CULINARY PRACTICES AND CONSUMPTION CHARACTERISTICS OF COMMON BEANS AT THE RURAL HOME LEVEL[1]

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SUMMARY

A survey was carried out on housewives of rural bean-producing areas for the purpose of collecting information on bean selection procedures, culinary practices and bean consumption in rural homes from four departments of northeastern Guatemala. The study sample consisted of 10 families selected at random from each of 19 municipalities. The questionnaire used had been pretested in two rural communities not included in the study sample. As already shown by other INCAP surveys of this nature, it was found that all families consumed common black beans, and on rare occasions beans of different color or species.

With respect to cooking practices, it was found that beans are not usually soaked prior to cooking, and that few housewives add salt at the beginning of cooking. Two fractions are usually obtained, the cooked beans and the cooking broth. Another finding was that beans are consumed in four preparations: cooked whole, strained and fried, ground and fried, and cooked and fried. Bean broth is consumed by both adults and children, and a thick broth is preferred since it is considered to be more nutritious and better tasting. Children begin to consume bean broth as early as two months of age, and beans at 14 months. The average amount of broth ingested was 62 g, and whole cooked beans, 70 g. Mothers surveyed indicated that broth was administered to children because: it was nutritious (56o/o of the mothers); in order to teach children how to eat (15o/o); or because of its taste (9o/o).

Manuscrito original recibido: 8–9–87.

1 This work was carried out with funds from the International Development Research Centre (IDRC), Ottawa, Canada, and the Bean/Cowpea Collaborative Research Support Program (CRSP), Title XII (INCAP Grant-in-aid PN-370).

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INCAP Publication I-1524.

Regarding the hard-to-cook phenomenon, 32o/o of the housewives indicated that storage time was responsible for it, while 17o/o attributed this condition to bad seeds, and 18o/o to sun-drying or inadequate postharvest practices and to their preparation for consumption.

Although the survey confirmed the importance that common beans have in rural diets, the main finding was that the first bean food product fed to children is the bean-cooking liquor or broth, which on the average contains 8.52o/o of total solids and 1.48o/o protein.

INTRODUCTION

The nutritional significance of common beans as a protein supplement to cereal grain-based diets is well recognized. In Central America for instance, bean intake provides from 20-30o/o of the daily dietary protein requirements (1-3), which increases the quality of the diet substantially (3-5). During recent years, efforts have been made throughout the world to increase bean availability by augmenting production through plant breeding activities and improved agricultural practices. Although efforts have been undertaken and yield increased, breeding activities have failed in that little consideration has been given to the incorporation of the desirable nutritional characteristics (6), since yield has been the only objective pursued. Yield is an important nutritional goal, since it may represent higher food availability and higher intake. Likewise, some consideration has been given to chemical composition and nutritive value, which are also components of nutritional goals (4). Acceptability characteristics, however, which is another important nutritional goal, has not been paid enough attention in breeding programs.

These characteristics include a wide variety of attributes, such as grain's size and shape, color and appearance, stability under storage conditions, cooking facilities and characteristics, quality of the product obtained, and flavor (2). Many of these acceptability characteristics have not been defined, and many are of a subjective nature, a fact that may explain why it was not that until recently were they incorporated into breeding programs. The definition and objective evaluation of acceptability, processing and cooking characteristics are relatively well-established for most cereal grains (7-10), and such data are also needed for food legumes.

The present study attempted to gather information on common beans' acceptability characteristics, giving special attention to bean preparation and consumption practices of bean-derived products in a selected bean-producing region of Guatemala.

MATERIAL AND METHODS

A survey was carried out in four departments of the northeastern region of Guatemala to study the preference characteristics of various bean types, ways of preparation and consumption by rural families. In this survey, cooking practices, addition of seasoning during cooking, and preparation of special bean dishes, were also investigated. An important

objective of this survey was to determine the families' bean eating habits, particularly those of young children.

Two bean-producing zones located in the eastern area of Guatemalan agricultural regions 6 and 7 (11) and a total of 18 municipalities were visited. Some of the communities –located between 76 and 1.325 m above sea level– had been studied in a previous agronomic survey carried out earlier during the same year.

Municipal capitals were chosen because the greater population concentration in located there. Ten families were chosen at random, with the only criteria that each must have at least one child, five years old or younger, at the time of the visit. The families were interviewed in each community.

Data were collected through an interview with the mother or with the person in charge of the family, particularly in questions related to food preparation. Based on an earlier experience the questionnaire covered the following aspects: 1. Family composition of the interviewing day. 2. General aspects of the bean harvested, amounts collected and used by the family, purchase and bean storage. 3. Bean preference, forms of preparation, intake frequency, distribution within the family, and other foods consumed with beans in the daily menu, and 4. Cooking practices. The questionnaires used were pretested in two rural communities not included in the sample.

