



Timing is Everything

Zest Labs Analysis: Over Half of Fresh Produce Pallets Exceed Cut-to-Cool Time Targets, Impacting Shelf-life and Food Safety

Zest Labs has evaluated the variance of cut-to-cool times from recent work it conducted with strawberry growers, and the impact of temperature on the berries' freshness and shelf-life. The analysis, which was conducted in August and September of 2017 with strawberries harvested in California, demonstrates how pallet-level freshness management drives economic benefits for growers and retail grocers.

The “freshness capacity” of produce is defined as its maximum amount of shelf-life under perfect conditions. Three primary factors impact the produce’s freshness capacity: quality at harvest, harvest conditions and post-harvest handling. When produce is harvested, heat from the field must be removed as quickly as possible to reduce its impact on shelf-life. The elapsed time from the moment of harvest to when the produce is pre-cooled to its optimum temperature for preserving its shelf-life is called cut-to-cool (CTC) time. After the produce is harvested, there can be many delays on the way to the pack house where they are scheduled for pre-cooling. These delays and the variations in ambient temperatures during these periods impact the freshness – and thereby the shelf-life – of the berries.



The Zest Labs analysis found that, for the strawberries harvested during this two-month period, the pallets experienced very different CTC times and were exposed to high temperatures for long periods of time before reaching the packing house, which leads to high variability on remaining shelf-life. Key findings include:

- Growers typically have a target maximum cut-to-cool time of 2 hours; the data shows 50.1% of the pallets had cut-to-cool times greater than 2 hours with some as high as 7 hours.
- The temperatures experienced by the pallets with cut-to-cool times greater than 2 hours ranged from 58.4°F to as much as 96.8°F.

Growers and precooling companies do their best to address these variables but often lack the data they need to proactively manage freshness.

Visual inspection or techniques such as ‘pulping’ cannot identify process-related issues. If this variance is not properly monitored and managed, pallets can unknowingly be shipped to retailers with insufficient shelf-life for display or consumer sale, resulting in waste, lost profits and potential food safety issues. While cut-to-cool is a primary factor impacting shelf life, there are other process-related factors that impact shelf life as well, making it imperative that growers and grocers work together to proactively manage freshness throughout the entire supply chain.

The Zest Fresh™ solution from Zest Labs gives these companies the real-time data needed to make the most effective decisions and ensure proper protocols are being followed. Using wireless IoT sensors, Zest Fresh captures key product freshness data, including: harvest quality, harvest condition and pallet level post-harvest handling, providing a complete picture of a pallet’s freshness and enabling full supply chain freshness management.



Zest Fresh can be used for all fresh and perishable products in the fresh food supply chain – including produce, meats, seafood and dairy. For more information about this study, please email info@zestlabs.com.

Analysis Methodology

To complete this analysis, wireless IoT sensors were inserted at field harvest in each pallet of berries using the Zest Fresh solution. The tags were then autonomously read at key points through the fresh food supply chain, with final readings taking place at the packing house.

For more information on how Zest Fresh can improve your business, please contact us at:

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