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FOOD RESEARCH INSTITUTE

## **TRADITIONAL PROCESSING OF PEANUTS IN GHANA**

A Peanut Collaborative Research Support Program  
(Peanut CRSP) Project Report

by

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## SUMMARY

A nationwide survey was conducted in Ghana in 1995 to study the traditional peanut processing industry. A total of eighty-five processors from all the ten regions of the country were interviewed. The survey revealed that the traditional peanut processing industry in Ghana is female dominated with the major products being peanut butter, peanut oil, "tunkusa" (partially defatted peanut butter) and "kulikuli" (fried tunkusa). Peanut butter which is used for the preparation of soups and stews in Ghana ranked first and was produced by ninety eight percent of the respondents. Several varieties of peanuts are cultivated in the country and of these the "China" variety was most preferred for the preparation of peanut butter because of it's high oil content, palatability, availability, and ease of dehulling. Other varieties used were "Manipintar", "Kulikuli", "Dagarasime", and "Kpedevi".

The processing of peanut kernels into butter in Ghana is essentially a batch process consisting of six main unit operations. These are sorting, roasting, dehulling, winnowing, milling and packaging. The survey revealed that the milling operation was the only fully mechanised operation in the production of peanut butter. Roasting of peanuts was found to be mechanised to an extent with the use of a roaster in some parts of the country. All other operations in the production of peanut butter were carried out manually.

The quantity of peanuts processed at a time varied widely from as low as 2.5kg. to 200kg. Frequency of processing also varied from everyday to once a month. Majority of the processors however processed peanut butter either once or twice a week and most processors only purchased the amount of peanuts required for a single batch processing and as such did not store the raw material for any considerable length of time.

Majority (84%) of processors roasted peanuts using washed sea or river-bed sand in either earthenware, aluminium or cast-iron pans over a fire or heat source. Wood fuel was commonly used. A rotating drum roaster was used in the Northern regions of the country and was preferred to the manual method of roasting because of it's higher efficiency with regards to burning losses, and the processors' reduced exposure to direct heat during roasting. Various parameters were relied upon to determine whether peanuts were cooked during the roasting process. These were ease of peeling with the fingers, colour, scent, taste, and in most cases a combination of these parameters were used.

The survey revealed three methods for the dehulling of roasted peanuts. These were rubbing between the hands or fingers, gentle pounding using a mortar and a pestle, or rubbing with a wooden board on tables, or on jute-sacks or even on cemented floors. The latter method was found to be the most widespread one used in the country.

Milling of roasted, dehulled and winnowed peanuts was by the use of the disc attrition mill and all the

processors preferred the product very finely milled. Most processors were able to tell the fineness of the product by simply rubbing an amount between the fingers or by visual observation during the milling process. Occasionally, salt, water, pepper and onions were added either during or after the milling process to improve the taste of the soup or prolong the shelf-life of the product.

The survey revealed that no sophisticated packaging is given to peanut butter in the country. The product is usually retailed directly from enamel or plastic bowls using either spoons or the the bare hands into polyethylene bags for customers. A batch of peanut butter could last for as long as three weeks although majority of the processors sold their product within a week.

Peanut processors in the country face several problems, the most important ones being the drudgery and health problems encountered in the roasting, dehulling and winnowing of peanuts during the preparation of peanut products. This was evident in the fact that all the processors interviewed were prepared and willing to adopt new techniques or methods of processing and even expressed the desire to pay a fee for the improved technologies. Finally this survey revealed several lapses during the processing and handling of the products and intensive education is needed to protect the health of consumers of these peanut products.

## INTRODUCTION

Peanut (*Arachis hypogea* L.) is an important oilseed in the developing world and is a valuable source of protein for human and animal nutrition. It is grown mostly by subsistence peasant farmers in all the agro-ecological zones of Ghana with the bulk coming from the Guinea and Sudan Savannah zones in the Northern half of the country.

Most of the peanut produced is processed by local women into peanut butter (paste) which is used for soups, vegetable oil, and to some extent used as "spread". Peanuts are also roasted or boiled or homogenised in combination with cereals and condiments and eaten as a snack or delicacy. More recently, Ghanaian mothers have been urged to incorporate peanuts and other grain legumes into traditional weaning formulations for infants in the country to improve the protein quantity and quality.

Peanut butter processing in Ghana is carried out at the traditional level using unstandardized methods and sometimes unhygienic conditions resulting in the products being of varied quality and without safe and adequate packaging. It has also been observed that to increase profit margins, some peanut products notably peanut butter is adulterated before being offered for sale. The conditions under which peanut butter is sold in the markets also predisposes it to rancidity development and its associated nutritional and acceptability problems. Despite these problems, a large section of the Ghanaian population still purchase peanut butter from the local

retail markets due to the drudgery and time involved in individual preparation at home. To date, no detailed studies have been conducted on the procedures involved in traditional peanut butter processing and handling in the country.

