

Postharvest Physiological Deterioration in Cassava



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Postharvest Physiological Deterioration

Postharvest Physiological deterioration (PPD) is a complex biological phenomenon in which the cassava storage roots are rendered unfit for consumption, processing and marketing within 2 days of harvest thereby reducing the nutritional and economic value of cassava roots.

Postharvest Physiological Deterioration symptoms

PPD is triggered as a wound response shortly after harvest characterised by development of bluish-black discoloration of the root parenchyma within 24-72 h after harvest. The deterioration begins at the site of wounding and later spreads to entire parenchyma tissue of cassava storage roots.

Stages of deterioration

The discolouration of cassava storage roots occurs either due to primary or physiological deterioration or the secondary or microbial deterioration. The primary vascular streaking is a physiological phenomenon independent of microbial activity characterised by the development of bluish black discolouration in the xylem vessels of the tuber which further spreads to the parenchyma cells as well. The primary deterioration occurs within 2-3 days post harvest. Secondary post-harvest deterioration also referred to as microbial deterioration occurs due to wide range of pathogenic microorganisms. Microbial deterioration starts at 10 days after harvest when the storage roots have already become unpalatable and unacceptable due to primary deterioration.



PPD symptom in fresh cassava roots as bluish black vascular streaking

Loss caused by Postharvest Physiological Deterioration

- PPD causes loss of quality of harvested roots
- Cassava roots showing PPD are not fit for consumption or processing
- Globally, the loss caused by PPD was estimated to be 19% of the total production, with losses in Asia, South America and Africa estimated at 8, 10 and 29% respectively.



A. Primary or Physiological deterioration



B. Secondary or Microbial deterioration

Factors influencing PPD

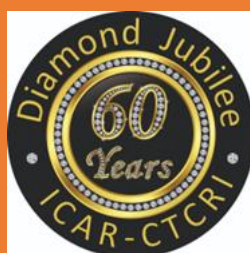
The factors influencing PPD initiation and development are mechanical damage during harvesting, genotype, environment, root shape, root length, presence of peduncles, peel adherence and texture, and soil compaction. PPD has positive correlation with root dry matter content and negative correlation with total carotenoid content.

Strategies to overcome PPD

Pre-harvest strategies include extended ground storage and pre harvest pruning. Post-harvest strategies include storage of harvested cassava roots, enzyme inactivation, chemical application, and avoidance strategies such as processing to flour. Breeding and biotechnological interventions are also undertaken to overcome the loss due to PPD. Cassava varieties such as Sree Reksha and Kalpaka have high tolerance to PPD symptoms and is found to be free of symptoms until ten days after harvest.

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