While conducting the survey, a sample of bean-cooking liquor or broth was collected in a glass bottle and placed under refrigeration until it arrived at the laboratory. There, it was analyzed for total solids on a 25 cc sample by complete dehydration, for total sugars by refractometry, and for protein content by the Kjeldahl method (12).

RESULTS AND DISCUSSION

The average family size was six members. As in other dietary surveys carried out by INCAP (1, 2), it was found that black beans were consumed by 100o/o of the families, and red or white beans were seldomly eaten. Only 31.2o/o of the families grew and consumed their own beans, while 68.8o/o purchased the beans they ate. Of those producing beans, 67.3o/o harvested it in September, 12.7o/o in November, and 20.2o/o harvested twice a year.

It was found that 47.3o/o of the families harvested less than 500 lb, 16.4o/o from 600 to 1,000 lb, 9.1o/o from 1,000 to 1,500 lb, and 27.2o/o over 2,000 lb.

The amounts kept for home consumption varied from 32 to 2,000 lb and only 59.2o/o of the families harvested enough grains to fulfill their own needs. Beans are stored mainly in burlap or fiber bags, and only 23.1o/o of the families stored beans in small tin silos or drums. Preservatives used were: manure, ashes, bean threshing residues (leaves, pods, etc.) and chemicals (Table 1). This information suggests that an increase in production and improvement of storage conditions would benefit a large population group of the rural area.

Regarding intake frequency, of the 176 families surveyed, 138, 137 and 171 families consumed beans for breakfast, lunch, and supper, respec-

TABLE 1

BEAN STORAGE UTILIZED BY RURAL FAMILIES IN THE EASTERN AREA OF GUATEMALA

No. of families[1]	Amount stored, lb	o/o Growers	Kind of container and treatment	No. of families[1]	o/o
14	32 — 100	26.4	Burlap sac	24	34.8
23	200 — 400	60.4	Burlap sac + preservative	21	30,4
5	500 — 1000	9.4	Drum	5	7.2
2	1200 — 2000	3.8	Drum + preservative	11	15.9
			Other	8	11.6

1 One-hundred and twenty three do not harvest or store beans, and no answer was obtained from 12 families.

tively, a fact that emphasizes the importance of beans in their diets.

Preference characteristics by the housewives are shown in Table 2. They indicated that recently-harvested beans cook faster, and the same was true for the bean bush-type plant. Other reasons for bean preference were the softness of the grain upon cooking, and its flavor. Cooking quality was always associated with beans which had not undergone prolonged storage. These data suggest the need to investigate the causes for quality loss in cooking, as well as to develop appropriate types of silos for storage.

Some information on the causes of hard-to-cook beans are summarized in Table 3. It is evident that storage is the main cause of hardness as housewives indicated. Nevertheless, they were able to identify other reasons, such as postharvest practices and seed quality.

With respect to cooking practices, it was found that less than 7o/o of the families soak beans before cooking. Some families soak the grains only when they are to be incorporated to corn dough to make "tamales", which are prepared by boiling. Beans are placed in cold water in the cooking pot by 65.9o/o of the families before placing the container on the fire, and 34.1o/o place the pot on the fire to heat the water and then add the clean beans. This practice perhaps reduces cooking time. Seasoning used were salt in 100o/o of families, followed by garlic and onion.

It is important to point out that at the time the survey took place, beans were being harvested; it is possible then to believe that beans available at the homes were of recent harvest, although cooking time (Table 4) ranged from 25 to 240 min. Nevertheless, 13 families reported cooking time to range from 25 to 45 min. Of this group, seven families

TABLE 2

BEAN PREFERENCE AND REASON FOR PREFERENCE AMONG RURAL HOUSEWIVES

Type of bean	o/o	Reason for preference	o/o	Quality on cooking	o/o
Recently harvested	61.9	Softness on cooking	55.7	Recently harvested	89.2
Stored	6.8	Flavor	28.9	Stored	0.6
Bush type	24.4	High yield on cooking	4.6	Bush type	7.4
Vine type	1.8	Physical quality	1.2	Vine type	1.1
Other	1.7	Nutritive value	3.9	Do not know	1.7
Do not know	3.4	Do not know	2.3		
		No information	3.4		

TABLE 3

HOUSEWIVES INFORMATION ON HARD BEANS

Information	No. of families	o/o
Storage	57	32.4
Postharvest practice	32	18.2
Seed quality	30	17.0
Cooking malpractice	19	10.8
Environmental condition	12	6.8
Do not know	26	14.7

used pressure cookers. Most housewives informed cooking time to take from 60 – 95 min, while 26.2o/o reported values ranging between 120 – 150 min. It is difficult to explain the reasons for such a wide variation in cooking time; hence, this is an aspect which requires more specific attention since it could be due to bean cultivars and cooking procedures, or both, assuming that the beans used were of recent harvest and had not been kept under storage.

