Postharvest physical risk factors along tomato supply chain: A case study of Fiji

Salesh Kumar¹
The Fiji National University, Koronivia Campus
and
University of the South Pacific, Suva, Fiji

Steven S.J.R Underhill²
University of Queensland and University of Sunshine Coast

Sunil Kumar³
University of The South Pacific

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Background

**Problem:** Fiji growers currently have limited access to high-value domestic market due to consistency of supply and product quality constraints.

**Our approach:** Develop a participatory guarantee scheme between growers and hotels based on agreed quality and supply. Support this with relationship with grower collaborative network assistance and improved postharvest handling protocols.

**Postharvest handling element:**
Analyse pre-existing postharvest vegetable supply chains in terms of risk, quality and losses. Then develop tailored low-cost solution specific to local conditions.
Range of production practices

Various on-farm postharvest
Various packing options

Multiple transport modes
We measured the physical postharvest risk factors along the supply chain. Compared different modes of transport, road conditions, time to market, packaging, maturity, as well as post-market shelf to find out where were the problems occurring.
Day 0 – pre-harvest in the field

Day 1 to 4 – ambient ripening

Day 5 – packing in plastic boxes

Day 6 (3pm) – departs farm

Day 6 (9pm) arrives at Suva

Day 7 – Fruit for sale at the Suva municipal markets
Commercial postharvest losses = 32.93% (farm to vendor)
Projected further 14.45% loss post-vendor if fruit not consumed within 48 hours

If there was a 1 day delay/break in the chain loses (and a 48hr post-vendor consumption) total postharvest losses = 60.78%.
Fruit storage temperature on-farm and during transport to Suva markets

- Fruit ripening in shed (day 3)
- Fruit in shed now covered (day 3)
- Fruit in creates
- Truck leaves farm for Suva
- Arrive and unloading
- Navua to Suva road
Incidence of vibration/impact loading during transport

Midwest bank of Sigatoka Valley. Truck pickups from adjacent farms.

Truck leaves farm for Suva.

@ Crows nest round about.

Navua – (1.5 hour stop).

Truck at/near Nabotini.

Navua to Suva road.

Arrive and unloading.

Truck moving around farm.
So, in-transit to market there was 43mm/s (severe) vibration event that occurred at 2.06(pm) and 40 sec; at which exact point the truck was travelling @ 21 Kph;

This specific vibration event occurred 30min and 8 sec after leaving the third farm pick up; and the truck stopped 27 min and 14 sec later to check the load.
The road are poor, the packaging not ideal and production practices variable, but the key postharvest challenge (the one much of the quality losses could be traced-back to) was poor on-farm ripening practices.

Need for better ambient ripening practices and on-farm postharvest hygiene to reduce disease.

What we found
Postharvest behavioural contributors

Positive inadvertent behavioural
1. Packing and pre-loading tomato crates first – lowers risk of vibration and impact loading stress.
2. Use of recycled plastic crates (to reduce cost) – better in-transit protection.
3. Slow truck speed due to level of loading and vehicle age – reduction of impact loading
4. On-farm ripened fruit (while market-based) – less prone to vibration loading

Negative behavioural detractors
1. Stage of ripeness at harvest - inconsistent with time available to harvest
2. No sorting and removing rotten fruit during – compounding pathogen losses
Postharvest capacity building approach we are applying in Fiji and Solomon Islands is all about gaining:

- Knowledge that supports better agribusiness decisions
- Explore alternatives postharvest strategies by providing simple low cost tools to do so.
- Using relatively high-tech equipment in participatory learning environment to highlight relatively fundamental handling practices.
- Highly targeted remediation
Thank-you