Kenkey production, vending, and consumption practices in Ghana

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A survey was conducted to study production, vending, and consumption of kenkey, a sour dumpling in Ghana. Information was obtained on the socio-cultural profile of the actors, processing technologies, practices which adversely affected product quality, shelf life, and quality attributes important to consumers. Kenkey production and retailing was the domain of women, and carried out mainly as a family business in home-based operations. Three types of kenkey were encountered: Ga-, Fanti-, and nsiho-kenkey. Production was dominated by the Ga and Fanti socio-cultural groups but consumption cut across all socio-cultural groups. The majority of producers processed 10–100 kg of maize per week but frequency of production varied from 1 to 10 times in a week. Unit operations in kenkey production were labour intensive and manually carried out apart from milling. The texture of kenkey was more critical to most consumers than taste and depended on a procedure called aflatalization *yielding a product with a semi-sticky, elastic consistency.*

Keywords: kenkey, nsiho, traditional food processing, indigenous food, street food, quality attributes

TRADITIONAL PROCESSING OF FOODS is an important activity in the informal sector of the Ghanaian economy and provides a means of livelihood for a large number of traditional food processors (Amoa-Awua et al., 2007). Kenkey is a sour dumpling and one of the most common foods produced by traditional food processors. It has a moisture content of 52–55 per cent, pH of 3.7, and a shelf life of 3–4 days. It is prepared after maize has been fermented into a sour meal and subsequently cooked. Kenkey's socio-economic importance is as a source of livelihood for many families engaged in its production and retailing, and also as a principal meal consumed

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regularly by a large segment of the population. Halm et al. (2003) have noted that kenkey is an important part of the diet of low-income workers. It is an affordable heavy meal which provides a feeling of satiety, making it economical.

The basic steps in the production of kenkey are steeping and milling maize grains which are kneaded with water and allowed to ferment spontaneously into a sour dough. The dough is wrapped in leaves and cooked into kenkey. Two main types of kenkey are produced, Ga-kenkey and Fanti-kenkey, which are indigenous to two different socio-cultural groups (Ga and Fanti) but are now eaten throughout Ghana. Other types of kenkey are known, though less popular. They include nsiho which is produced after maize grains have been dehulled or polished, and also sweet kenkey to which sugar is added during processing.

Commercial production and street vending of kenkey make a sizeable contribution to both the rural and urban economy. As street food, kenkey is convenient, ready-to-eat, cheap, and affordable for the poor and provides informal and self-employment opportunities as well as supplementary income for households (Tortoe et al., 2008). Vending of kenkey contributes positively to food security of all actors in the chain including maize farmers, input suppliers, kenkey processors, and vendors. The kenkey vending business starts from the house and a woman with a little capital can set up kenkey production in the home (Tortoe et al., 2008).

In this study, a survey was carried out to gather information on production, vending, and consumption of kenkey in Ghana and to identify major problems and bottlenecks related to its production.

Materials and methods

Survey area and sample selection

The survey was conducted in a total of nine districts in three regions or provinces of Ghana: Ga, Tema Municipality, and Accra Metropolis in the Greater Accra Region; Cape Coast, Abura-Asebu Kwamankese, Mfantseman, and the Awutu-Efutu Senya districts in the Central Region; and Asuogyaman and Manya Krobo districts in the Eastern Region. These districts were carefully selected to cover production of three types of kenkey*:* Ga-kenkey, Fanti-kenkey, and nsiho which the current authors refer to as white-kenkey.

Table 1 Distribution of respondents per region/province

Survey area	*Total interviewed*	*No of actors interviewed*		
		Producers	*Vendors*	*Consumers*
Greater Accra Region	374	105	106	163
Central Region	310	85	84	141
Easter Region	241	67	55	119
Total	925	257	245	423

A preliminary survey was conducted to gather information on production areas and to test the questionnaire. The sample size was set according to Dagnelie (1998) as described by Chadare et al. (2008). Stakeholders eligible for interview were selected by ranking kenkey producers and vendors and a total of 257 producers, 245 vendors, and 423 consumers were interviewed (Table 1). Producers were interviewed at their production sites, while consumers and vendors were selected randomly on the streets and market places.