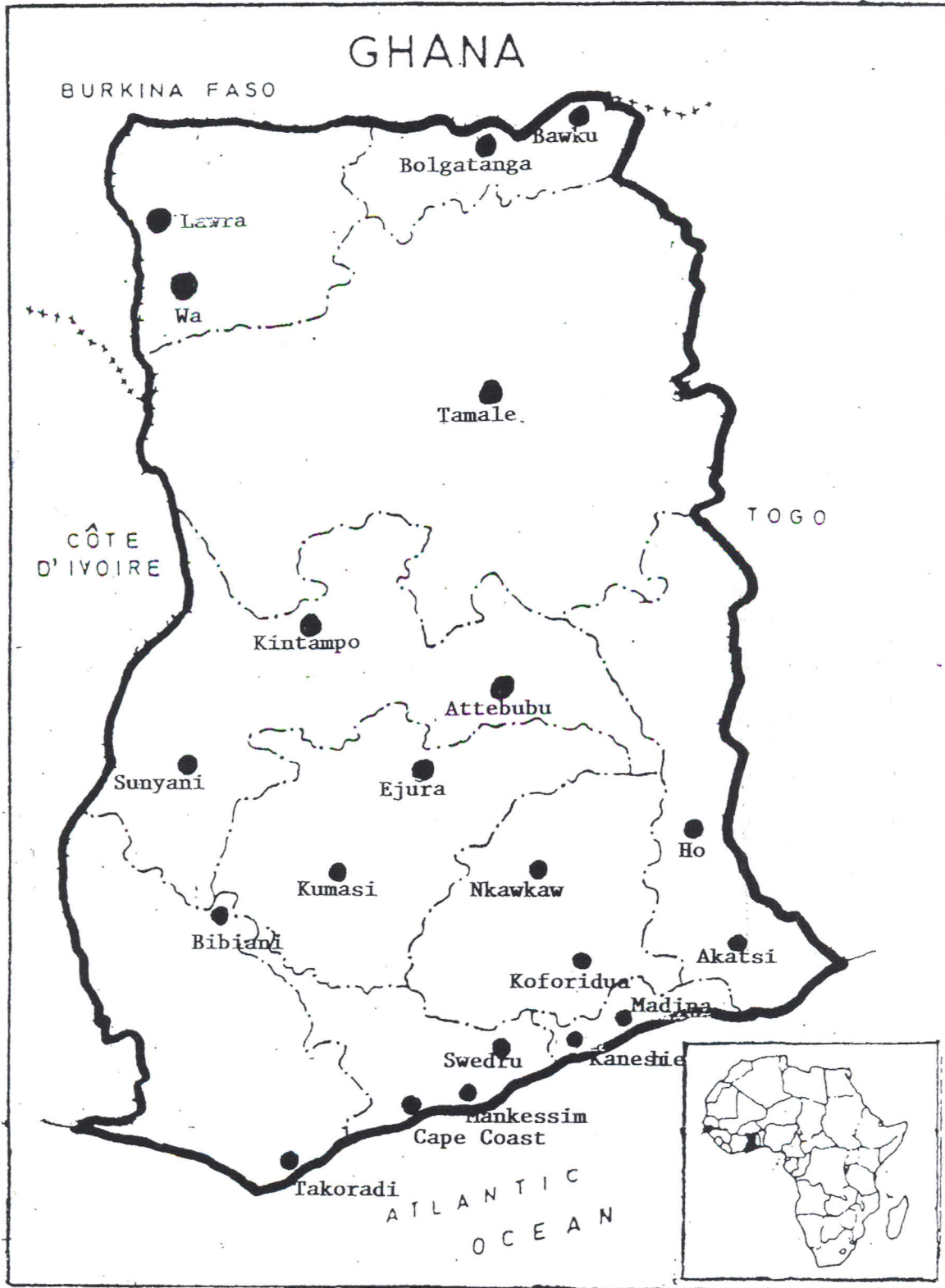
The Food Research Institute of the Council for Scientific and Industrial Research of Ghana with funding from the Peanut Collaborative Research Support Program (Peanut CRSP) through Alabama A&M University carried out a nation-wide survey in 1995 to study the traditional peanut butter processing industry in Ghana. The study covered processing, handling, packaging and storage of peanut butter as well as problems encountered by the processors and their preparedness to adopt new technologies. This report presents the findings of this survey.



## SURVEY DESIGN

The survey covered all the ten regions of Ghana. At least two major markets in each region were visited with the exception of the Northern region where only Tamale was visited because of unsafe conditions in most parts of this region due to tribal conflicts at the time of this survey. An effort was made to select the two markets to be as far apart as possible in each region. A questionnaire (Appendix 1) designed for the survey was pre-tested in markets in the Greater-Accra region and after slight modifications was used for the nation-wide survey which covered eighty-five respondents. The major towns and cities surveyed are shown in Figure I. These were Bibiani, Takoradi (Western region), Kumasi, Ejura (Ashanti region), Sunyani, Attebubu, Kintampo (Brong-Ahafo region), Bolgatanga, Bawku (Upper East region), Cape-Coast, Swedru, Mankessim (Central region), Koforidua, Nkawkaw (Eastern region), Kaneshie, Madina (Greater-Accra region), Ho, Akatsi (Volta region), Tamale, (Northern region), Lawra, Wa, (Upper West region). Respondents were interviewed in the markets whilst selling or retailing peanut butter or during processing at their processing sites usually the home. Local interpreters were hired to help conduct interviews in a language in which the respondent was most fluent.

MAP OF GHANA SHOWING AREAS COVERED BY SURVEY



## MAIN SURVEY FINDINGS

### BACKGROUND INFORMATION

From the survey conducted, it was revealed that the peanut processing industry in Ghana is female-dominated. Of the 85 processors interviewed 84 were female with only one being male.

