

# INCREASE IN PRODUCTION AND AVAILABILITY OF GOOD QUALITY FRUITS AND VEGETABLES

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## Abstract

Numerous economic losses occur annually due to poor post-harvest handling of fruits and vegetable. These losses affect the quantities getting to the Nigerian population and also the nutritional qualities are affected. The losses can be reduced to the barest minimum and ensure availability by using proper post- harvest handing strategies such as controlled environment, reduced temperature, fungicide sprays, proper packaging, hot water dip and waxing/ oiling. Good quality fruits and vegetables should be able to provide the needed vitamin (vitamin C) and some mineral content.

## Introduction

Fruits and vegetable play important roles in the diets of a majority of population in the tropics by providing essential minerals and vitamins along side with flavour, colour and variety. They also contribute some proteins and calories (Ihekoronye and Ngoddy, 1985; Ekundayo and Okigbo, 1991). Economic losses caused by poor post-harvest handling are heavier than is generally realized because fresh fruits and vegetables deteriorate easily while passing from the field at harvest to the consumer (Duckworth, 1966; Pyke,1981).

Production of fruits and vegetables in developing countries in 1976 represented about 20% of total crop production (Anon, 1978). As estimated by FAO (1986), the post-harvest losses from fruits are enormous. It is also estimated that between 30-50% of plant foods produced in Nigeria goes waste due to poor post-harvest handling (Atinmo, 1986; Ohiagu, 1986).

Fruits' like mango, tomatoes, oranges and pawpaw are available almost in all parts of the country. Apart from being eaten raw, they are used as raw material in the manufacture of juice and marmalade and are a major source of vitamin C, minerals and fiber in. the diet (Olaofe and Akogun, 1990). But they are perishable and undergo rapid deteriorative change leading to loss of quality soon after harvest, loss in quality is accentuated by mechanical injury, which causes structural and physiological disorganization of the tissues and greatly facilitates the entry of micro-organisms thereby causing spoilage and food losses (Duckworth, 1966; Nelson and Tressler, 1980).

The .consequences of post-harvest food losses, when measured in terms of human suffering and economic cost, present a challenge that merits priority attention. Hence, the need to increase their production and maintain a constant quality. As the population of Nigeria continues to grow, there is persistent pressure to increase food supplies and ensure national food availability, especially fruits and vegetables (FAO, 1966).

## Ensuring Good Quality of Fruits and Vegetable

For fruits and vegetable to be of good quality, they should possess the following requirements:

- (a) They should be healthy and sound, free from any blemish liable to affect their natural power of resistance, such as traces of deterioration, bruises or unhealed cracks.
- (b) They should be wholesome, clean, and free from extraneous matter, free from any foreign taste or smell and without abnormal surface moisture having regard to their nature.
- (c) They should be of normal size and appearance, having regard to their variety, season and production area.
- (d) They should reach a degree of maturity, which having regard to the normal duration of the journey, will ensure their arrival in good condition, without much difference in taste, aroma and flavour.
- (e) They should be of normal texture without being too soft (overripe) and should retain the ascorbic acid (Vitamin C) in them.
- (1) Mechanical damage should be avoided using well-designed containers for careful conveyance form the farm and to the market.

Storage of fruits is done in order to control the rate of respiration, transpiration,-, infectious diseases and to preserve the fruits in its most useable form for consumers. Generally, tropical fruits like banana,,

pawpaw, pineapple, avocados, oranges, etc, do not store well in a cold region. If prolonged storage is needed, this can be achieved to some extent with refrigeration, proper control of post-harvest disease, regulation of the atmosphere, chemical treatment and irradiation.

The preservation of vegetable involved checking enzyme action destroying or retarding the growth of micro-organism. The primary methods are by controlled environment, heat treatment, canning, dehydration, salting, chemical preservation and fermentation. For long-term storage, refrigeration is applied. Green vegetables can be stored 5°-30 °C at relative humidity of more than 80% successfully for a week.

The delay in preserving fruits and vegetables alter their freshness, palatability and nutritive value, hence unfit for human and animal consumption (Okey, 1992).

### Strategies to Reduce **Post Harvest** Losses

In trying to improve the production of fruits and vegetables, one may get frustrated by losses, which occur during post-harvest handling. This situation can be arrested by reducing these losses. To reduce post harvest losses, fruits and vegetable must be free of skin breaks, bruises, injuries and other mechanical damages.

The following strategies would help to minimize post-harvest losses and ensure availability of fruits, vegetable and their products.

#### 1) **Controlled Environment**

The composition of gases in the storage environment can affect the storage life of fruits and vegetables. This environment can be manipulated to control the rate of respiration and enhance their storage level. In controlled atmosphere (CA) storage, oxygen is lowered to 2.3% and carbon dioxide is increased to 3.5%. while temperature may be reduced to 2-3 °C and nitrogen is used as insert filler. Volatile compounds such as ethylene and excess carbon dioxide can be absorbed by incorporating gas absorbents in the environment.