Survey instrument design

The questionnaire used was designed to collect data on kenkey production, retailing, and consumption. It was validated by pretesting on 20 producers, 21 vendors, and 28 consumers in Accra. Demographic data collected related to gender, age, religion, marital status, and academic qualifications. Technical data on the process was collected including type of raw materials used, processing procedure, equipment, and degree of preference for each type of kenkey. Other information collected included quality criteria for maize grains used, quality attributes of kenkey, quantity produced, shelf life, and frequency and time of kenkey consumption. The survey was carried out through individual interviews or in focus group discussions of 2–3 respondents. Interviews were conducted in English or the local language.

Data analysis

Survey data was analysed using the Statistical Package for Social Scientists (SPSS) for Windows, version 16.0. Frequencies and percentages of both demographics and actual questions were analysed. Significant associations were tested at $p \leq 0.05$ using Chi-square.

Results

Socio-cultural profile of kenkey producers

The socio-cultural characteristics of the producers who were interviewed during the survey are shown in Table 2. Only 4 out of the 257 kenkey producers encountered were male. Traditional food processing is the domain of women in Ghana; hence 98.4 per cent of the kenkey producers were women. The majority of the processors (67.5 per cent) were at least 40 years old. Asiedu-Addo (2011) had reported that kenkey producers are mostly elderly females who are 50 years or older and who have acquired the skills long ago and now serve as trainers in the community. During the survey, it was often observed that the older women engaged in kenkey production, while their daughters sold the product.

The dominant socio-cultural groups engaged in kenkey production were Fanti (31.4 per cent) and Ga (24 per cent) since Fanti- and Ga-kenkey are indigenous to these two socio-cultural groups. Other socio-cultural groups accounted for nearly half of the producers since kenkey has become a national food in Ghana. Most processors had little or no formal education: 23 per cent had attended junior high school and

7.8 per cent senior high school. Only one respondent had tertiary education. In 2003, Halm et al. reported that kenkey producers were mainly women with little or no formal education. Most producers were married (65.1 per cent), and nearly all were Christians (92.7 per cent). Muslims accounted for 3.1 per cent and traditionalists 2.71 per cent. About 60 per cent of the producers were heads of households.

Table 2 Socio-cultural characteristics of kenkey producers

Characteristic	*Percentage (N = 257)*
Age (years)	
< 20	0.4
20–29	15.9
30–39	16.3
40–49	32.6
<50	34.9
Gender	
Female	98.4
Male	1.6
Ethnic group	
Fanti	31.4
Ga	24
Ewe	17.8
Twi	9.3
Krobo	4.7
Others	33
Educational level	
No formal education	38.4
Adult education	5.4
Primary school	17.8
Middle school	4.7
Junior High School	23.3
Senior High School	7.8
Tertiary education	0.4
Marital status	
Single	14.3
Married	61.5
Divorced	16.7
Widowed	3.5
Religion	
Traditionalist	2.71
Christian	92.64
Muslim	3.10
Others	1.55
Household status	
Head of household	59.3
Dependant	49.7

Organization of kenkey production

Nearly all the respondents carried out their kenkey production activities as a home-based operation. Only 10 out of the 257 producers had production sites situated away from where they resided (Table 3). The majority of the producers (56.6 per cent) engaged 1–2 workers. Only 5.4 per cent had more than five workers while 73 per cent of the producers were related to their workers. The majority of the producers (84.5 per cent) learned the trade within the family, 7.8 per cent through

