

Postharvest status of plantains in some selected markets in Ghana

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ABSTRACT:

Plantain production and marketing has been done traditionally, as the problem of food production shortage during the last decade in Ghana has temporarily been solved with import substitute staple like rice. A survey of marketing and utilisation of plantain in twenty-two urban markets from five regions of Ghana revealed that fruit maturity has important criteria to all players in the plantain postharvest system. Unavailable, improper infrastructure and facilities coupled with unreliable transportation system and poor road network shorten the shelf-life thus causing rapid ripening with subsequent increase in postharvest losses. The practiced technology for enhancing ripening of fruits, though low, was appropriate and cost effective. The role of market queens in the retailing of the product had a negative effect on the rate of returns of the retailers, which contributed to about 45% of the traders being seasonal sellers. However with about 60% of respondents had basic education and their level of record and book keeping was impressive.

Keywords:

Plantain, postharvest, marketing, ripening, Ghana.

Article Citation:

Pearl A. Adu-Amankwa, Bernard Agyeman Boateng.
Postharvest status of plantains in some selected markets in Ghana
Journal of Research in Agriculture (2011) 1: 006-010

Dates:

Received: 05 Sep 2011 / **Accepted:** 10 Sep 2011 / **Published:** 03 Nov 2011

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INTRODUCTION

Plantain (*Musa* spp. AAB, ABB) is an important cash and subsistence crop in Ghana. It has been known to be attractive to small-scale farmers mainly due to its low production cost per hectare compared to those of maize, rice, cassava and yam (Lancaster and Coursey, 1984). However, post-harvest losses as high as 10 to 30% are associated with the crop, because plantains have a short pre-climacteric period of less than one week and a shelf life of about 11 days under ambient conditions (Sugri *et al.*, 2010).

In the last two decades, the problems of food production shortages in several developing countries especially in Africa have become increasingly important. Food shortage has been persistence largely due to the emphasis placed on the production of export cash crops with the neglect of the producers in developing production of staple food crops for a rapidly growing urban market (FAO, 1985).

Urban market demand has expanded at an alarming rate as a result of increases in rural-urban migration. For instance, between 2000 and 2008 the average price per kilogram of plantain increased by about 600% (MOFA, 2009). In order to meet the food demands in these urban areas, governments have to increase imports of alternative food staples. These are often cheaper, more convenient to organize and regularly supplied. These characteristics are not prevalent in the national food production and marketing systems of these countries. Root crops and plantains are valuable food sources, which can be used to reduce the import dependency in numerous countries. These staples are produced in a relatively efficient way, given the limited resources available in a traditional production system (FAO, 1990). However, it is this type of traditional system that has failed to fully resolve the food supply problem in Africa especially for the urban centers (FAO, 1985).

Facilitating a link-up between rural producers and urban customers and fulfilling demand in urban areas depend strongly upon efficient postharvest system. In the case of plantains, development of the postharvest systems and the reduction of postharvest losses are hindered by a lack of knowledge on handling, storage and of processing techniques.

It is believed that many of the techniques used for the handling and preservation of bananas could also be used for plantains. However, research findings confirming this and details on the application of these techniques in the case of plantains are not

available. It is always quoted that since plantain at all stages of ripeness is utilized, there are no postharvest losses. As such the economic benefits of any improved plantain postharvest technology in Ghana is expected to be low (Cropley and Morriss, 1993). However, losses may occur from mechanical injury and as the plantain ripens. There remains a need to both classify and quantify the type of losses that occur. This includes the definition of maturity stage at which losses occur, difference in susceptibility between cultivators, where in the postharvest chain. These losses occur and the significance of the level of loss (Wainwright and Burdon, 1991).

Ghana's Ministry of Food and Agriculture (MOFA) in its medium term plan has proposed programmes of research involving the research institutes and the Universities under National Agricultural Research Project. The improvements in cultural management techniques, which will emanate from this program, could attract the entry of commercial entrepreneurs into the market, thus changing in part the production base of plantains. Under such circumstances a further review of postharvest technologies would be warranted.

In order to establish a code of practice for harvesting, handling, transportation and processing of plantain for both the local and export market, market surveys were conducted. The objective of the survey was to identify the constraints along the postharvest chain that needs intervention.

MATERIALS AND METHODS

The survey on marketing and utilisation of plantains was conducted in five-regions of Ghana, namely, Ashanti, Brong-Ahafo, Central, Greater Accra and Western Regions. Ninety-three plantain sellers were interviewed with a questionnaire from twenty-two urban markets from the five regions (Table 1). The respondents, who were all plantain sellers, were chosen randomly with the assistance of the staff of Department of Extension Services, Ministry of Food and Agriculture. The respondents were selected from markets using random sampling.

RESULTS AND DISCUSSIONS

Demography of traders

The survey revealed that whilst production of plantain involves mainly men, the marketing was predominately dominated by women. About 7% of the persons interviewed were men who were all wholesalers. The ages of the respondents were ranged between 30-50 years. Fifty-five percent of

**Table 1: Distribution of Plantain Sellers by Region**

NAME OF MARKET	NUMBER OF TRADERS SELECTED	PROPORTION OF TRADERS SELECTED (%)
ASHANTI REGION		
BOLASO	5	5.4
SOFOLINE	6	6.5
NEW BEKWAI ROUNDABOUT	2	2.2
BANTAMA	4	4.3
AHINSAN	2	2.2
KEJETIA	5	5.4
TAFO	3	3.2
BRONG AHAFO REGION		
SUNYANI	6	6.5
BEREKUM	5	5.4
CENTRAL REGION		
KOTOKORABA	5	5.4
ANAFO	5	5.4
PEDU	3	3.2
EDINA (ELMINA)	2	2.2
WESTERN REGION		
SEKONDI	6	6.5
MARKET CIRCLE	4	4.3
GREATER ACCRA REGION		
MAMPROBI	5	5.4
ACHIMOTA	4	4.3
AGBOBLOSHIE	5	5.4
KANTAMANTO	5	5.4
KANESHIE	4	4.3
MALLAM ATTA	4	4.3
ADABRAKA	3	3.2
TOTAL	93	100.0

the persons interviewed sold plantains throughout the year with 45% as seasonal sellers.