Postharvest handling, however, cannot be discarded since solar exposure –which is a practice used by farmers to reduce moisture content for storage purposes–, has been demonstrated by García and Bressani (13) to increase cooking time. Since wood is the most common fuel used in rural areas and is becoming scarce, fast cooking methods must be developed, and storage systems optimized.

Table 5 presents several bean preparations consumed by the persons surveyed. As the data reveal, beans in rural areas are mainly consumed as whole cooked beans. Nevertheless, there is a relatively large group that prefers beans prepared by sieving the whole cooked beans– which

TABLE 4

COOKING TIME FOR BEAN PREPARATION IN RURAL HOMES

Cooking time[1] min	Families[2]	o/o
25 — 45	13	7.4
60 — 95	101	57.4
120 — 150	47	26.7
180 — 240	15	8.5

1 Fuel used: wood: 93.2o/o; kerosene: 1.7o/o; propane gas: 5.1o/o.
2 n = 176.

TABLE 5

FAMILY PREFERENCES FOR A DETERMINED BEAN PREPARATION

Bean preparation	No. of families
Cooked whole	174
Cooked whole + oil	3
Whole and fried	22
Sieved and fried	128
Fried with lard ("volteados")	21
Ground	29
Others	52

removes part of the seed coat—, and fried. Whole cooked beans shown in Table 6, are consumed accompanied by a large variety of other foods, mainly corn tortillas, but also with other animal food products such as fresh cheese, cream and eggs.

Bean broth is the preparation that mothers prefer when introducing young children to the family diet (Table 6). The broth represents the liquor which separates from whole beans when they are cooked (14). It is fed with a small number of tortillas, cooked rice and in some intances, with egg yolk or vegetables. Bean broth is consumed by all family members three times daily. Hence, from this point of view as well as from the fact that it is fed to children, it should receive more attention. Based on the interviews, it was determined that thick broth (Table 7) is preferred because it is considered to be more nutritious, and that it has better flavor than a thin clear liquid. Mothers provide broth to their children as early as when they are two months old, and as late as 12

TABLE 6

OTHER FOOD EATEN BY CHILDREN AND ADULTS WITH BEAN BROTH OR WHOLE BEANS

Food	Adults	Children	
	With beans (No. of families)	With broth (No. of families)	With beans (No. of families)
Tortilla	176	161	170
Cheese	148	103	148
Cream	103	—	89
Eggs	87	93	44
Meat	39	—	—
Pasta	5	—	—
Rice	95	105	82
Bread	—	7	—
Others	33	71	29

TABLE 7

FAMILY PREFERENCES FOR BEAN BROTH CONSUMPTION

Reason for giving bean broth to children	No. of families	o/o	Reason for preference of thick broth	o/o
Nutritious	99	56.2	More nutritious	61.9
Physiological reasons	27	15.3	Better flavor	23.9
Flavor	13	7.4	Physiological reasons	3.4
Economic	14	7.9	Physical qualities	3.4
Beliefs	11	6.2	Do not know	4.5
Do not know	12	6.8		

months of age, as observed in Table 8. The average age was six months. The amounts of bean broth fed were quite variable at each age group, and decreased with age, when fed together with cooked beans. The highest intake recorded was 160 g at six months of age. Flores *et al* (1, 2) reported bean broth intake to decrease with age in Indian populations; the amounts of bean broth fed at 1 - 2 years averaged 20 g/day. Whole cooked beans are first offered to children at 10 months of age, but there were some cases where they started eating beans as late as at two years. The average age was 13.5 months.

Table 9 indicates that the amount of solids in bean broth varied from 6.96 to 10.63o/o in region 7, and from 7.46 to 10.67o/o in region 6. Total sugars varied from 4.25 (Asunción Mita) in region 6, to 6.50

TABLE 8

BEAN BROTH CONSUMPTION BY AGE OF CHILDREN

Age, months	Broth intake, g	
	Range	Average
2 — 4	24 — 120	66
5 — 7	24 — 160	63
8 — 10	24 — 40	57
10 — 12	26 — 110	51