Table 3 Characteristics of kenkey production

	Producers of kenkey			*Percentage of all producers*
	Ga-kenkey	*Fanti-kenkey*	*White-kenkey*	
Where kenkey is produced				
Home	37.09	33.87	24.59	96.1
Site outside home	0.81	2.82	0.40	3.9
Storage facility for maize				
Container	1.94	N/A	2.71	4.7
Store room	25.96	32.6	12.34	70.9
Commercial mill	4.26	1.58	7.36	13.2
Market place	0.39	N/A	0.39	0.8
Others	5.43	1.55	3.49	10.5
Quantity of maize purchased at a time				
25 kg	8	13	22	17.4
50 kg	53	54	22	52.2
100 kg	33	24	18	30.4
Duration of maize storage				
1–4 weeks	22.09	25.19	23.64	70.9
5–8 weeks	9.69	5.04	2.33	17.1
9–14 weeks	2.71	3.49	N/A	6.2
More than 14 weeks	3.10	1.55	1.16	5.8
Quantity of maize processed per week				
10–50 kg	42	41	33	50.0
50–100 kg	34	36	17	35.2
Above 100 kg	18	14	8	37.2
Others	-	-	4	1.6
Frequency of production in a week				
1–3 times	7	73	34	46.2
4–6 times	39	9	11	23.9
7–10 times	43	7	17	27.1
>10 times	5	2	-	2.8
Estimation of shelf life of kenkey in days				
1–3 days	63	35	20	N/A
4–6 days	25	33	40	N/A
7–14 days	6	21	2	N/A
>14 days	-	2	-	N/A

training/attachment, 5 per cent from friends, and 2 per cent through other means. Most of the respondents were engaged in kenkey production because it had been a family business for generations.

Forty-seven per cent of the producers processed 10–50 kg of maize per week, 34.9 per cent processed 50–100 kg/week, and 17.9 per cent more than 100 kg of maize in a week. Forty-five per cent of them produced kenkey 1–3 times in a week, 25.6 per cent 4–6 times per week, and 26.4 per cent 7–10 times in a week, while 2.7 per cent produced kenkey more than 10 times in a week. Forty per cent of the producers also retailed the kenkey they produced. Most producers (242) agreed that kenkey production was a profitable business while 16 did not.

The majority of the producers stored their maize, only 10.5 per cent did not. For those who stored their maize, most (70.9 per cent) had store rooms set aside for the purpose. A few (4.7 per cent) stored maize in containers, while 13.2 per cent stored maize at the customer service mill they used. A very small percentage (0.8 per cent) stored their maize at the market place while the rest used other facilities. Most of the producers (70.9 per cent) stored their maize for 1–4 weeks, 17.1 per cent for 5–8 weeks, 6.2 per cent for 9–14 weeks, and 5.8 per cent for more than 16 weeks.