The major peanut products available in Ghanaian markets were found to be peanut butter, peanut oil, "tunkusa" (defatted peanut butter), freshly milled and pounded peanuts, "kulikuli" (moulded and fried tunkusa) and milled "kulikuli". Peanut butter was ranked as the major peanut product by eighty-three (98%) of the eighty-five processors interviewed. Peanut oil was ranked second by 13% of the respondents with "tunkusa" ranking third. Peanut butter was sold in all the markets visited. The sale of peanut-oil was confined to the Upper West, Upper East, Northern, Ashanti, Brong-Ahafo and to a limited extent the Western regions. Peanut-oil was not available in markets in the Greater-Accra, Volta, Eastern and Central regions. When asked, most processors attributed the absence to the extremely high cost of the product. This may be due to the fact that these areas are not peanut producing areas and also the availability of cheaper sources of vegetable oils such as palm-kernel, coconut, and palm-oils in these areas. Processing and sale of "tunkusa" and "kulikuli" was restricted to the Upper, Brong-Ahafo, Ashanti and northern parts of the

Western regions. Milled and moulded peanut was available only in the Ashanti and Brong-Ahafo regions.

Majority (85%) of the processors interviewed did not process peanut butter into other products but rather sold the butter as such. The remainder of the processors in addition to peanut butter produced peanut oil, tunkusa, and kulikuli. All the respondents in the Volta, Greater-Accra, Central, and Eastern regions did not process peanut butter further. Forty-seven percent of those interviewed not only processed and sold the commodity themselves in the markets but also retailed it to other sellers in the markets and to "chop-bar" (local restaurant) operators who used it in the preparation of peanut butter soup.

The quantity of peanut kernels processed into peanut butter at a time varied from as low as 2.5kg. to 200kg. The frequency of processing also varied from everyday to once a month. Majority (76%) of the respondents processed peanut butter either once or twice a week.

#### **RAW MATERIAL**

The survey revealed that none of the processors owned her own peanut farm from which the commodity could be obtained. Whilst one processor used peanuts from her husband's farm all the others bought the commodity from the local markets or recognized markets in the major peanut growing areas. In areas where peanut is not grown, middlemen actually travel to the markets in the growing areas to purchase the commodity which they later sell in

the local markets. From this survey the major markets for peanuts were identified as those in the following towns and cities: Tamale, Bolgatanga, Bawku, Wa, Lawra, Takyiman, Attebubu, Sunyani, Kintampo, Ejura, Akatsi, Ho and Mankessim. These markets may therefore be considered as appropriate sampling points for any further work involving peanuts.

The variety of peanut most preferred for peanut butter production was the "China" variety (Fig.1). This was used by 67% of the processors interviewed. The use of this variety was most widespread in the Eastern, Brong-Ahafo, Ashanti, Greater-Accra, Western and Central regions. When asked reasons for their preference of this variety, most processors said it contained more oil, was more palatable, available, attractive, easy to dehull and browns more evenly during roasting. Other varieties preferred were "Manipintar" (named by 13% of processors), "Kulikuli" and "Dagarasime" (Fig.2) each by 9% of respondents. The latter three varieties were most preferred in the Upper-West, Upper-East and Northern regions where they are cultivated. Another variety used was "Kpedevi" (Fig.2) in the Volta region. High oil content and ease of dehulling were the major reasons named for the preference of all these varieties. These may be related to the fact that in Ghana, most people prefer peanut butter soup with much oil on the surface. Another contributory factor could be that dehulling is manually done and as such, varieties which dehull easily are preferred since the drudgery involved is reduced.

