enrichment with various types of food materials and chemical nutrients, for the cost of various levels of enrichment and for design of product formulations, allowing for nutrient losses during processing. A coconut bun with nutrient enriched filling was developed. This product could be manufactured in the many bakeries scattered throughout the Philippines.

Chemical analysis of the two products showed reasonable agreement with calculated nutrient levels, but generally nutrient levels were below calculated levels, implying that some scaling up of nutrient requirements may be necessary for this model. The real value of the systematic methodology cannot be finally assessed until an attempt is made to implement the industrial production in the Philippines and introduce the products into the diets.

This first stage of the development of the raw material selection model has provided a basis for further work on inclusion of the other properties of the raw materials such as eating quality, so that a comprehensive model for the quantitative design of foods can be finally achieved.

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