the case of foods sold at a given volume, aeration will, of course, reduce the wt of ingredients used and, thus, lead to a reduction in ingredients costs.

The effects realized through aeration depend upon the degree of aeration chosen, that is on the amount of air incorporated. In a number of cases, even fairly small volumes of air can bring about considerable improvements in texture and consistency.

USES OF AERATION

The scope of aeration through protein based whipping agents is wide. Typical applications include such fields as sugar confectionery, nougat, fondant cream, marshmallow; biscuits and cookies; snacks, including aero fat types; desserts, chilled, frozen, canned, instant; foam headings in soft drinks; special ice cream products and frozen items; salads; vegetable creams; etc.

Study of Nutritive and Biological Value of Textured Soy Proteins in Adults, Children, and Rats

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INTRODUCTION

We here summarize the various studies which were carried out in our laboratory on extruded textured soy protein. We studied: (A.) the acceptance by adults, (B.) the acceptance by children, (C.) the comparison of the nitrogen balance of adults who first ate a diet of normal foods and then ate a diet in which meat protein was replaced by textured soy proteins, and (D.) the comparison of the efficacy of soy protein diets with casein diets for the growth of rats previously fed a protein free diet for 14 or 42 days.

STUDY OF ACCEPTABILITY OF TEXTURED SOY PROTEINS BY ADULTS FOR A 3 WEEK PERIOD

Protocol

Ten volunteer adults participated for 3 weeks. Each subject ate a daily lunch of 40 g dried soy protein instead of meat protein. Three kinds of dried soy protein were used in the dishes: ham flavor, beef flavor, and no flavor. The adults ate normal food at dinner. The weekly menu was repeated three times.

Results

The acceptance and digestive tolerances were quite satisfactory. These satisfactory results were probably due to the good quality of soy protein. However, the preparation and treatment of the recipes and the art of cooking also played important roles.

COMPARISON OF THE ACCEPTABILITY OF A FIXED DIET AND AN AD LIBITUM DIET BY CHILDREN

Protocol

Subjects: Two groups of children in good health participated. For several months, all children lived in an

TABLE I

Acceptance of Soy Protein by Children
Soy Protein Offered and Consumed[a]

Group I infants[b]	Week of fixed diet		Week of ad libitum feeding	
	Offered	Consumed	Offered	Consumed
Average of 11 subjects	10	9.7	9.5	8.2
t	1.02	1.28	0.08	2.58

[a]Soy protein (in g) offered and consumed.
[b]Average age: 33 months.

TABLE II

Acceptance of Soy Protein by Children
Soy Protein Offered and Consumed[a]

Group II infants[b]	Fixed diet		Ad libitum feeding	
	Offered	Consumed	Offered	Consumed
Average of 12 subjects	7.5	7.1	8.3	8.3
t	0.99	1.52	1.41	1.95

[a]Soy protein (in g) offered and consumed.
[b]Average age: 48 months.

TABLE III

Nitrogen Balance Studies on Adults[a,b]
Comparison of Digestibility, Net Protein Utilization, and Biological Value of Meat with Textured Soy Protein

Subjects	Meat			TVP		
	CDU	NPU	BV	CDU	NPU	BV
Average value on 10 subjects	89.5	39.3	43.6	87.7	30.9	35.7
t[c]	2.42	14.8	17.1	4.88	13.6	15.6

[a]Comparison of digestibility, net protein utilization, and biological value of meat with textured soy protein.
[b]NPU = net protein utilization, TVP = textured vegetable protein, and BV = biological value.
[c]No significant differences were found according to student's *t* test.