FIG.1: MOST COMMON PEANUT VARIETY USED IN THE  
PREPARATION OF PEANUT BUTTER IN GHANA

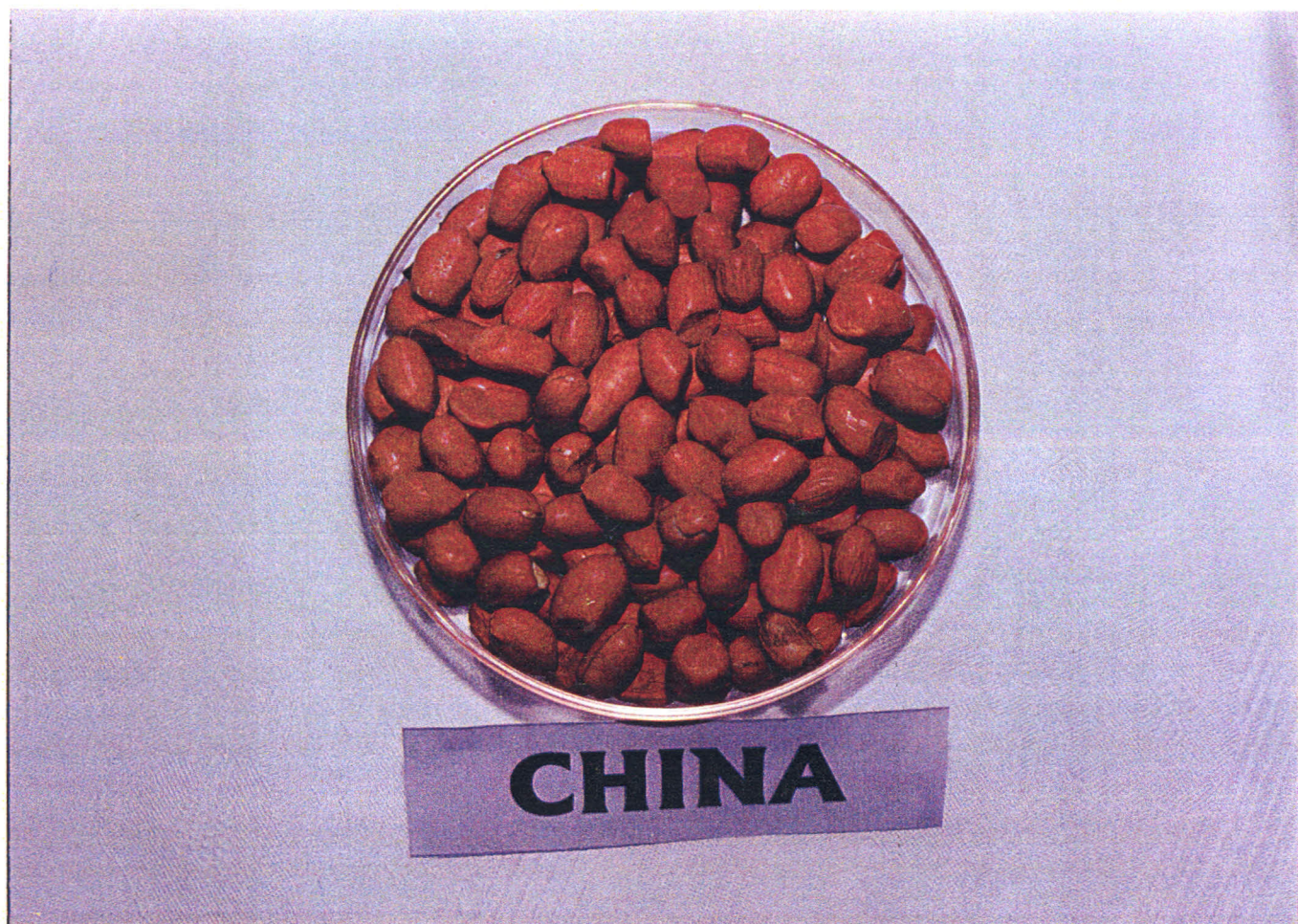


FIG.2: COMMON PEANUT VARIETIES USED IN PREPARING PEANUT BUTTER IN GHANA



The amount of peanuts purchased at a time varied from 5kg. to 500kg. Thirty percent of the processors purchased less than 50kg. of peanuts at a time whilst 45% purchased amounts ranging between 50 and 100kg. and 25% bought over 100kg. of peanuts at a time. The survey revealed that after purchasing, most processors (86%) do not dry peanuts further before use. Forteen percent of the processors said they dried peanuts further for periods ranging from one to seven days. This according to them was when peanuts bought were freshly harvested. Drying was by means of direct sunlight and was carried out by simply speading the peanut kernels on a cemented floor usually the verandah of the house, or on polyethylene sheets till dry. These polyethylene sheets may not necessarily be the best because of condensation problems which may result in re-wetting of the kernels creating conditions favourable for mould growth and subsequent mycotoxin production.

Forty-seven percent of the processors purchased the quantity of peanuts required for one batch processing and therefore did not store the nuts. Fifty-three percent however purchased and stored peanuts for periods ranging from five days to eight weeks before processing. The kernels are usually purchased in jute sacks and are either stored in sheds, on wooden planks in the kitchen, or in store-rooms in the house or the markets till required for processing. It may be noted here that the storage conditions especially those of temperature and humidity are bound to have an effect on the quality of



the final product with regards to microbial and mycotoxin contamination.

Ninety-one percent of the respondents cleaned or sorted peanuts before using. Sorting was manually done by simply picking out undesired kernels (Fig.3). Whilst one processor said she sold the undesired kernels to a local restaurant operator for use in the preparation of food, another said although she tried her best to sort out bad kernels, it was impossible to remove all because of the large numbers involved. Some processors who did not sort peanuts said they did not do so because the farmers had already sorted them before selling. Manual sorting of peanuts may be very tedious and time-consuming especially for processors who handle fairly large amounts. The temptation not to sort properly is therefore bound to be high unless the associated dangers of consuming bad peanuts are appreciated by the processors. Easier sorting methods therefore need to be introduced.

### **ROASTING**

The survey revealed that roasting of peanuts in Ghana is mostly done manually. Majority (84%) of the processors interviewed roasted peanuts manually whilst the remaining sixteen percent roasted nuts mechanically by the use of a rotating drum. One processor said she roasted peanuts in an oven.

Manual roasting of peanuts is carried out either in earthenware, aluminium, or cast-iron pans usually supported on three large stones arranged in a triangular

form or constructed of clay in which the fire or heat source is made. A piece of broken calabash is used for stirring peanuts during roasting (Fig.4). Sixteen percent of the respondents roasted peanuts in earthenware pans whilst fifty-six percent used aluminium pans with twelve percent using cast-iron pans. Earthenware pans were used mostly in the Western, Volta, Ashanti and Brong-Ahafo regions. Cast-iron pans were used only in the Greater-Accra and Central regions only. The use of aluminium pans was widespread in all the regions of the country.

The mechanical means of roasting using the rotating drum was observed in three regions namely the Upper-West region (where eighty percent of those interviewed used this method), Brong-Ahafo (forty percent), and Greater-Accra region where only one respondent used this equipment. Most processors in the Upper-West region said they purchased the roasting equipment from neighbouring Burkina Faso. The roasting drum consists of a light metal plate in a cylindrical form of about 45cm. in diameter and 60 cm. in length. It is closed at both ends and has a "sliding gate" on the side for feeding in and removal of peanuts before and after roasting (Fig.5). The drum is welded to a horizontal shaft which runs longitudinally through the drum. The shaft is bent at one or both ends and turning this rotates the drum which is supported over the fire by two metallic stands (Fig.6). After roasting, the drum is lifted off the fire by means of the shaft and the roasted nuts poured out.

