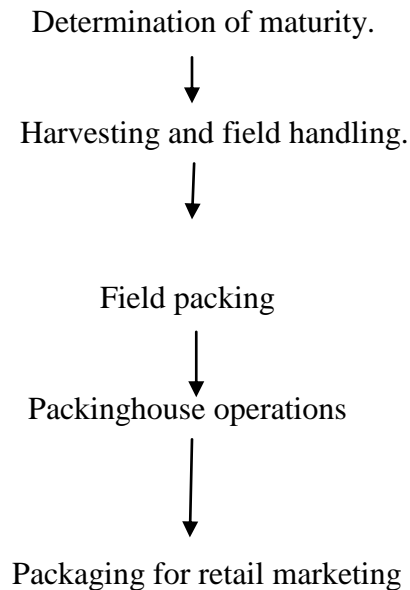


POSTHARVEST HANDLING OF CASSAVA

By: Ayoub Mohammed

Because of its highly perishable nature care must be taken along the entire chain of operations from harvesting to marketing if the integrity of the tubers re to be maintained. The approach is that is needed is a systems approach since each stage of the handling operation directly impacts the extent to which spoilage may occur. There are several important components in the 0 postharvest handling of cassava.



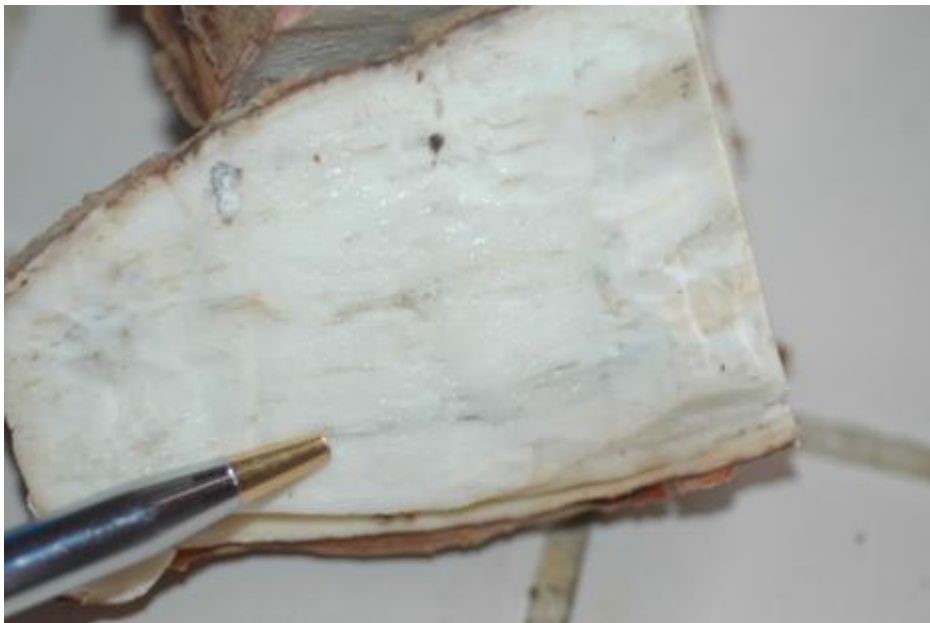
Cassava spoilage.

There are two components to the spoilage of cassava. The initial response is a physiological condition referred to as vascular streaking. Vascular streaking is an intrinsic condition which is exacerbated by damage to the tubers during postharvest handling operations. Vascular streaking expresses as discolouration to flesh of the tubers. It occurs when phenolic compounds present in the tubers are converted to coloured compounds called quinines. The process is catalyzed by an enzyme polyphenol oxidase acting on the phenolic compounds in the presence of oxygen. Dehydration caused by physical damage to the tubers of the tissues further exacerbate the

conditions. Damaged tissues become portals of entry for pathogens resulting in rotting of the tubers.

Given the nature of the spoilage of the tubers it is clear that the following precautions must be taken when handling cassava tubers.

- Ensure that tubers are not damaged during postharvest handling operations.
- Ensure a moist environment around the tubers.
- Prevent the interaction of tubers and air for long periods.
- Clean and sanitize tubers soon after harvesting to remove surface pathogens.



