



Quality Assurance Status and Future Perspective in Fresh and Processed Fruits of Bangladesh

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Quality Assurance of Fresh Fruits---

Physical Parameter

Cultural Practices

Since yield, postharvest quality and safety of fruits is influenced by the cultural practices, therefore, cultural practices like irrigation, application of fertilizers, pesticides etc. are exercised during the production of the fruit crops.

Quality Assurance of Fresh Fruits---

Irrigation

- For fresh market, the fruit trees are irrigated at different growth stages for maximizing the yield.
- For processing purpose, we reduced the irrigation towards the maturity of fruits to increase the weight of the solids.


For example we irrigated at different growth stages of litchi fruit to determine the quality and yield parameters of litchi. The results revealed that the number of fruits and unit fruit weight were higher due to 7-8 irrigations at 15 days interval from flowering to the fruit maturity stages than that of non-irrigated trees.

Quality Assurance of Fresh Fruits---


Fertilizers: Proper dose of fertilizers are applied according to the cropping nature of fruits as per fertilizer recommendation guide of Bangladesh.

Pesticide: The use of pesticides stopped before harvesting of the fruits to avoid the off-flavours of fruits which is more detectable after processing.

Quality Assurance of Fresh Fruits---



IPM Technology



Pheromone trap

Harvesting Technique and Time of Harvest

- Harvesting is done based on the maturity of fruits, at the time of harvesting to maintain the quality and subsequent shelf life of harvested fruit.
- Proper harvesting technique is used at Research level to avoid mechanical damage as well as minimization of postharvest losses of fruits but in most cases the farmers do not follow the proper harvesting technique.



Handling and Transportation

- Handling is done with care at Research level to minimize the causes of damage. But at the growers, wholesalers and retailers level improper post-harvest handling is observed which causes injuries, discoloration, and respiration that increase moisture loss ultimately failure to maintain the quality and safety of fruits.
- In case of transportation, the over loading tendency is observed at wholesalers level which deteriorates quality rapidly ultimately creates highest postharvest losses of fruits.



Temperature and relative humidity

- Fruits are stored at room temperatures and humidity soon after harvest to maintain their safety and quality.
- There is a facility at BARI to maintain adequate temperature and relative humidity but it does not work properly due to erratic power supply.

Pre-cooling

- Pre-cooling is done soon after harvest (24 to 48hrs) to remove field heat as well as to delay ripening of fruits.
- Tunnel shade or temporary packing house is generally used at growers and wholesalers level.
- At export level (Cold storage of BADC at Hazrat Shahjalal International Airport, Dhaka), pre-cooling is done in the corridor of the cold storage soon after shipment.

Cooling

- Cooling is done after on-farm pre-cooling.
- The room cooling system is found at institutional and exporters level of Bangladesh where ice cooling system is sporadically at wholesaler and retailers level of Bangladesh.
- Bangladesh Agricultural Development Corporation (BADC) established a cold storage at Hazrat Shahjalal International Airport, Dhaka which is used to cool the products before export or after import.



Pre-cooling



Room-cooling

Sorting and grading

- Sorting:** Sorting is done based on the physical damage, insect, pest and disease infestation of fruit. Sorting is made manually where the mechanical sorting is rare in Bangladesh.
- Grading:** Grading of fresh fruits is done based on the size, shape, weight, mature, immature and quality of the fruits. Mechanical grader for fresh fruits is not available in Bangladesh context.



Ungraded and sorted fruits



Sorting and grading is done manually

Washing of Fresh Fruits

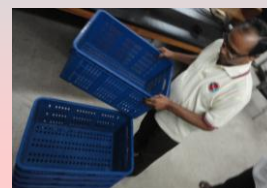
- Clean water and sodium hypochlorite (NaOCl) is used for washing of fresh produce at Research level of Bangladesh.
- The fresh produces are generally washed with drain water, industrial water, wastage water and dirty water at wholesale and retail level of local market where clean water is not available.

Table 1. Washing of fresh fruits and stored at room temperature (28-32°C)

| Name of fruits | Storage life (days) | | |
|--------------------|---------------------|-----------------------|--------------------------|
| | Without wash | Wash with clean water | Wash with Chlorine water |
| Papaya (Local) | 3 | 7 | 8 |
| Banana (Sabri) | 3 | 5 | 6 |
| Mango (BARI Aam-3) | 8 | 10 | 12 |

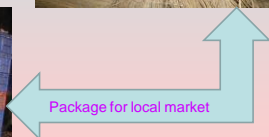
Packaging

- The use of plastic crates is increasing day by day at wholesale and retail markets of Bangladesh
- Hortex Foundation developed corrugated fibre board carton (CFB carton) at institutional level to export the fresh produce.
- Noor Mohammad plastics limited (private organization) recently developed insertable plastic crates for fresh produce.
- Some processing and frozen industries also developed a few packaging technique to export the frozen foods for international market.



Moisture content: Moisture content is determined to know the water loss through using mechanical dryer. A little scope is available in Bangladesh to control the surrounding atmosphere of harvested fruits to prevent any undesirable loss in quality.

Sugar: Acid ratio: It is measured to know the proper stage of maturity of fruits (jackfruit, mango, banana, papaya etc.). A study indicates that when the fruits are maturing, the sugar content is increased day by day.



Quality Assurance of Fresh Fruits--

Acidity: It is measured to know the sourness of fresh and processed products.

Soluble solid content: It is done to know the maturity of the fruit. Higher soluble solid content indicates increased ripeness, as well as sweetness of the fruit.