TABLE 9

BEAN BROTH COMPOSITION

Localities	Sugars[1], o/o	Total solids go/o	Protein, go/o
Region 7			
Los Amates	5.06 ± 1.21	6.96 ± 1.68*	1.25 ± 0.48
Gualán	5.40 ± 1.08	7.45 ± 2.73	1.30 ± 0.53
San José La Arada	5.83 ± 1.95	7.94 ± 2.82	1.20 ± 0.41
Quetzaltepeque	5.60 ± 1.82	8.98 ± 1.71	2.00 ± 0.94
Camotán	5.79 ± 1.65	7.82 ± 3.17	1.35 ± 0.52
San Juan Ermita	5.17 ± 1.37	8.01 ± 4.43	1.67 ± 0.95
Chiquimula	5.17 ± 1.37	6.96 ± 3.40	1.43 ± 0.48
Ipala	6.25 ± 1.13	10.63 ± 5.26	2.10 ± 0.85
Region 6			
San Luis Jilotepeque	4.50 ± 0.65	9.04 ± 3.74	1.40 ± 0.56
Monjas	4.90 ± 0.82	7.50 ± 1.73	1.20 ± 0.46
Progreso, Jutiapa	5.57 ± 1.79	10.67 ± 4.77	1.84 ± 1.13
San Manuel Chaparrón	5.11 ± 1.02	8.56 ± 1.86	1.34 ± 0.41
Agua Blanca	5.25 ± 2.05	9.63 ± 2.70	1.47 ± 0.40
Asunción Mita	4.25 ± 1.86	7.46 ± 5.24	1.35 ± 1.01
Santa Catarina Mita	5.88 ± 1.03	9.44 ± 5.39	1.52 ± 0.89
Quezada	6.50 ± 1.00	9.00 ± 1.22	1.50 ± 0.26
Jalpatagua	6.08 ± 1.07	8.78 ± 5.10	1.37 ± 0.36
San José Acatempa	5.00 ± 2.42	8.49 ± 5.50	1.40 ± 0.69

* Standard deviation. 10 samples per location.

1 Refractometry.

(Quezada) of the same region. The samples contained 1.20 to 2.10% protein. The three chemical components –sugars, total solids, proteins–, were directly related. The nutritive value of the broth should be established, alone and in combination with the other food items consumed by children, according to the survey. If its nutrient content and nutritional quality are established, recommendations can be formulated for the weaning process, on its use as a food component available at home. Likewise, it would be of interest to learn about the factors responsible for the variability found in total solids and proteins. These could very well be due to bean cultivars, bean cooking procedures, and possible postharvest practices and storage. If the role of these factors can be ascertained, they can then be optimized to make a food of attractive nutritive value for children, with home availability.

RESUMEN

PRACTICAS CULINARIAS Y CARACTERISTICAS DE CONSUMO DEL FRIJOL COMUN A NIVEL DEL HOGAR RURAL

Con el propósito de recolectar información sobre la selección de procedimientos de cocción, prácticas culinarias y consumo de frijol en los hogares de las áreas rurales localizadas en cuatro departamentos del noreste de Guatemala, se llevó a cabo una encuesta en las amas de casa de las áreas rurales productoras de frijol. La muestra del estudio incluyó 10 familias, seleccionadas al azar, de cada una de 18 comunidades. El cuestionario que se utilizó había sido evaluado previamente en dos comunidades rurales no incluidas en el estudio. Según se ha demostrado anteriormente a través de otras encuestas de esta naturaleza llevadas a cabo por el INCAP, se encontró que todas las familias consumían frijoles negros y, con raras excepciones, frijoles de otro color o especie. En lo que a las prácticas de cocción atañe, se pudo determinar que no siempre se remojan los granos antes de cocinar y que son pocas las amas de casa que agregan sal al principio de la cocción. Por lo general, se obtienen dos fracciones: los frijoles cocidos y el caldo de cocción. Otro hallazgo fue que los frijoles se consumen en cuatro diferentes formas: cocidos enteros, enteros y fritos, colados y colados y fritos (volteados). Los adultos y los niños consumen el caldo de frijol, por lo que prefieren un caldo espeso, ya que se considera que es más nutritivo y de mejor sabor. Los niños empiezan a ingerir el caldo desde los dos meses de edad, y los frijoles a los 14 meses. La cantidad promedio de caldo consumido fue de 62 g y de frijoles cocidos, 70 g. Las madres entrevistadas indicaron que administraban caldo a sus hijos porque: era nutritivo (56% de las madres); para enseñarle a sus hijos a comer (15%); o por su sabor (9%). En cuanto al fenómeno de dureza, el 32% de las amas de casa indicaron que lo atribuían al tiempo de almacenaje; el 17% a las condiciones de mala semilla, y un 18% causado por el secado al sol, o por prácticas inadecuadas de postcosecha, y a su preparación para consumo.

Aun cuando la encuesta demostró la importancia que tiene el frijol común en las dietas rurales, el principal hallazgo fue que el primer producto derivado del frijol que consumen los niños es el caldo que, en promedio, contiene 8.52% de sólidos totales y 1.48% de proteína.

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