Kenkey production practices

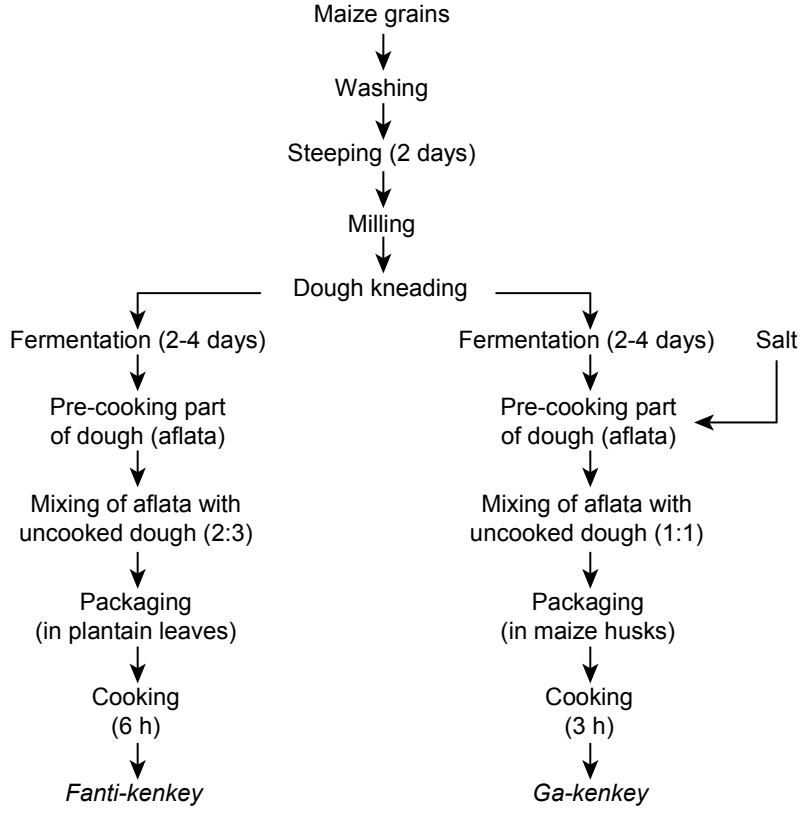

Figure 1 Flow diagram of the production of Fanti- and Ga-kenkey

The procedures for production of Ga- and Fanti-kenkey are shown in Figure 1. Maize is cleaned by sorting/hand picking, sieving, and winnowing to remove all foreign matter including chaff, stones, insect-damaged grains, and other debris. The maize grains are then steeped in water in tanks, barrels, or other containers for 2 days during which period the maize begins to ferment. This is seen as air bubbles rising to the top of the steep water. The steep water is drained off, the maize washed, and then milled in a plate mill into a smooth meal. The meal is kneaded with water into a dough. The dough is now tightly packed into containers which may be wooden vats, aluminium pots, enamel or aluminium basins, or plastic containers, and usually allowed to ferment spontaneously for a minimum of 2 days and a maximum of 4 days. A part of the fermented dough is then made into slurry and cooked with constant stirring into a thick paste called *aflata*. For Ga-kenkey salt is added to aflata