Controlled Atmospheric (CA) storage has been commonly used to delay ripening and spread of diseases, lower incidence of storage disorders and inhibit toughening and yellowing (Pyke, 1981). Nigerian Stored Products Research Institute (NISPRI) has designed Delayed Fruits Ripening (DEFRI) container- a structure with compartments that can contain fruits as well as gas absorbents, which can absorb CO<sub>2</sub> and ethylene (Kuku, 1986)

Cold Atmosphere storage can be used to preserve a wide range of fruits and vegetable including oranges, apples, bananas, plantains, onions, etc.

#### 2) **Reduced Temperature**

Low temperature slows down the rate of respiration of stored fruits vegetables and also helps to maintain the natural equilibrium of enzyme systems. The low temperature method is especially useful when the freshness of fruits and vegetables has to be maintained during transportation from one place to another.

Temperature drops of 8-12 °C have been reported in Evaporator Coolant System (ECS) designed and developed by NISPRI. Increases shelf life of 16 and 11 days has been achieved with mangoes and pineapples stored in these systems (Kuku, 1986).

#### 3) **Fungicide Sprays**

There are various chemicals capable of minimizing the rate of rotting in fruits. They can delay ripening by controlling the gases in the storage atmosphere of the fruits. Common examples are benomyl benzoate, potassium permanganate (KMnO<sub>4</sub>).

These chemicals usually produce best results when in conjunction with wax and can be applied to oranges, mangoes, bananas, onions, etc.

#### 4) **Proper Packaging**

Packaging of fresh fruits and vegetables protects and preserve them so that they can reach the consumer in a wholesome condition as they move from one location to another. A strong packaging material that is perforated, durable and ensure continuous aeration of the produce during transit should be used. These materials should equally have smooth surfaces that will reduce microbial deterioration which may result from wounds. Individual fruits or vegetables can be separated within a storage container to prevent them from rubbing on each other during

transportation. Soft wrapping materials can be incorporated in-between the products to prevent damages.

5) **Hot Water Dip**

Fruits can be dipped in hot water of 50 -55 °C for about 60 seconds to control surface infection as well as infections that have penetrated the skin of fruits. This treatment has been successfully tried on mangoes, bananas and plantains. Blanching of leafy vegetable for various periods of times in hot water has also been applied.

6) **Waxing/Oiling**

This technique is suitable for improving the appearance of fruit. The wax coating is often applied as water-wax emulsion containing suitable fungicides. Waxing can:

- i) Delay ripening and hence spoilage,
- ii) Cover tiny injuries and scratches on the surface of fruits and vegetable,
- iii) Increase moisture and vitamin retention, and
- iv) Reduce physiological losses in weight,

### **Conclusion**

Significant losses can occur in the protein, sugar, mineral and ascorbic acid contents of fruits due to post-harvest handling operations. These losses, which constitute obvious reductions in nutritional quality and availability, can pose nutritional problems in developing countries, where the greatest part of the population depends on plant foods for their protein and mineral intake.

A pre-requisite to maintaining good quality fruits and vegetables is the avoidance of mechanical damage. This can be achieved by using the aforementioned strategies, which preserve their quality and minimize losses to the barest minimum.

### **References**

- Anon (1978) *Post-harvest Food Losses in Developing Countries*. National Academy of Sciences, Washington D.C,U. S.A. Pp230.
- Atinmo, T. (1986) Storage, Preservation and Processing of Agriculture Produce in Nigeria: Which Way Forway. Seminar Paper on Integrated Rural Development for Military Government, Lagos, Nigeria.
- Duckworth, R. B. (1966). *Fruit and Vegetables* First edition. Oxford and New York. Pergamon Press.
- Ekundaye, C. A. and Okigbo, R. B. (1981) The Effect of Pathogenic Fungi on the Nutritional Value of Black Plum (*Vitex Domiana*) *Nigeria Journal of Botany*, 4: 61-68
- FAO (1986) World Food Security. In Jose Antonio Vierra-Callor (editor) *Selected Issues and Approaches*.
- Ihekoronye, A. I and Ngoddy, P. O (1985) *Integrated Food Science and Technology for the Tropics* London: Macmillan.
- Kuku, F. O (1986). Post Harvest Losses With Emphasis on Fruits and Vegetables. Highlights of the 10<sup>th</sup> Anniversary Conference of NIFEST, Badagry Pp 128 Nelson, P.E and Tressker, D. K. (1980) *Fruit and Vegetable Juice Processing Technology* 3<sup>rd</sup> edition. Wesport City, USA: A. V. Publication Co.
- Ohiagu, C. E. (1986) Post Harvest Losses: The Case of Cereals and Legumes. Highlights of the 10<sup>th</sup> Anniversary Conference of NIFST, Badagry, Nigeria, pp 88-90.
- Oke, i, F.(1992). The Future of Frozen Foods in Nigeria, *Journal of Food Technology*, Vol. I.
- Olaofc, O, and Akogun, O. O (3990) Mineral and Vitamin C Contents and Their Distribution in Some Fruits. *Nigerian Food Journal*, Pp 8
- Pyke, M (1981) *Food Science and Technology* 4<sup>th</sup> edition. London: John Murray.