The business was found to be capital intensive due to the high cost of transportation. The offspring of the sellers hardly took up the business because most of them (80%) were more educated than their parents and perceived the business as being a menial one with low profit returns. About 60% of the respondents have basic education and their record and book-keeping was thus impressive.

Fruit maturity

The survey revealed that most of the plantain sellers used flower-end black, fruit splits, black spots and red patched on the fruit, and angularity of the fingers as signs of maturity

(Marriott and Lancaster, 1983). When plantains are in great demand, especially during the lean season, the farmers tend to harvest any available fruit for sale. The market mummies, however encounter problems selling immature fruits in the city and urban markets in the Accra Metropolis. The traders therefore buy up the farms and leave the fruits to mature to the desired specification before harvesting. The different categories of consumers who patronise these matured fruits want them fresh and with good appearance. Thus, the market women preferred late evening harvesting in order to reach the market with fresh produce.

Postharvest practices

The results from the survey indicated that none

of the respondents gave the fruit any postharvest treatment except in Accra, Sekondi, Cape Coast and Elmina markets where methods to enhance the ripening process was practised. The low technology used was appropriate and cost effective considering the high price of ethylene gas. The method conformed to the principles of ripening as discussed by Hulme (1970) and Proctor and Caygill (1985). Matured plantains were packed in polysack- lined baskets for two days. This practice generates heat and ethylene gas which triggers ripening. Air was then allowed into the baskets for uniform ripening. Unlike workers like Medilicott *et al.* (1987) and Wainwright and Burdon (1991) who used acetylene, ethylene and carbide to ripen the fruits, the traders allowed natural ripening to take place.

Transportation

In Ghana the fruits are either packed as bunches or clusters in bulk up to a depth of two meters without any packaging or wrapping protection. The survey showed that with the introduction of long vehicles in the plantain trade, a height of four meters is being used for large consignment to Accra. Alternatively, the individual fingers may be packed into sacks for transportation or stacked on the seats of mummy trucks. Each method has advantages. Packing whole bunches is rapid whereas division of bunches although, a time consuming operation, and requires skilled labour but makes more efficient use of vehicle space especially when using true horn “*asamienu*” variety, which has irregular shaped bunch with long fingers.

The survey also showed the mode of packaging that is as either finger or bunch was dependent on the market. At Circle and Sekondi markets in the Western Region, the plantains were transported as fingers. In Cape-Coast and Elmina markets of the Central Region, some of the plantains were transported as fingers. The markets of Ashanti and Brong-Ahafo regions surveyed had all the plantains arriving at the market as bunches. In Accra, most plantains for the relatively larger markets (i.e. Mallam-Atta, Makola and Kantamanto) were transported as fingers whilst those for Achimota, Adabraka, Agbobloshie and Mamprobi were transported as bunches. Due to the bad road network, the women could spend an average of 2-3 days in the growing area.

Mode of Retailing

Usually, plantains are in season from November to February. About 90% of the traders interviewed sold their plantains to both retailers and consumers. The French plantain type “*apem*”

fetches better price than the False horn type, “apantu”. A peculiar situation was observed at Kantamato and Mallam-Atta markets. The women who brought in plantain had no right to sell, instead the market queens or their agents dictated the price and did the selling in the market at a commission. Sometimes the owners of the plantains made a loss. In such instances, these middle women still ensured they took off their commissions. This practice has been reported in some other West African markets where there are strong trader associations who control supply of products in the markets (Dennis and Peprah, 1995; Saul, 1987; Smith and Luttrell, 1994). Selling in these markets can be done by the members association or through them.

Storage facilities and postharvest losses

The infrastructure and facilities at the markets are poor. The traders sat in the sun with straw hats and the plantains were exposed to the high tropical temperatures that can rise to 38°C at midday in the survey areas between December and February. These high temperatures caused withering of the products due to high transpiration and respiration rate. According to Wills *et al.* (1981), a weight loss of 5% will cause perishable commodities to appear wilted and shriveled and this was observed in the markets that retailed their plantains as fingers. Asiedu (1987) however, showed that water loss in plantain was mainly from the peel. Uneven ripening was also observed due to the exposure of the plantains to heat. These are postharvest handling challenges that have negative implications for the relative monetary value of the plantain fingers offered for sale. The other type of loss suffered was mechanical injury. This occurred whether the plantain was green or ripe. It is believed in Ghana that, because plantains are consumed at all stages of ripeness (i.e. green and even over-ripe) there were no postharvest losses. However, the survey clearly showed that marketing of ripe plantain was difficult in certain parts of the country. The poor storage facilities and improper storage conditions enhanced ripening, softening and subsequent rotting of the fruits.

CONCLUSION

The postharvest status of plantains at both local and regional markets showed that market infrastructure is virtually non-existent specifically to handle plantains, especially at the regions. Seasonal variations had an effect on the postharvest operations. Women dominated the marketing operation. The sellers had criteria for accessing the maturity of the



fruit using black flower-ends, red patches and fruit split. Appropriate low technology was used in enhancing fruit ripening. Bad road network enhanced postharvest losses.

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