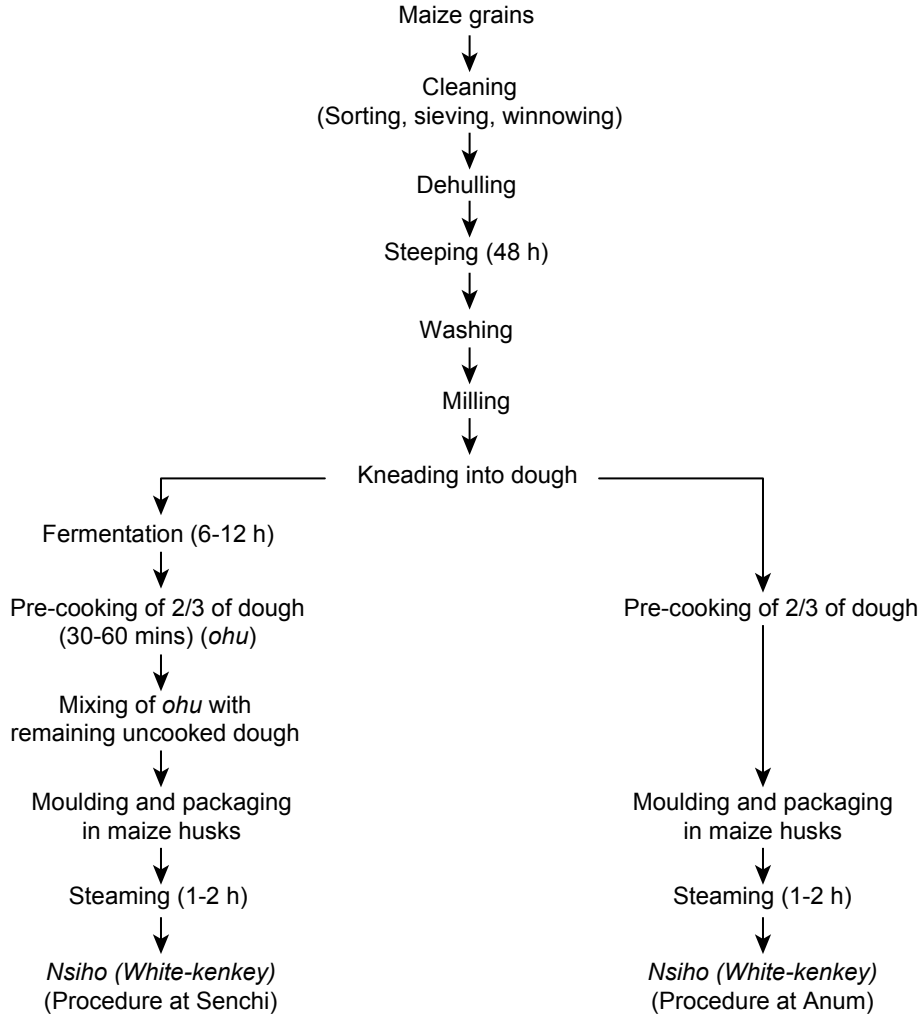

Figure 2 Flow diagram of the production of nsiho (white-kenkey)

during cooking, but to Fanti-kenkey no salt is added. The aflata is now mixed with a portion of the uncooked fermented dough in a ratio which depends on the type of kenkey being produced. For Ga-kenkey the usual ratio of aflata to fresh dough is 1:1 and for Fanti-kenkey 2:1. For Ga-kenkey, the blended mix of aflata and fresh dough is then moulded into round balls of about 300 g each and wrapped in maize husks, while for Fanti-kenkey they are moulded into rectangular shapes and wrapped in plantain leaves. Ga-kenkey is then cooked for 3 h and Fanti-kenkey for 6 h.

With regard to white-kenkey, the survey showed that two different procedures were observed. At Atimpoku and Senchi townships, kenkey was only fermented through steeping of the polished maize grains, while at Anum dough was fermented in addition to steeping of maize as is done with Ga- and Fanti-kenkey.

The production procedure for nsiho (white-kenkey) is shown in Figure 2. It involves winnowing and sorting of maize grains to remove dust, chaff, and stones. The cleaned maize is wetted and dehulled in a plate mill to remove the germ and chaff. The polished grains are then steeped in water for 48 h. After steeping, the grains are washed and milled into a smooth meal. Two different procedures were observed for further processing into nsiho. In the method observed at Atimpoku and Senchi, the milled meal is pre-cooked for about 30–60 mins into a thick gelatinous paste called *ohu*. The ohu is moulded into balls and wrapped in maize husks. They are packed into a pot containing a small amount of water lined with sticks and corn husk and steamed for 1 h. In the other procedure which was observed at Anum, the maize meal is kneaded with water into a dough and fermented spontaneously for 6–12 h. After fermentation two-thirds of the dough is pre-cooked for about 30–60 mins into ohu. The hot ohu is then mixed with the remaining one-third uncooked dough as is done for Ga- and Fanti-kenkey. The mixture is moulded into balls and wrapped in maize husks. The balls are packed into a perforated pan and placed over a pot of boiling water and steamed for 1 to 2 h.

The majority of the kenkey producers interviewed (66.67 per cent) assessed the quality of maize grains by physically examining the size, shape, and appearance of the grains. About 27 per cent of the producers relied only on the appearance of the grains, while 2.3 per cent assessed maize quality by the variety of local maize. Few respondents (1.55 per cent) assessed maize quality by both size and experience, while 1.94 per cent assessed maize quality by experience alone.

Kenkey production is a lengthy and labour-intensive operation; therefore, kenkey is purchased from commercial producers rather than prepared in the kitchen as part of food preparation. In the survey respondents were asked to rank the labour-intensive operations: 28 per cent considered aflata preparation, which involves continuously stirring the thick paste on an open fire for 30 to 60 mins, as the most difficult operation and most producers resorted to casual labour for this part of the process; 26 per cent considered moulding of kenkey balls by hand as the most difficult operation; 21 per cent mixing of aflata and fresh dough; and 5 per cent preparation of slurry for cooking into aflata. Others (11.5 per cent) considered the combined operations of aflata preparation and moulding of kenkey, and 9 per cent mixing of aflata and fresh dough and moulding of kenkey as the most difficult operations.