FIG.3:      MANUAL SORTING OF PEANUTS IN BABILE  
                 (LAWRA DISTRICT)



FIG.4:      MANUAL ROASTING OF PEANUTS IN BOLGATANGA



FIG.5: ROTATING DRUM ROASTER SHOWING SIDE OPENING FOR FILLING AND EMPTYING PEANUTS

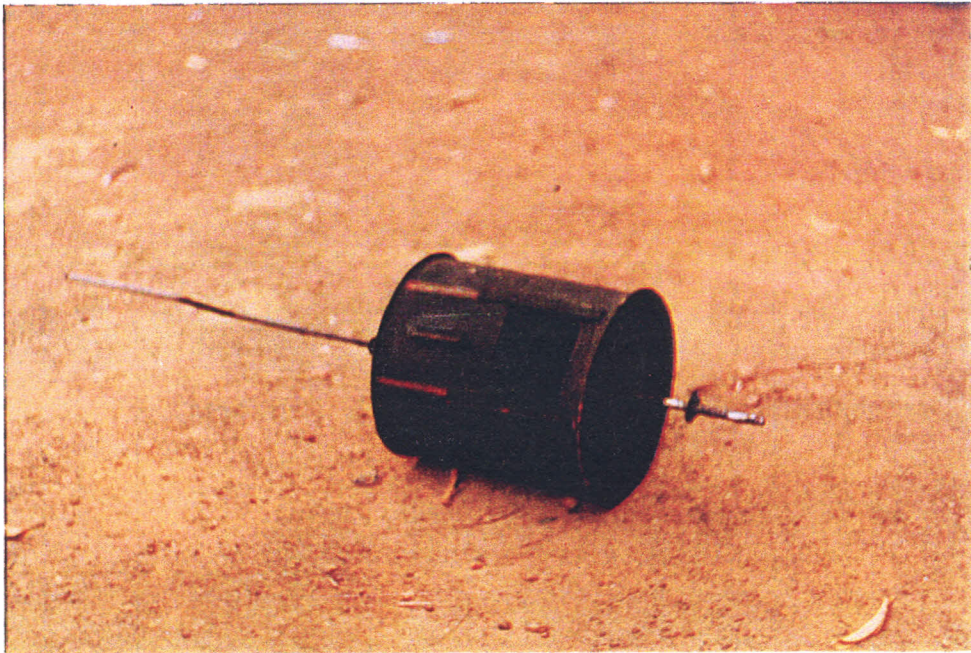


FIG.6 ROASTING PEANUTS USING THE ROTATING DRUM IN SUNYANI



The most common method of roasting peanuts in Ghana is by roasting with sand usually washed sea-sand. In non-coastal areas, sand from the river-bed is collected, washed and used for roasting. Seventy-six percent of the respondents used this method whilst twenty-four percent roasted peanuts without sand. Majority of the processors who roasted without sand used the mechanical form of roasting, the rotating drum. This method was therefore found to be most prevalent in the Upper-West region.

Regarding source of heat energy for roasting, the survey revealed that wood fuel was most commonly used. Eighty-nine percent of the processors depended on wood fuel whilst ten percent used charcoal. Only one processor out of the eighty-five interviewed used liquified petroleum gas (LPG) as fuel source for roasting peanuts. With so much emphasis on the need to conserve the natural vegetation, the use of wood should be discouraged and alternative fuel sources encouraged.

The quantity of peanut roasted at a time varied from 2.5kg. (1 olonka) to 50kg. (20 olonka). Fourteen percent of the processors interviewed roasted over 25kg. at a time. Incidentally, these processors were the ones who used mechanical roasters. Manual roasting time depended on the quantity of peanuts. It ranged from ten minutes to two hours with 47% of the processors stating thirty minutes as the time required for complete roasting of peanuts. Using the rotating drum or mechanical method, roasting time varied from 30 to 45 minutes.

The parameters used to ascertain whether roasting was complete were listed as the ease of peeling with fingers, colour, scent, taste, and in most cases a combination of these were used. Majority (46%) of the respondents named ease of peeling and visual observation of the colour as the parameters used in determining if peanuts were well roasted. By this method, few peanuts are taken from time to time during roasting peeled by rubbing with the fingers and the colour observed. Generally, peanuts are considered cooked when they attain a golden brown colour. The degree of browning is at the discretion of the processor. Twenty five percent named the change in colour alone, fifteen percent used ease of peeling, seven percent relied on the scent alone and another seven percent used the combined parameters of colour and taste to ascertain if roasting was complete. In view of the fact that in Ghana no additives are added to traditionally-processed peanut butter, it can be concluded that the final quality of this product in terms of colour and even flavour is highly subjective and this was evident in the wide variations in the colour of peanut butter observed during this nation-wide survey.

Most processors found it difficult to quantify the amount of peanuts burnt during the roasting process. Fifteen percent of the respondents said they could not estimate the amount burnt. Another fifteen percent said none or just a few kernels got burnt. Most of these processors were those who used the rotating drum or the mechanical means of roasting implying a relatively higher

efficiency of this method. Using the manual roasting method however, losses due to burning were as high as ten percent.

An observation made during this survey was that in some of the cities visited, most processors hire people to roast their peanuts for them because of drudgery involved. This observation was made in Accra and Kumasi.

#### **DEHULLING AND WINNOWING**

Dehulling of roasted peanuts during the traditional processing of peanut butter in Ghana is done manually. If sand was used in roasting, then peanuts are poured into a seive to remove the sand after which dehulling takes place. The survey revealed three main methods used for dehulling roasted peanuts. These are by rubbing peanuts between the hands or fingers, by gentle pounding in a mortar with a pestle, or by rubbing with a piece of wooden board on cemented floors or on jute sacks or tables in a room or veranda. (Fig. 7 shows dehulling of roasted peanuts using a wooden board).