Colour: The colour of the fresh fruit is measured by comparing it with defined colour disks or tiles or using chromameter. Colour of processed products is measured using a colorimeter or a spectrophotometer.

Texture: Textural qualities of fruits are observed with the fingers, the tongue, the palate or the teeth. The range of texture is considerable, and the departure from an expected texture is a quality defect. The firmness as a texture is measured by firmness meter.

Quality Assurance of Fresh Fruits--

Sensory evaluation

➤ Sensory evaluation of fresh and processed fruit products are done by well-trained personnel who can make fine distinctions between the senses of taste, smell, touch, and sight.

➤ A taste panel is formed to test the fresh fruits for its appearance, peel colour, pulp colour, texture, flavor, sweetness, overall acceptability and finally on the nature of fresh fruits.

➤ For processed products, it is done to test the colour, flavor, viscosity, sweetness/sourness, overall acceptability and finally on the nature of the processed products.

Quality Assurance of Fresh Fruits--

Present status of quality assurance of fresh and processed products both domestic and international market

- For export fresh products meet the required SPS standard.
- While the produce failed to meet the SPS standard, the products are sold in the local market.

Present status of quality assurance-----

Responsible Institute for Quality Assurance of Fresh & Processed Food

Bangladesh Standards and Testing Institution (BSTI):

- This Institution regulates the procedures and enforcing the quality control law of food items.
- The Institution has formulated more than 1700 national standards including over 300 for food and agricultural products of which 46 standards for food are mandatory. Some standards are for exportable items.
- The Institution has already adopted ISO 9000, ISO 14000 and HACCP as Bangladesh standards.
- Unfortunately no standard is available for fresh produce.
- Quite a large number of companies have decided to implement a quality management system within their organization and have chosen ISO 9000, ISO 14000 and HACCP as base systems.

Present status of quality assurance-----

Other Existing Institutes

- Other existing institutes such as INFS (DU), IFST (BCSIR) and Atomic Energy Commission are not well equipped and also not so much capable to perform the required tests and certification
- Very recently under the Ministry of Agriculture, a Pesticide Residue Analytical Laboratory with modern facilities has been established at Bangladesh Agricultural Research Institute.

Exporting status of Fresh Fruits of Bangladesh

Major Exported Items

Jackfruit, Lemon (Ada lebu, Jara lebu, Satkara, Elachi lebu, Pumelo), Indian Olive, Mango, Guava, Litchi, Pineapple, Jujube, Wood apple, Hog plum, Golden apple, Jamon/Blackberry, Elephant foot apple, Tamarind, Indian dellenia, Burmese grape etc.

Major Exporting Countries

United Kingdom (UK), France, Germany, Kingdom of Saudi Arabia, Oman, Qatar, United Arab Emirates, Bahrain, Kuwait and other EU countries etc.

Exporting status of processed products

Bangladesh Export

- ❖ 90 items of Agro-processed products are being exported throughout the world
- ❖ Products are being exported now to over 70 countries throughout the world.
- ❖ Mostly Canada, UK, Middle east where Bangladeshi and Asian peoples are living.

Table 1. Export scenario of fresh fruits from 2005-06 to 2010-11

| Fiscal Year | Quantity (in MT) | Growth (in %) | Value (in Million \$) | Growth (in %) |
|-------------|------------------|---------------|-----------------------|---------------|
| 2005-2006 | 2242.00 | - | 6.67 | - |
| 2006-2007 | 1528.13 | (-) 31.84 | 4.89 | (-) 26.69 |
| 2007-2008 | 2694.70 | (+) 76.34 | 8.65 | (+) 76.89 |
| 2008-2009 | 1878.69 | (-) 30.28 | 6.04 | (-) 30.17 |
| 2009-2010 | 5411.21 | (+) 188.03 | 17.37 | (+) 187.58 |
| 2010-2011 | 11756.63 | (+) 117.26 | 37.68 | (+) 116.92 |

Quality Assurance of Fresh Fruits---

Emerging Challenges

- Maintaining high food quality is very important for national and international trade. Presently, it is reported that some of the wholesaler and middlemen are using ripening chemicals as well as CaC₂ indiscriminately even they are using chemicals like formalin to extend the shelf life of fresh fruits which deteriorate the quality of fruits and consumers are in health risk. It is considered a new challenge to maintain the quality and safety of fresh fruits.
- In exporting fresh fruits, the most important and at the same time most difficult tasks is the compliance of the safety requirements of the agri-produces and to strictly follow the EU Pesticide Regulations.

Emerging Challenges-----

- Challenges facing export of fresh produce may become difficult to face if quality standards are not enforced.
- The government have no strong monitoring team for ensuring quality assurance of fresh and processed product to meet the challenges of global food safety requirements.
- It is, therefore, high time that Bangladesh will have to fully prepared to face the critical challenges ahead to ensure a strong presence in global markets with agri-commodities particularly with the fresh fruits.

Conclusion

- Quality assurance (QA) is the critical step to maintain high quality of fresh and processed products.
- The aim of quality assurance (QA) is to supply the quality products both domestic and export markets through maintaining good agricultural practices (GAP), good manufacturing practices (GMPs), HACCP, sanitary and phytosanitary (SPS).
- Bangladesh has a high potentiality of export expansion due to increased global demand for quality assurance products.
- With the improvement of quality assurance, we will have a bright future for boosting fresh and processed products export from Bangladesh.