Shelf life of kenkey

The respondents were asked for their estimation of the shelf life of kenkey based on experience. The majority estimated the shelf life of Ga-kenkey to be 1–3 days, Fanti-kenkey 7–14 days depending on whether it was first wrapped in a polyethylene sheet before the plantain leaves, and white-kenkey 4–6 days.

Only a minority of the producers were able to sell all the kenkey they produced. Most of the Ga-kenkey producers mashed any unsold kenkey and added it to aflata during subsequent production. The majority of the white-kenkey producers reheated and sold any left over kenkey. Fanti-kenkey producers did not resort to these practices because of the longer shelf life of Fanti-kenkey.

Production practices that negatively affect the quality of kenkey

According to the producers, several practices adversely affected the quality of kenkey. When maize grains were not properly cleaned but were contaminated with debris, bad grains, insect damaged grains, etc., it gave rise to a discoloured product with an offensive odour. This also occurred if containers and utensils used were not properly washed, or dirty water or packaging materials were used. Use of over-fermented dough also gave a product with bad odour. Use of unfermented or under-fermented dough gave kenkey an uncharacteristic sweet taste. Poorly prepared aflata produced kenkey with an inelastic or poor texture, sometimes with lumps in the kenkey. Use of a higher ratio of aflata to fresh dough resulted in kenkey with too soft a texture. Other operations which produced kenkey with too soft a texture included use of too much water in aflata preparation or for steam cooking of kenkey. Inadequately milled maize with meal of large particle sizes produced kenkey with a hard texture.

Table 4 Problems encountered in kenkey production and solutions proposed by producers

Intermediate and final products	*Criteria used to assess quality of the product*	*Problems encountered with quality*	*Proposed solution by producers*
Steeped maize	Softness and swelling of grains	Bad odour of maize grains; meal after milling not smooth	Use sorted grains, clean water; do not put hand in steep water during steeping
Fermented maize dough	Colour, odour, taste, texture, swelling of dough	Bad odour, dough too sour	Ferment dough for only 2 or 3 days for Ga- and Fanti-kenkey and 1 day for white-kenkey
Pre-cooked dough (aflata)	Aroma, colour, and textural changes	Poor consistency, too soft, lumps in aflata	Good consistency and lump-free aflata, aflata well cooked.
Kenkey	Aroma, texture, taste, softness, and elastic kenkey	Bad odour, hard texture of kenkey, rough and lumps in kenkey	Use only well-cleaned maize, do not ferment dough for more than 3 days (Ga- and Fanti-kenkey) or 1 day (white-kenkey). Use well-cooked aflata. Mix aflata and fresh dough well

Solutions proposed by respondents to some of these problems are summarized in Table 4. They deal with using cleaned maize, clean water, fermenting dough for 2–3 days only, good preparation of aflata, among others.

Commercialization of kenkey

Vending of kenkey as street food. Two hundred and forty-four vendors who were engaged in selling kenkey were interviewed. The vendors cut across all age groups but only 5.7 per cent were less than 20 years old. The greater proportion, 32.5 per cent were 20–29 years old, 24.2 per cent 30–39 years old, 20.9 per cent 40–49 years old and 16.4 per cent at least 50 years old. The vendors belonged to many socio-cultural groups including Fanti, Ga, Ewe, Twi, and Krobo. In the Central and Eastern Regions most of the vendors were married women while in Greater Accra there was an equal proportion of married and single women. Ninety-two per cent of the vendors were Christians, 5.3 per cent Muslims, and the rest traditionalists and other religions. Ga-kenkey sellers were predominant in the Greater Accra Region, Fanti-kenkey sellers in the Central Region, and nsiho sellers in the parts of Eastern Region surveyed.

