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I N C A P A R I N A
THE LOW COST PROTEIN-RICH FOOD PRODUCT

by

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INTRODUCTION

Several factors in Latin America, and elsewhere, are responsible for the relatively poor nutritional status of the population. Among the more obvious manifestations of this problem, is the prevalence of serious protein malnutrition, especially among young children. The effects in terms of mortality, morbidity and impaired physical development in children, have, of course, been well documented. Retardation in mental development also seems evident, and scientific data which will serve to clarify this are being accumulated by INCAP and other institutions.

Unfortunately, animal sources of protein are scarce throughout the developing areas of the world. In addition, the extremely low purchasing power of the people prevents the traditional sources of protein from reaching those who need it most. Currently high birth rates tend to aggravate the situation further, for even in those regions where proteins of animal origin are available, the population growth is out-distancing supplies and will probably do so for some time to come. It was the recognition of this series of factors that led INCAP to the conclusion that a low cost protein-rich food could meet a vital social and economic need in the world of today. After ten years of intensive laboratory research and five years of commercial development in several Latin American countries, it now seems evident that the INCAP-developed protein-rich, low cost food, INCAPARINA, can help to alleviate this need. It is hoped that this article will be of interest to those who have been following the development of Incaparina, as well as to those whose interest in the product may be more recent.

THE PRODUCT

Incaparina is the name given by INCAP to vegetable mixture containing 25% or more, of proteins, comparable in quality to those of animal origin, and which have been proved suitable for the feeding of young children. Several formulae, utilizing vegetable protein concentrates derived from cottonseed or soybeans, have been developed and are now in commercial production in several countries. Table 1 shows the basic Incaparina formulae currently in commercial application.

TABLE 1BASIC FORMULAE AND ALTERNATIVE MODIFICATIONS
IN GRAIN CONTENT USED IN THE PREPARATION OF
INCAPARINA

f o r m u l a e			
Ingredients g/100 g.	No. 9A	No. 14	No. 15
Ground cooked whole corn *	58	58	58
Cottonseed flour	38		19
Soybean flour		38	19
Torula Yeast	3	3	3
CaCO ₃	1	1	1
Vitamin-A, I.U.	4500	4500	4500
* Note: Amount of rice, corn or sorghum, or other suitable cereal grains (cooked or uncooked), may be varied and used separately or together in such a way as to account for 58 g. per 100 g. of the total product.			

The resulting enriched flour, marketed under the name Incaparina, is utilized in the home in accordance with the cultural pattern of the consumers. Though Incaparina may be readily incorporated in such foods as soups, puddings, cookies, etc., its principal use in Latin America has been as a popular drink commonly called "atole" or "colada". In this latter form, Incaparina is prepared by cooking it with water and flavoring, and it may be served either warm or chilled. As a drink, it has been found to be in accordance with the established dietary habits in many Latin American areas and highly acceptable to both children and adults. Formula modifications are possible which give promise for the adaptation of the product to the dietary patterns of other areas of the world where such a protein supplement is needed.

The fullest possible utilization of locally available ingredients is one of the primary principles on which Incaparina is based. The cereal grains, which constitute more than 50% of the product's volume, are those which can be grown economically in almost all developing countries. The protein concentrate portion is also derived from sources such as cottonseed, which is being produced on an expanding scale in most of the areas of the world where protein deficiency is a serious public health problem. Usually

the only ingredients that may have to be imported are the torula yeast, which provides the vitamin-B complex and some protein, and the synthetic vitamin-A. These items add relatively little to the ingredient cost.

THE PRICE

Incaparina has also been able to meet the requirement of low price to the customer, essential if a product of this type is to reach those who need it most. In spite of its higher nutritive value, Incaparina has been competitively priced with most staple foods of general consumption. The price may, of course, vary with different conditions in each market but, in general, it is sold at about five or six times less than milk. In Colombia, for example, it is being sold at retail for 1.75 (Colombian Pesos) per 500 gram package. At the current rate of exchange, this is the equivalent of about U.S.\$0.10 per pound. This 500 gram package is sufficient to prepare 20 glasses of a drink having a nutritive value similar to that of an equal amount of milk. Figure 1 illustrates the pricing objectives of Incaparina, in comparison with other food products, commonly used for the feeding of children during the weaning and post-weaning period.