Vascular streaking- first symptoms of cassava spoilage



External symptoms of spoilage (secondary infection) on damaged tubers.



Soft rot associated with secondary infection of cassava tubers

Maturity indices

Knowing when the tubers are ready for harvesting is a key first step in ensuring tubers with good eating quality. If harvesting is delayed the tubers will become “brittle when cooked a condition often described by consumers as “past’. While there is still debate as to what actually happens it is believed that after the accumulation of maximum starch in the tubers the plant tends to remobilize the starch to sugars to facilitate new shoot growth and therefore the tubers lose its “mealiness” when cooked. One variety which do not succumb to this condition is the M MEM varieties. These varieties seem to go from one season to the next without the concomitant brittleness associated with other varieties. Two varieties, CMC 40 and M.Col. 22 which are generally regarded as sweet varieties will develop high levels of toxins increasing the chances of poisoning if left on the field for more than 11 months and 7 months respectively.

As the cassava nears maturity there is a marked yellowing of the leaves. Ideally the stems are cut leaving about 12-18 inches above the ground. The tubers are left for a further 2 weeks before harvesting. This technique is believed to facilitate filling out of the tubers with starch resulting in a superior product. Most farmers in Trinidad do not practice this technique because of the threat of praedial larceny.



Leaf yellowing on mature fields- A good sign of maturity

Harvesting field handling and sorting.

Once the tubers are ready for harvesting, they should be carefully removed from the soil. Ridges facilitate the easiest harvesting tubers when compared to the other systems of bed formation. Since the tubers are generally confined to the ridges the edges of the ridges are loosened with a garden fork greatly reducing damage to the tubers. When grown on flat beds and or cambered beds, it is difficult to know exactly where the tubers are and therefore a greater likelihood that they will be punctured during harvesting operations. Harvested tubers should be placed in harvesting crates and kept in a cool part of the field. The common practice of placing tubers in feed bags have the distinct disadvantage of increasing the chances of damaging the tubers especially during transportation resulting in a greater incidence of spoilage. When harvesting crates are used there is less likelihood that damage occur during transportation.

Another good practice is to sort tubers in the field. Because of the very nature of the crop some amount of damage is expected during harvesting operations. It is a very good practice to put damaged tubers in a separate crates.



Undamaged tubers



Damaged tubers placed in separate containers

Packinghouse operation

Tubers should be treated and ready for market within 3-4 hours of harvesting. Failure to do so will result in greater postharvest losses. On arrival at the packinghouse tubers should be soaked in water followed by washing with a hose. A soft bristle brush used under running water will help in removing soil debris. It is better to wash damaged tubers first since these will be subjected to the most rapid spoilage. Once soil and other field debris are removed then the tubers are placed in a chlorinated dip at 100ppm for 10 minutes. The old practice of dipping in a fungicidal dip is discouraged because new food safety trends are dictating a movement away from these practices.

Storing damaged tubers

Damaged tubers will show symptoms of spoilage from as early as 12 hours following postharvest treatments. It is far more profitable to immediately peel and freeze these tubers immediately after treatment. Another option is to grate and freeze the damaged tubers after chlorination.

Freezing of tubers either as chunks or as a grated cassava can be sold to supermarkets allowing for greater income from the enterprise.

Broken pieces can be grated pressed and dried into cassava flour.

Storing whole tubers

Even whole tubers will deteriorate very rapidly if they are not stored properly. Most farmers do not follow proper postharvest handling procedures for cassava tubers resulting in poor quality tubers offered for retail sale. Simple techniques can be used to ensure that whole tubers reach the retailer in a state of wholesomeness. Some of these methods that can be used include the following

1. Keep tuber moist at 10-12⁰ C for overnight storage
2. Store tubers between moist clean burlap bags for taking to market the following day.
3. Store tubers in sealed polyethylene bags.

4. Waxing: Tubers can be waxed with food grade paraffin wax. Once tubers are wholesome then the product can last for up to 3 weeks.