Manual dehulling of roasted peanuts by hand was found to be widely practised in the Volta and Central regions where 90% and 60% respectively of respondents used this method. Few respondents also used this method in the Western and Eastern regions. The survey revealed the use of the mortar and pestle in the Upper-West, Brong-Ahafo, Ashanti, and Greater-Accra regions. Dehulling on cemented floors or on jute sacks or tables using a wooden board was found to be the most used method

FIG.7: DEHULLING OF ROASTED PEANUTS IN KUMASI MARKET



FIG.8: MANUAL SORTING OF DEHULLED AND WINNOWER PEANUTS  
IN SUNYANI





Dehulling by means of a wooden board was used by 61% of the respondents. Twenty five percent of the respondents dehulled peanuts by hand whilst 14% used the mortar and pestle.

The survey revealed that dehulling by hand was the most time-consuming of the three methods. A 25kg batch of roasted peanuts most often took as long as 4 hours to dehull and winnow in contrast to an average time of thirty minutes used for the other two methods. Regarding the percentage of kernels not completely dehulled and the degree of breakage obtained, dehulling by hand was found to be the best as all the respondents who used this method said all the kernels were completely dehulled and no breakages of kernels occurred. Using the mortar and pestle for dehulling, the amount of peanuts not completely dehulled varied considerably from just a few kernels to as high as 30%. Percentage of broken kernels also ranged from from 3% to 100%. When roasted peanuts were dehulled on cemented floors or on flat surfaces using a piece of wood, the percentage of kernels not completely dehulled ranged from 8% to 20% and degree of breakage ranged from 20% to 100%.

The ease of dehulling is bound to depend on several factors such as the degree of roasting, size of kernels, variety of peanuts, and the force applied during dehulling amongst others. From this survey it is evident that the dehulling step is one of the most tedious and labour intensive ones in the traditional processing of peanut butter in Ghana. After dehulling, peanuts are

winnowed by pouring portions of dehulled peanuts into a tray or bowl and the hulls separated by the wind as it is poured into another container usually placed on the ground. This procedure is repeated several times until all the hulls are removed.

Most processors interviewed informed us that after winnowing, peanuts are manually sorted to remove burnt and unde-hulled kernels as these if not removed will result in a bitter end product with a very dark colour which will not appeal to consumers. (Fig.8 shows the manual sorting of dehulled and winnowed peanuts).

#### **MILLING**

Milling of peanuts is the next step in the processing of peanuts into peanut butter. All the respondents interviewed used the plate/disc attrition milling machine (Fig.9) to mill their peanuts. The processors do not own the machines but rather pay a fee for their use. Incidentally, these are the same machines used in milling corn and other cereals in the country. The time required for milling was found to depend on whether the machine operated on diesel oil (gas-oil) or electricity. On average 25kg. of peanuts was milled in 5 minutes and 15 minutes using electricity and diesel oil respectively.

All the processors interviewed said they preferred to have their peanut butter very finely milled. When asked how they tested the fineness of peanut butter during milling, 86% of the respondents said they rubbed a little of the product between their fingers ("finger-

feel") and were able to know if the desired fineness had been attained. Seven percent of the processors said by visual observation they were able to tell the fineness. Five percent of the respondents used a combination of "finger-feel" and visual observation whilst 2% used both visual observation and "mouth-feel". Losses occurring during milling varied considerably from negligible to about 250gm. per 50kg. of peanuts milled. Some processors said they always had the mill dismantled and the remnants scraped out especially if they were the last in the milling queue. This survey revealed that majority (95%) of peanut butter processors do not mix the product after the milling process. One respondent said she only mixed the product after two weeks when oil separation started. Four other respondents said they mixed peanut butter in the mornings before decanting into bowls for sale in the market. A wooden ladle was used for mixing when carried out.

Peanut butter on sale in Ghanaian markets is one commodity always suspected by the populace to be highly adulterated. Popular adulterants known are maize and cassava flours which are relatively cheap and are added to increase bulk and thus the seller's profit margin. As expected, addition of these adulterants was denied by all the processors interviewed. Thirteen percent of the respondents however said they incorporated additives into peanut butter. The additives named were water, oil, salt, pepper and onions.

FIG.9: MILLING PEANUTS IN KUMASI MARKET



In some markets in Ghana peanut butter is sometimes "heaped" on wooden boards for sale. Some processors therefore add some water (about 50mL to 2.5kg. of peanut butter) to form a paste stiff enough to be placed on the board in the market. Six percent of the respondents added water to peanut butter. This practice was found in the Brong-Ahafo and Eastern regions. Some processors added salt to roasted peanuts (About 500gm. salt was added to about 20kg. of peanut) before milling. Addition of salt was recorded in the Upper-East region. Two processors said they poured peanut oil on the surface of the peanut butter to prevent it from getting too thick with time and making scooping very difficult. One processor in the Brong-Ahafo said she added some dried pepper, salt and onions to peanuts before milling to improve the flavour of the peanut butter soup.

#### **PACKAGING AND RETAILING OF PEANUT BUTTER**

In Ghana, no sophisticated packaging is given to traditionally processed peanut butter. Roasted peanuts after dehulling and winnowing are milled directly into either enamel or aluminium bowls, plastic buckets or drums and conveyed home. The product is then retailed from the bowls. Sometimes small portions are transferred into smaller bowls, wooden boards, flat trays or into polyethylene bags and displayed for sale in the markets.