FIGURE 1

HOW MUCH DOES ONE POUND COST? (IN U.S. \$)

	\$0.10	\$0.20	\$0.30	\$0.40	\$0.50	\$0.60	\$0.70	\$0.80	\$0.90	\$1.00
FARINA		\$0.28								
CORN STARCH	\$0.16									
PLANTAIN FLOUR		\$0.27								
POWDERED MILK*					\$0.64					
INCAPARINA	\$0.10									

Note: Colombia prices november, 1965

The laboratory trials of Incaparina conducted by INCAP, including biological evaluation with animals and extensive clinical testing, have proved that the protein content and quality of the mixture approach those of milk. Feeding the mixture to children under controlled conditions has demonstrated conclusively that the mixture can provide sufficient proteins to maintain adequate nutrition. Although Incaparina has been used to cure serious cases of protein malnutrition, it was developed primarily for preventive purposes. The product is not a medicine; it is a food.

The following data (Table 2) compare the nutrient content of one glass of Incaparina with that of other common foods.

COMPARISON OF THE NUTRITIVE VALUE OF ONE GLASS OF INCAPARINA WITH OTHER COMMON FOODS

	Atole of * corn masa <u>1 glass</u>	Atole of INCAPARINA* <u>1 glass</u>	Milk <u>1 glass</u>	Meat <u>1 oz.</u>	Egg <u>1 unit</u>	Fresh cheese (whole milk) <u>1 oz.</u>	Fresh cheese (skim milk) <u>1 oz.</u>
Calories	86	138	141	36	80	79	33
Protein, g.	1.0	6.9	6.9	6.4	5.6	5.2	5.3
Fat, g.	0.4	1.0	7.6	0.7	5.5	6.0	0.5
Carbohydrates,	20.2	25.3	11.3	0.6	0.5	1.0	1.6
Calcium, mg. ^{g.}	22	164	374	6	26	235	205
Phosphorus,mg.	22	174	168	52	95	112	100
Iron, mg.	0.0	2.1	1.0	1.7	1.5	0.4	0.5
Vitamin-A,I.U.	0	1,125	363	0	90	257	43
Thiamine, mg.	0.02	0.58	0.08	0.02	0.05	0.01	0.02
Riboflavin,mg.	0.00	0.28	0.50	0.07	0.20	0.13	0.16
Niacin, mg.	0.19	1.25	0.10	0.79	0.04	0.04	0.06

NOTES: Values taken from the Food Composition Table for Central America and Panama, Fourth Edition (INCAP Publication E-246).

* One glass of atole is prepared by dissolving either 25 g. of Incaparina or corn masa in one glass of water, boiling the mixture for 10 to 15 minutes and sweetening it with 12 g. of sugar.

Prior to offering Incaparina to possible producers, INCAP tested the product in Guatemala on a commercial basis in 1959. The success of this small test led to more extensive experimental commercial sales in over 40 rural communities and the Capital City of Guatemala during the following year. The results of this seven-month trial indicated that a product of this type had considerable commercial potential. Since then Incaparina has undergone wide and well-controlled consumer acceptability and market testing in Colombia and Mexico with equally successful results. Similar tests are now under way in the other four Central American countries, in Panama and in Venezuela prior to its commercial introduction. INCAP considers that this type of consumer acceptability and market research are essential steps in the introduction of Incaparina in any country.

GOVERNMENT AND MEDICAL PROFESSION SUPPORT

Before granting of authorizations to producers, the appropriate government's assurance of its interest in having the product commercially distributed, is secured. Experience to-date has indicated that the commercial distribution of the product, under the terms of INCAP's policies, is meeting with increased support from governments and international agencies, as well as the medical profession. Support of this type, as well as the support of many other groups, is also contributing significantly to the success of Incaparina.