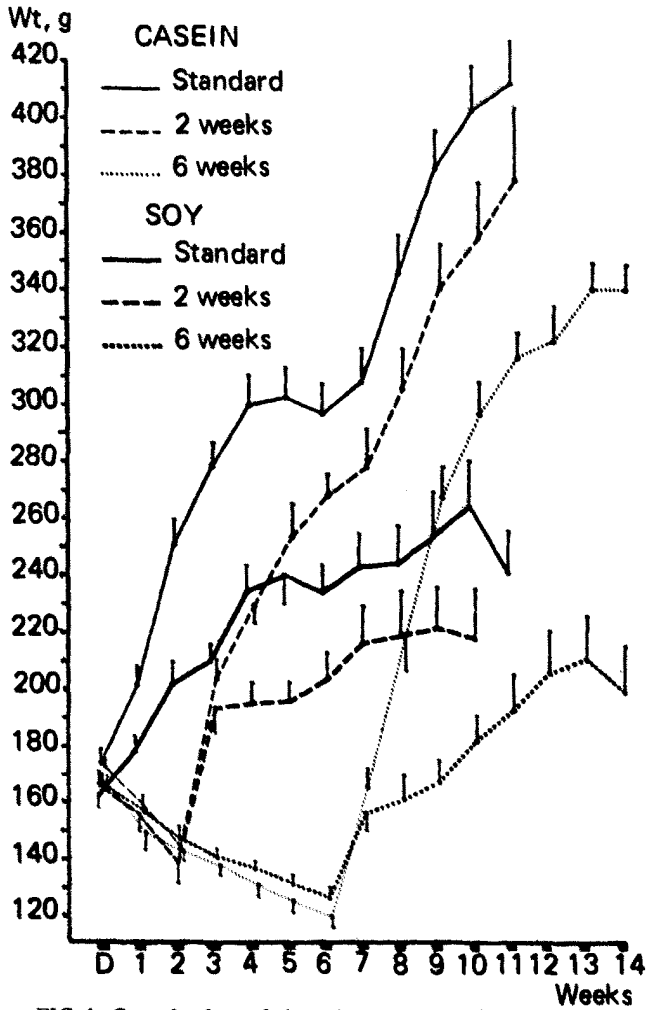

FIG. 1. Growth of rats fed casein or soy protein diets with and without previous protein free diets for 14 or 42 days.

institution. First group, 11 children, average age, 33 months; second group, 12 children, average age, 48 months.

Textured soy protein: We used soy proteins with ham flavor, with beef flavor, and with no flavor. The children's daily diets contained 18 g dried textured soy protein (20% total daily protein).

Diets: Four kinds of diets were used successively: fixed normal diet without soy proteins for 1 week, fixed diet containing soy proteins for 1 week, ad libitum diet without soy proteins for 1 week, and ad libitum diet containing soy proteins for 1 week.

Results

The results of the first and second groups are given successively in Tables I and II. It is obvious that there were no significant differences between food intakes during the weeks of fixed diets and those of the ad libitum diets with or without soy protein. Results of the two groups of children were also close.

COMPARATIVE NITROGEN BALANCE OF ADULTS FED BOTH A NORMAL DIET AND A DIET CONTAINING SOY PROTEIN FOR ONE WEEK EACH

Protocol

Subjects: Ten normal subjects from 43-79 years of age participated.

Diet: In the first week, the subjects received a normal diet. In the second week, meat protein was replaced by an equal amount of textured soy protein. The average composition of the diets was: animal protein, 29%; vegetable protein, 37%; and soy protein, 23%.

Results

Results of the nitrogen balance tests are given in Table III. There was no significant difference of CDU, net protein utilization (NPU), and biological value (BV) between the two kinds of diets.

COMPARISON BETWEEN THE EFFICACY OF CASEIN AND THE EFFICACY OF TEXTURED PROTEIN ON THE NUTRITIONAL RECUPERATION OF RATS FED A PROTEIN FREE DIET FOR 14 OR 42 DAYS

Protocol

For this experiment, 120 rats, each weighing 170 g were used. They were divided into six groups of 20 rats each. The first group was fed a casein diet all the time; the second group was fed a protein free diet for 14 days and then a casein diet. The third group was fed a protein free diet during 42 days and then a casein diet, while the fourth group was fed a soy protein diet all the time. The fifth group was fed a protein free diet for 14 days and then a soy protein diet, and the sixth group was fed a protein free diet for 42 days and then a soy protein diet.

Results

Figure 1 shows the growth of each group of rats. In the groups previously fed a protein free diet, the rats fed the soy proteins grew less than those fed casein. It is possible that the rats fed textured soy protein had a lower protein intake than those fed casein. It is difficult to calculate the exact quantity of daily intake because there were certain losses of soy proteins during feeding.

In general our studies on adults and children showed that the acceptability and digestive tolerance of textured soy proteins were fairly good. There was no significant difference in the nitrogen balance of adults when meat protein was replaced by textured soy protein. As for the study on the growth of rats, we should consider that the lower wt gain on the soy diet was probably the result of a lower intake of soy protein than of casein.

Nutritional Experience with Infant Formulas Containing Soy

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INTRODUCTION

Many of the developing nations have little in the way of an organized dairy industry. Often production of cows' milk is limited and spotty, the microbiological quality is generally poor, and satisfactory facilities for collecting, processing, and bottling milk may be virtually nonexistent. Under these conditions the need for infant and weaning foods at reasonable cost based on non-dairy ingredients is very great. The practice at weaning time often has been to offer the infant whatever food the grown-ups have available. As a result the infants fare poorly. Digestive disturbances and malnutrition are common and mortality is high.

Therefore it is not surprising that we in The League for International Food Education (LIFE) get many requests for technology for producing soy milk products ranging from