This survey revealed that sixty-four percent of the respondents either transferred peanut butter to the markets in enamel or aluminium bowls (basins) and

actually retailed directly from these bowls using their bare hands or spoons. Some of these processors also transferred portions into polyethylene bags which they retailed simultaneously. Six percent of the processors retailed the product from wooden trays whilst one processor in the Ashanti region sold the product in leaves. The use of bowls and polyethylene bags for retailing traditionally processed peanut butter in Ghana was encountered in all the the regions visited and was not particular to any one region or area.

The time required to sell a batch of peanut butter varied considerably from one day to twenty-eight days. Majority (76%) of sellers however sold their product within one week of processing. Fourteen percent of the processors sold their peanut butter between eight and fourteen days whilst five percent completed sale of their product between fifteen and twenty-one days. It took the remaining five percent of respondents over three weeks to complete the sale of their peanut butter.

The time taken to sell a batch of peanut butter is very crucial to the quality of the product especially as it is exposed to the environmental conditions of generally high temperatures and humidities daily during the retailing period. These conditions are very favourable for the growth of microorganisms particularly moulds. Aflatoxin production by moulds can occur especially in cases where water is added to the product to give it a "stiff " consistency before selling. The indiscriminate use of the hands for retailing could

certainly result in gross microbial contamination of the product and should be discouraged. As to whether fresh peanut butter was added to left-over butter, eighteen percent of the processors said they added fresh peanut butter to the left-over from the previous batch. This practice can also be regarded as a potential source of contamination and should not be encouraged.

#### **FURTHER PROCESSING OF PEANUTS**

Peanut butter is the main processed product from peanuts in Ghana. Other products are prepared from peanuts but on a much smaller scale. These are peanut oil, "tunkusa" and "kulikuli". The survey revealed that further processing of peanuts was practiced in only some regions. These were the Upper East, Upper West, Northern, Brong-Ahafo, and Ashanti regions. As expected these are the major peanut producing areas in the country.

#### **PRODUCTION OF "TUNKUSA", "KULIKULI" AND OIL FROM PEANUTS**

"Tunkusa" is partially defatted peanut butter. The preparation of this product is very similar to that of peanut butter. Peanuts are roasted, dehulled, winnowed, and milled. Some processors of this product said peanut kernels are not allowed to brown as much as for peanut butter. Salt is sometimes added to the roasted and dehulled peanuts before milling. This is to increase the shelf-life of the final product. After milling, hot water is added and wooden ladles used to knead the mixture (Fig.10) until oil separation commences.

FIG.10: PREPARATION OF "TUNKUSA" IN BOLGATANGA



FIG.11: SKIMMING OF PEANUT OIL FROM "TUNKUSA" MIXTURE





FIG.12      MOULDING "TUNKUSA" INTO BALLS FOR FRYING INTO  
"KULIKULI" IN BABILE (LAWRA AREA)



FIG.13:      FRYING "KULIKULI" IN TANOBOASE (TAKYIMAN AREA)



Oil separation during the kneading process takes between 15 and 20 minutes. The oil is skimmed off (Fig.11) and more hot water added and the kneading process repeated till no more oil separates out. The yield of oil ranged from 1/2 a liter to 1 liter per 2.5kg. of peanuts. The residue left after oil has been skimmed off is "Tunkusa". The average lifespan of this product is three days after which if not sold off is moulded into balls or other fancy shapes (Fig.12) and "deep-fried" in peanut oil into a product named "Kulikuli" (Fig.13). "Kulikuli" is eaten as a snack food whilst "Tunkusa" is used for the preparation of soups and stews just like peanut butter. It is widely patronised by local restaurant operators because of its reduced cost when compared to peanut butter.

#### PROCESSING, HANDLING AND DISTRIBUTION PROBLEMS OF PEANUTS IN GHANA

Three unit operations in the processing of peanuts were identified by most respondents as being very tedious, time-consuming, and laborious. These were roasting, dehulling, and winnowing of peanuts. Other operations mentioned were the mixing and kneading process during the preparation of "Tunkusa", the sorting of 'bad' kernels, and the unavailability of credit facility.

Eighty percent of the respondents named roasting of peanuts as a major problem in the processing of peanut butter and "tunkusa". They all complained that roasting was not only tedious but that they usually felt feverish,

tired and dizzy after roasting. Some of the processors confirmed that this problem had been overcome to some extent after they purchased the mechanical roaster described earlier. Some processors actually hired people to roast their peanuts for them at a fee. Forty five percent of the respondents named dehulling as a problem for them. They said it was laborious and time-consuming. Fourteen percent named winnowing as another tedious operation in the processing of peanut butter.

Other unit operations were named as problems by a few processors. Sorting of bad kernels was named as a problem by three processors. Mixing and kneading of the milled peanuts with hot water during the preparation of "tunkusa" was named by three respondents as being very tedious whilst another three said they needed credit facility to keep their peanut processing businesses from collapsing.

The survey revealed that peanut processors in Babile in the Lawra district of the Upper-West region have formed themselves into a co-operative of forty women. The idea of co-operatives should be encouraged in all the regions as this will lead to a better utilization of any new equipment introduced as well as serving as a focal point for technology transfer and education among the processors.

### ADOPTION OF NEW TECHNIQUES FOR PEANUT PROCESSING

All the processors interviewed said they were prepared to adopt new techniques or methods for peanut processing. Most of them indicated that they needed new techniques for roasting and dehulling and were prepared to own their own roasters and dehullers if the cost was reasonable. Others expressed the desire to pay for these services whilst a minority said they were prepared to form co-operatives to own these improved equipment.