FOOD INDUSTRY PARTICIPATION

The participation of interested and qualified food industry companies operating in the developing countries, provide the most effective way to make the fruits of INCAP's research available to the greatest number of people through normal commercial production and distribution. The basis of this cooperation between industry and INCAP, rests on the granting of formal authorizations to experienced companies who are qualified and willing to carry out suitable projects in markets where such a product can be commercially successful and will meet a real need. In exchange for authorizing the use of the trade mark registered name INCAPARINA and the INCAP-patented formulae, the Institute requires the cooperating producer to submit his product to a system of quality control, and reserves the right to review the advertising and promotional material used in order to assure ethical treatment. In addition, both parties also agree to a suitable price structure which will make Incaparina available to the broad-based market for which it is intended. The price, as well as all other factors involved in the economics of the project, must be such as to assure the producer a reasonable rate of return on this investment when volume distribution is achieved.

CURRENTLY AUTHORIZED INCAPARINA PRODUCERS

<u>GUATEMALA</u>	CERVECERIA CENTRO-AMERICANA, S.A. 3a. Avenida Norte, Final Finca El Zapote Ciudad de Guatemala - Guatemala
<u>BRAZIL</u>	PRODUCTOS ALIMENTICIOS QUAKER, S.A. Avenida Senador Queiroz, 605 llo. Andar - Conjunto 1112 Sao Paulo - Brazil
<u>COSTA RICA</u>) <u>EL SALVADOR</u>)..... <u>HONDURAS</u>) <u>NICARAGUA</u>)	QUAKER DE CENTROAMERICA 2a Avenida SO No.202-D Managua Nicaragua
<u>PANAMA</u>	CENTRO AGRICOLA, S.A. Apartado No. 10 David, Panamá
<u>COLOMBIA</u>) <u>PERU</u>).....	QUAKER OATS COMPANY Productos Quaker, S.A. Apartado Aéreo 2074 Cali, Colombia
<u>VENEZUELA</u>	PRODUCTOS QUAKER, C.A. Apartado 446 Valencia, Venezuela

PRESENT COMMERCIAL DEVELOPMENT

Incaparina was first introduced commercially by a local company in Guatemala in early 1961, following the product development work which INCAP carried out during the preceding two years. Since then, Incaparina has become well established in Guatemala where current sales are exceeding 55 metric tons per month, and are continuing to increase. This satisfactory volume has permitted the producer to reduce the price of his one-pound package from U.S.\$0.24 to U.S.\$0.20, a measure which became effective in November 1965. It is expected that this reduction in price to the consumer will further stimulate the consumption of Incaparina among those who need this type of supplement.