Consumption of kenkey. Consumers of kenkey cut across all socio-cultural groups. The total number of 423 consumers interviewed was made up of nearly an equal proportion of males and females. About 30 per cent were from the Twi socio-cultural group, 26.9 per cent from the Fanti socio-cultural group, 18.4 per cent from the Ewe socio-cultural group, and 13.1 per cent from the Ga socio-cultural group. Ninety-three per cent were Christians, 5 per cent Muslims, 1.9 per cent traditionalists, and 0.2 per cent other religions.

Consumers gave various reasons for eating kenkey. The majority (31.5 per cent) ate kenkey because it was convenient/ready-to-eat, 28.8 per cent because it was heavy/filling, 17.4 per cent because it was readily available, 9.9 per cent because it was cheap/affordable, 6.0 per cent because they were tired of eating other foods, and 6.5 per cent for other reasons. Most of the consumers preferred to eat kenkey with fresh sauce; i.e. fresh chillies, tomatoes, onion, and salt ground together accompanied with fish (Table 5). The quality attributes preferred by consumers for the different types of kenkey are shown in Table 6. The texture of kenkey appeared to be even more critical to consumers than the taste.

A lot of the respondents (36.2 per cent) ate kenkey 2–3 days in a week, 18.4 per cent once a week, 17.3 per cent 4–5 times in a week, 10.9 per cent more than 7 times in a week, 9 per cent 6–7 times in a week, while 8.3 per cent of the respondents rarely ate kenkey. Most (52.2 per cent) ate kenkey at lunch, 31 per cent for breakfast, 16.3 per cent at dinner, 0.2 per cent between meals, and 0.2 per cent on special occasions. The majority (56 per cent) bought kenkey from street vendors, 33 per cent from hawkers, 7.6 per cent at the production site/house, and 3.3 per cent from restaurants/chop bars. Most respondents (78.7 per cent) ate kenkey at home, 12.5 per cent at the street vendor's place, 7.8 per cent at the office or shop, and 4 per cent at the restaurant/chop bar. Most of the respondents were dependants and not head of household.

Table 5 Consumption frequency and accompaniment of types of kenkey

	Ga-kenkey (%)	*Fanti-kenkey (%)*	*Nsiho (%)*
Consumption frequency (times per week, N=423)			
>7	10.1	13.9	11.9
6–7	11.9	7.4	8.9
4–5	15.7	18.5	20.8
2–3	34.6	36.1	40.6
Once	21.4	12.0	13.9
Rarely	6.3	12.0	4.0
Accompaniment			
Type of fish			
Shrimps	6.9	13.0	3.0
Small Tilapia	34.0	26.9	68.3
Small herrings	42.1	48.1	5.9
Red fish	15.7	10.2	2.0
Others	1.3	1.9	20.8
Type of sauce			
Fresh sauce	72.3	56.5	85.1
Black sauce	15.1	8.3	7.9
Tomato stew	6.3	26.9	3.0
Okro stew	5.7	3.7	1.0
Soup	N/A	3.7	1.0
Others	0.6	0.9	2.0

Table 6 Quality attributes of kenkey preferred by consumers

Type of kenkey	*Characteristic texture*[1]	*Soft texture*	*Taste*	*Appearance*	*Others*
Ga-kenkey	76	77	47	10	0
Fanti-kenkey	44	31	33	3	1
White-kenkey	26	36	29	7	3

Note: 1 Semi-sticky/elastic consistency

Discussion

This survey has confirmed that production and vending of kenkey is largely a female activity, mainly carried out within the family with operations being home-based and often involving older women (40–50 years). Halm et al. (2003) reported that kenkey producers were mainly women with little or no formal education. According to Allotey (1996) production of kenkey is based on traditional technologies that have been handed down the generations. This study has also shown kenkey production to be a lengthy (4–6 days per batch) and labour-intensive operation, yet requiring few facilities. These are mainly containers for steeping maize, mixing maize meal,

fermenting dough, and cooking pots. The only mechanical facility required is a mill for milling or dehulling maize grains. However, for these mechanized operations most producers use the services of commercial plate mills which are available in every neighbourhood in Ghana. Though few facilities are required for kenkey production, the processing procedures are complex and labour input is high. Kenkey production as a business, therefore, appears limited to families which have been engaged in these operations for generations.