### CONCLUSION

Peanut butter is the most widely consumed peanut product in Ghana but its preparation has been found to be still practised at the traditional level using very tedious and laborious methods. Unit operations such as roasting, dehulling and winnowing need to be partially if not fully mechanised to reduce the drudgery involved in its preparation and ensure uniformity in product quality which has hitherto been fully dependent on the processors' personal subjective judgement.

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APPENDIX I

FOOD RESEARCH INSTITUTE

STUDIES OF EXISTING TRADITIONAL PROCESSING PROCEDURES FOR  
PEANUT BUTTER

1. Background information

Name of processor \_\_\_\_\_ Sex  F  M

Region \_\_\_\_\_ Town/Village \_\_\_\_\_ Market \_\_\_\_\_

Which peanut products do you produce? rank in order of importance

<u>Product</u>	<u>Rank</u>
_____	_____
_____	_____
_____	_____
_____	_____

Do you process peanut butter for  
a) processing into other food items?  Yes  No

State Items: \_\_\_\_\_

b) Sale as such  Yes  No

c) Distribution to retailers  Yes  No

d) Other uses  Yes  No

Specify: \_\_\_\_\_

What quantity of peanut is processed at a time? \_\_\_\_\_ kg \_\_\_\_\_ Olonka

How often is peanut processed \_\_\_\_\_ per wk/month

2. Raw Material

Where do you obtain peanuts from?

- a) Own farm
- b) Recognised depot; Name \_\_\_\_\_
- c) Local market; Name \_\_\_\_\_
- d) Other source \_\_\_\_\_

What Variety/type of peanut do you purchase/grow? \_\_\_\_\_

Why? \_\_\_\_\_

Amount purchased at a time \_\_\_\_\_ Olonka/Minibag

Do you dry peanuts after purchase?

Yes No

How? \_\_\_\_\_  
Sundrying Mechanical

If Sundrying, where is this carried out? \_\_\_\_\_

For how long? \_\_\_\_\_ hrs/days

How

Where do you store peanuts before processing \_\_\_\_\_

For how long \_\_\_\_\_ days/wks

Do you clean/sort peanuts before use?

Yes No

How do you clean/sort? a) Manual

b) Mechanical

3. Roasting

How are peanuts roasted? \_\_\_\_\_  
Manual Mechanical Other

What roasting equipment is used?

a) Earthenware pan

b) Aluminium pan

c) Other (Specify) \_\_\_\_\_

How are peanuts roasted?

- a) Raw roasting
- b) Roasting with sand
- c) Other \_\_\_\_\_

What is the source of heat energy?

- a) Wood fuel
- b) LPG Gas
- c) Other \_\_\_\_\_

Quantity of peanut roasted at a time \_\_\_\_\_ Olonka/kg

Roasting time \_\_\_\_\_ mins/hr.

How do you tell roasting is complete? \_\_\_\_\_

What quantity of peanuts get burnt? \_\_\_ Cigarette/Margarine tin/gms

4. Dehulling and Winnowing

- How do you dehull and winnow? a) Manual
- b) Mechanical

Describe equipment used \_\_\_\_\_

What amount is <sup>not</sup> completely dehulled \_\_\_\_\_ Olonka/kg

What amount of Kernels is broken \_\_\_\_\_ Margarine tin/gms

How long does dehulling and winnowing take \_\_\_\_\_ mins/hr.

5. Milling

Do you "mill" roasted peanuts?  Yes  No

How are peanuts milled?

- a) Stone grinding
- b) Pounding in mortar
- c) Mechanical

If mechanical, state type of equipment \_\_\_\_\_



How long does milling take? \_\_\_\_\_ 'Olonka/kg \_\_\_\_\_ mins/hr

What fineness is desired? \_\_\_\_\_  
Very fine                      Average                      Coarse

How do you test fineness \_\_\_\_\_  
Mouthfeel    fingerfeel    Visual    Other

What losses occur during milling? \_\_\_\_\_ margarine tin/gm

Do you mix paste after milling?

                       
Yes                      No

If Yes, how?

\_\_\_\_\_ With hands                      With Ladle                      Other

Are additives added?

                       
Yes                      No

If Yes, name them and in what amounts \_\_\_\_\_  
\_\_\_\_\_

6. Further processing

Do you extract oil from peanut butter?

                       
Yes                      No

If Yes, how \_\_\_\_\_

What amount oil is obtained from 1 Olonka paste \_\_\_\_\_ mls/L.

What happens to residue after oil extraction?

- a) Sold for stew/soup \_\_\_\_\_
- b) Fried into Kulikuli \_\_\_\_\_
- c) Other use \_\_\_\_\_

7. Packaging and retailing

How do you package peanut butter for sale?

- a) In open bowls \_\_\_\_\_
- b) In glass jars \_\_\_\_\_
- c) In polyethylene bag \_\_\_\_\_
- d) Other \_\_\_\_\_

Period of time required to sell  
a batch of peanut paste

\_\_\_\_\_ days

\_\_\_\_\_ weeks

\_\_\_\_\_ months

Is fresh peanut paste added to leftover?

Yes

No

Are there any additional processing operations?

Yes

No

If yes, name and describe them:

Do you have any problems with the processing, handling and  
distribution of peanuts?

Are you prepared to adopt new techniques/methods in the  
processing of peanuts?

# Food Research Institute



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