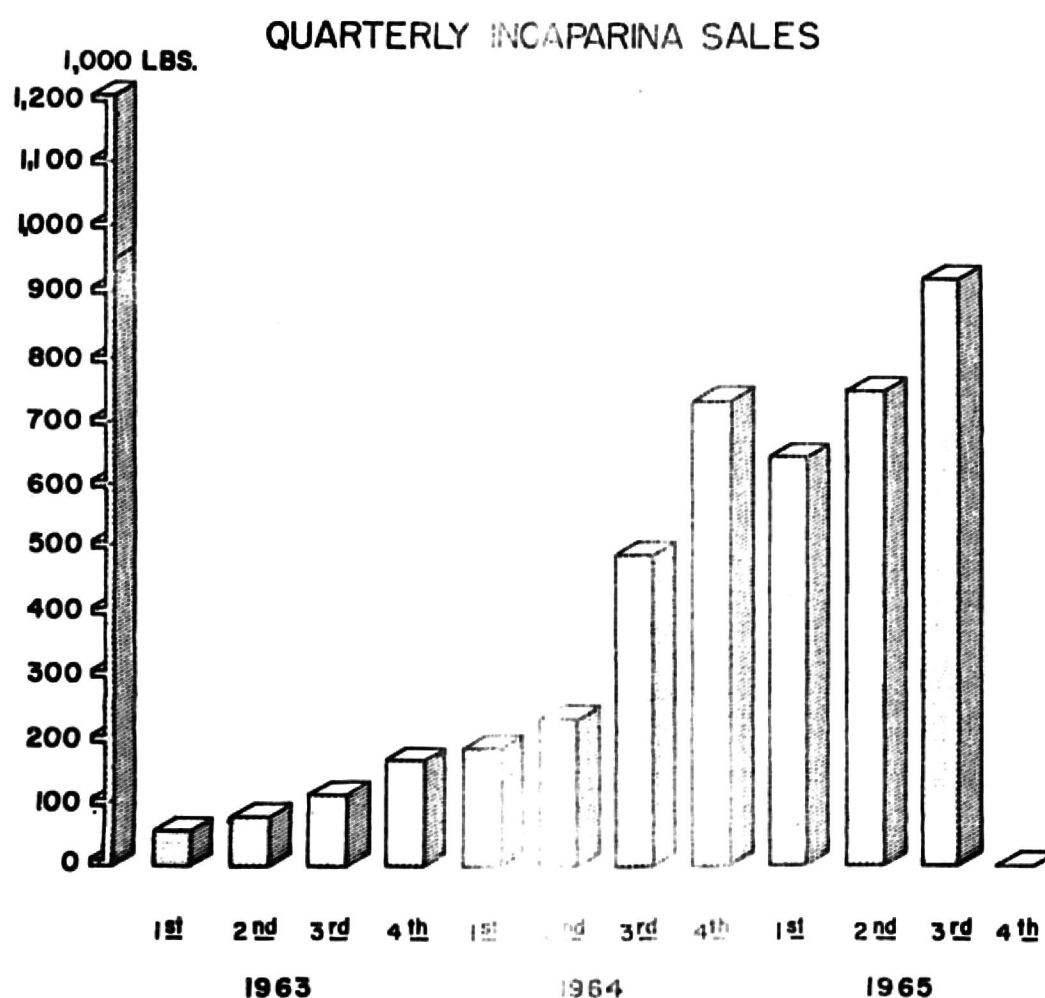
Consumers' surveys, made by both INCAP and the Guatemalan producer during 1965, have confirmed that the product is now well-known as a food of high nutritive value and low cost. Knowledge of the product exceeded 90% among the persons interviewed in the two surveys. Findings also revealed that about 50% of the persons interviewed were currently using Incaparina in their homes. This degree of knowledge of the product and market penetration compares favourably with other packaged foods which have been marketed in Guatemala for many years.

In Colombia, Incaparina was also subjected to a series of acceptability and consumer research studies during 1962. These were followed by a successful market test in the City of Cali, which culminated in the initiation of national distribution of the product in late 1964. The Colombian National Institute of Nutrition, the Ministry of Health of that country, and UNICEF, have collaborated closely with the producer in the active promotion of Incaparina, and sales through regular commercial channels are continuing to increase.

Market testing got under way in both Panama and Venezuela in June 1965. Depending on the outcome of these tests, full-scale commercial distribution is being planned for 1966 in these two countries.

Figure 2 contains a graphic presentation of the increase in sales of Incaparina from 1963 through the third quarter of 1965.

FIGURE 2



PRODUCT DEVELOPMENT NOW UNDER WAY

Experience with Incaparina to-date has indicated that the necessary volume to assure efficient production, distribution and the low price essential for a product of this type, can only be achieved in markets having a total population of around 4 or 5 million. For this reason, it was found necessary to handle the four smaller Central American countries, Costa Rica, El Salvador, Honduras and Nicaragua, under a regional programme. The INCAP authorization for this project was granted to a qualified producer in May 1965. This commercial firm now has consumer acceptability studies under way in each of the four countries in order to provide the basic data needed to plan the market testing required for the eventual commercial distribution throughout the area. It is expected that the data resulting from the acceptability studies will be available soon so that market testing can get started during 1966.

The Brazilian producer has also completed acceptability and consumer studies and is now preparing to undertake market testing in that country. Some preliminary product development work has been done in Peru, and the potential markets in other Latin American countries are under study by various interested food industry companies. Assuming that Incaparina can secure the consumer acceptability it has already achieved in Guatemala and seems to be obtaining in Colombia, it is estimated that sales in Latin America could eventually exceed 30,000 metric tons per year. At the current average price to wholesalers, this could represent a potential gross return to producers of about 10 million U.S. dollars per year.

Considerable interest has been expressed in the product for possible commercial application in other parts of the world. It is anticipated that this interest will increase now that the commercial success of Incaparina seems to be reasonably assured in those countries where it has been introduced. Further information on Incaparina and its commercial development can be obtained by writing to INCAP, Apartado Postal 1188, Guatemala, Guatemala, C.A.

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