Diversity in the production methods for the three types of kenkey covered in this study lies in the use of whole or dehulled maize grains, duration of fermentation period, ratio of aflata to fermented dough used, addition of salt, packaging leaves used, method of cooking/steaming, and duration of cooking. The predominance of a type of kenkey depended on the dominant socio-cultural group in the region; Ga-kenkey was therefore dominant in the Greater Accra Region where the Ga socio-cultural group are the indigenes, Fanti-kenkey in the Central Region where the Fanti socio-cultural group are the indigenes and nsiho/white-kenkey in the two districts in Eastern Region. The survey areas had been carefully selected to obtain adequate and reliable information on the three types of kenkey.

Nsiho is made from dehulled maize grains and also fermented for a shorter period hence has a white colour with a less acid and a more bland taste. Ga- and Fanti-kenkey are made from whole maize, but Ga-kenkey contains salt and also a smaller proportion of aflata which gives it a less sticky texture than Fanti-kenkey. Ga-kenkey is wrapped in maize husks and Fanti-kenkey in plantain leaves which have marked effects on the aroma and taste of the two types of kenkey. As regards white-kenkey, the dehulled grains may only be steeped, without further dough fermentation, and some processors may also include aflata. White-kenkey may also be wrapped in either maize husks or plantain leaves but the use of maize husks is more common and gives a whiter product. A recent innovation in the packaging of Fanti-kenkey is to first wrap the kenkey ball in a polyethylene sheet before the plantain leaves. This extends the shelf life but the leaves still affect the aroma and taste of the kenkey.

Kenkey is sold to the public at the productions sites or homes, by street vendors at specific locations, and by hawkers who move from place to place. Unsold Ga-kenkey is mashed and added to aflata during subsequent production but white-kenkey may be re-heated and sold.

For most consumers texture rather than taste is the most important sensory characteristic used to assess the quality of kenkey. Most consumers look for Ga or white-kenkey with a soft texture and Fanti-kenkey with a sticky texture. Most producers responded that the proportion of aflata used in kenkey is critical to the texture of the product. This gives kenkey the desired semi-sticky consistency. In a sensory evaluation of the texture of Ga-kenkey, the highest score was given by panellists for Ga-kenkey prepared from a 1:1 aflata to uncooked dough mixture (Bediako-Amoa and Muller, 1976). Their study confirmed that aflatalization is necessary to produce kenkey of the desired texture. Sefa-Dedeh (1993) reported that aflata acts as a binding agent, giving kenkey its firm and semi-sticky consistency. When aflata is mixed with uncooked fermented dough it enables the product to be moulded into balls and other shapes (Sefa-Dedeh and Plange, 1989).

Most workers have reported that both Ga- and Fanti-kenkey are cooked for 3 h but the present survey showed that most producers cook Fanti-kenkey for 6 h or even longer. No backslopping with old dough to hasten fermentation was observed in the present study though this has been reported in the literature (Halm et al., 2003).

The reasons consumers gave for eating kenkey was its convenience as a ready-to-eat food, availability, and affordable price. A lot of respondents also believed that kenkey water left over in the cooking pot after cooking has curative properties against diarrhoea, malaria, and jaundice. The anti-diarrhoeal activity could be due to a probiotic effect as Olasupo et al. (1994) isolated four strains of *Lactobacillus plantarum* from kenkey that produced bacteriocins.

Conclusion

The paper outlines the variety of methods adopted in producing the popular food product, kenkey, in Ghana. It is possible that the methods could be improved by mechanizing labour-intensive operations such as mixing of pre-cooked and uncooked dough and also the long cooking period could be reduced by pressure cooking. The quality of kenkey could also be made more consistent by the use of starter culture. It is, however, important that in upgrading processes women are not displaced and denied a traditional income-generating activity which has often happened in upgrading production of African traditional foods.

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