



# Enhancing Tomato Paste Manufacturing with Spectrophotometers for Color Quality Control

## Introduction

Color is one of the most critical quality attributes in tomato paste. A deep, uniform red signals ripeness, freshness, and robust flavor, while dull or brown tones can suggest inferior quality or over-processing. In fact, in USDA grading, up to 30% of the score for processed tomato products is based solely on color

Traditional visual methods of assessing paste color—comparing samples to USDA standards or color fans—are subjective and prone to inconsistency.

Spectrophotometers, particularly the **HunterLab ColorFlex L2 Tomato**, provide processors with objective, repeatable, and standardized measurements that eliminate guesswork, ensure consistent grading, and support process optimization.

## Importance of Color in Tomato Paste

- **Consumer Perception and Market Value**

A rich red paste equates to freshness and flavor. Pale or brownish paste undermines consumer confidence and reduces grade classification.

- **Regulatory Standards**

Tomato Paste Score (TPS) is a defined quality metric required for official USDA grading. Instrumental measurement provides the most reliable path to compliance.



- **Processing Insight**  
Color reveals lycopene content, degree of concentration, and potential heat damage during evaporation. Monitoring TPS values during processing helps identify deviations early.
- **Supplier and Buyer Confidence**  
Quantitative data allows suppliers and customers to agree on quality benchmarks, reducing disputes and returns.

## What Color Reveals About Tomato Paste

- **Pigment Content** - High TPS correlates with greater lycopene concentration.
- **Thermal Processing Effects** - Browning or darkening (lower L\*) can indicate overheating.
- **Raw Material Ripeness** - Incoming fruit maturity impacts the a/b ratio and ultimate paste redness.
- **Consistency Across Batches** - Instrumental monitoring prevents variability in final paste appearance.

## Applications for Color Measurement in Paste Production

- **Incoming Tomatoes** - Evaluating ripeness before processing with Fresh Tomato Color Index (FTCI).
- **In-Process Control** - Monitoring color during hot break, mid-concentration, and final evaporation to predict paste grade.
- **Final Paste Evaluation** - Assigning USDA grade using **Tomato Paste Score (TPS)**.
- **Supplier Qualification** - Buyers compare objective TPS data across lots and sources.

## Best Practices



1. **Instrumental Measurement with TPS**  
Use ColorFlex L2 Tomato to generate official TPS values instead of subjective visual comparisons.
2. **Process Control Points**  
Measure incoming fruit, in-process concentrate, and final paste. Adjust blending or concentration as needed.
3. **Data Integration**  
Connect measurements to SPC or LIMS systems for trend analysis and documentation.

## ColorFlex L2 Tomato – Purpose-Built for Paste

The **ColorFlex L2 Tomato** is a compact, benchtop spectrophotometer designed specifically for tomato processors. Key features include:

- **45°/0° Geometry** – Industry standard for tomato grading accuracy.
- **Pre-Loaded Tomato Scales** – TPS, TSS, TCS, TJS, FTCl, a/b ratio, and Lycopene Index built into the instrument.
- **Rugged and Easy to Use** – Spill-proof, chemical-resistant housing and touchscreen interface built for daily QA/QC use.
- **Calibration Aids** – Supplied with HunterLab Tomato Calibration Tile, white tile, and black glass for traceable accuracy.
- **Connectivity** – USB, HDMI, and Ethernet for seamless integration into plant QC systems.

## Case Study: Paste Producer Improves Grade Yield

A large tomato paste processor previously relied on visual grading, resulting in ~15% of product downgraded to Grade B or below. After adopting **ColorFlex L2 Tomato**



and standardizing TPS readings at three points (incoming fruit, mid-process, and finished paste), the plant achieved:

- Fewer off-grade downgrades.
- Objective data for resolving customer disputes.
- Improved yield of Grade A product, increasing revenue.

This demonstrated fast ROI while strengthening buyer confidence.

## Conclusion

For tomato paste producers, color defines quality. Visual assessments can no longer meet the requirements of modern QA/QC systems, USDA grading, or international supply chains.

The **HunterLab ColorFlex L2 Tomato** delivers a dedicated, robust, and easy-to-use solution tailored for the tomato industry. By providing direct TPS values, rugged operation, and seamless integration with plant systems, it ensures consistent grading, reduces waste, and protects brand reputation.

In an industry where **every shade of red matters**, the ColorFlex L2 Tomato is the proven standard for accurate, reliable tomato paste color measurement.