CHILBLOC

Chilling injury of fruits can be alleviated by physical techniques such as low temperature conditioning, heat treatment, controlled or modified atmosphere storage, waxing, and microbial control. Chilbloc alleviates the pressure of chilling injury using microbial species that are effective and safe for the environment.

Chilling Injury:

Chilling injury in banana fruit is caused by prolonged exposure to temperatures less than 13°C. This can occur during bunch development in the field or postharvest handling and storage. Mild symptoms of chilling injury are localised to peel tissue and reduce visual quality of fruit.

Symptoms include surface discoloration, dull or smokey color, subepidermal tissues reveal dark-brown streaks, failure to ripen, and, in severe cases, flesh browning. Chilling injury results from exposing bananas to temperatures below 13°C (56°F) for a few hours to a few days, depending on cultivar, maturity, and temperature. For example, moderate chilling injury will result from exposing mature-green bananas to one hour at 10°C (50°F), 5 hours at 11.7°C (53°F), 24 hours at 12.2°C (54°F), or 72 hours at 12.8°C (55°F). Chilled fruits are more sensitive to mechanical injury.

The main primary events in chilling injury are:

- low temperature-induce changes in the properties of cell membranes due to changes in the physical state of membrane lipids (membrane phase change)
- production of reactive oxygen species (eg. hydrozen peroxide) that oxidize leading to altered enzymatic activities and structural proteins (e.g. tubulin) are disrupted.

SALIENT FEATURES

- Decreased malondialdehyde (MDA) content and ethylene production
- Enhanced activity of H+-ATPase, Ca2+-ATPase, cytochrome C oxidase (CCO) and succinate dehydrogenase (SDH)
- Reduced electrolyte leakage,
- Slower development of chilling injury
- Sustained firmness and Hue angle

Symptoms of Chilling Injury:

Produce	Lowest safe storage temperature (°C)	Symptoms
Avocado	5-12	Pitting, browning of pulp and vascular strands
Banana	12	Brown streaking on skin
Cucumber	7	Dark-coloured, water-soaked areas
Eggplant	7	Surface scald
Lemon	10	Pitting of flavedo, membrane staining, red blotches
Lime	7	Pitting
Mango	12-13	Dull skin, brown areas
Melon	7-10	Pitting, surface rots
Papaya	7-15	Pitting, water-soaked areas
Pineapple	6-15	Brown or black flesh
Tomato	10-12	Pitting, Alternaria rots

USE RECOMMENDATIONS

POST HARVEST

- **Soaking:** Dilute 1 g in 1 L water /Kg Biomass and soak for 45 minutes
- **Spray:** Dilute 25 g in 1 L water /400 Kg Biomass

PREHARVEST

- In Drip 5 days before harvest: 10 g/L
- Spray on the Bunches 3 days before harvest: 5 g/L

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