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Quality control in cucumber for export

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The short shelf life of cucumber (21-24 days) emphasizes the need for proper production, harvest and post-harvest handling procedures. A high quality product is essential to impact upon the export market and to ensure reasonable returns. Some of the problems encountered by CATCO during the 1986 - 1987 season are illustrated, and ways and means of maintaining fruit quality are defined.

Keywords: Cucumber; Post harvest handling

Introduction

Antigua exported approximately 78 tons of cucumber to the USA during the period January to April, 1987. The target for the 1987-1988 export season is 187 tons. To achieve this target those constraints which hampered production during the previous season must be removed. Several problems were encountered in the production, harvest and post-harvest procedures which affect the quality and self-life of the cucumbers. The ability of the Caribbean Agricultural Trading Company (CATCO) to return a good price to growers, depends on the receipt of a high quality product.

Outlined subsequently are details of the major constraints observed during the previous season and recommendations to prevent their recurrence. A set of procedures is suggested which, if adhered to, should ensure procurement of a high quality product for the market.

Quality criteria

Groundspot: This occurs as a yellow-green area where cucumbers are in contact with the soil and away from exposure to the sun. On heavy clay soils and under heavy rainfall conditions the fruit may become embedded in the soil thus increasing the size of the groundspot. Usually, unless the spot covers more than three-quarters of the fruit there is no diminution in quality.

Yellowing: Yellowing is usually an indication of senescence and cucumbers showing this symptom are totally undesirable. Yellowing is accelerated by too low or too high a storage temperature. Below 10°C cucumbers suffer chilling injury and yellow rapidly; above 15°C similar symptoms are exhibited. Exposure to ethylene also promotes yellowing.

Shrivelling: Excessive water loss after harvest causes shrivelling at the blossom end of the fruit. The fruit rapidly goes flaccid afterwards. Flaccidity of fruit was noticeable both in the field prior to harvest and upon arrival at the packhouse. Since the entire cultivated area was rain-fed and undergoing water stress during the

period of observation, it appears that fruit was not turgid at harvest and deteriorated further during processing (washing, waxing, grading and packing). shrivelling indicates poor handling or storage practices.

Cottony Leak: A soil-borne fungal pathogen, *Pythium aphanidermatum* is the causal agent. Soft, water-soaked lesions precede the growth of a cottony-type fungus which may cover all of the fruit. Infection is usually evident during prolonged storage and once established, spreads rapidly (McCombs and Winstead, 1963).

Recommendations

Field Cooling: As a hot day progresses, vines lose water by transpiration and the fruit accumulate field heat. Cessation of harvesting by midday on hot days is recommended to prevent the accumulation of a high level of field heat. Cooling immediately after harvest is critical to the maintenance of fruit quality. Fruit should be hydro-cooled by immersion in cold water, preferably in the field.

Disinfection: The removal of soil and other foreign material from the surface of the cucumber is necessary to prevent infection by soil fungi. Washing in chlorinated water is recommended to reduce fungal and bacterial infection (Segall and Smoot, 1962). Cut or broken ends are the most susceptible to being infected: cucumbers in this condition should be discarded during grading and sorting. Infection is rendered even more unlikely if the cucumber is removed from the vine with a small portion of the stem intact.

Waxing: The application of a thin surface coating of a wax slows down moisture loss considerably, thus reducing wilting and shrivelling of fruit. Moisture loss can be reduced by as much as 50% (Mack and Janer, 1942).

Storage: A storage temperature of 12-13°C ensures the longest shelf-life (see Table 1). However, for storage of one to two weeks, 10°C is preferable, because chilling is minimal and yellowing is retarded. High humidity (95%) in storage is also essential to prevent cucumbers from becoming flaccid.

Table 1 Cucumber spoilage after 18 days storage at 20° and 12°C> (after Apeland, 1961)

Post-harvest Problem	Storage Temperature	
	20 (°C)	12 (°C)
Marketable (%)	38.0	69.6
Shrivelled (%)	24.5	4.7
Diseased (%)	27.0	18.5
Yellowed (%)	8.5	8.2

Data represent observations on 5 randomly chosen boxes (210lbs) in storage. Fruit were waxed but not washed in chlorinated water.

Summary of Procedures

1. Immediately after harvest, crates containing cucumbers should be immersed for 15 min. in cold water (5°C) in field tanks adjacent to the area harvested. After immersion crates should be stored in a cool, shaded area.
2. As soon as possible after harvesting cucumbers should be removed from the field for processing. Transportation should be effected using a covered vehicle to prevent re-exposure to the sun.
3. Washing should be done in water containing 10% sodium hypochlorite (Chlorox). Frequent changes of the chlorinated water are necessary as accumulated soil reduces the effectiveness of the chlorine.
4. Cucumbers should be put into cool storage as soon as possible after processing and packing. Since exposure to ethylene causes yellowing, cucumbers should not be stored, either in transit or in a cold room, with tomatoes, melons, bananas or papaya.

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