



Spectrophotometers ensure the color quality and consistency needed in today's ketchup manufacturing market. Image Source: Flickr user EvelynGiggles (CC BY 2.0)

People with kids would probably agree that ketchup is the secret ingredient to improving the diets of young children. With it, you can convince almost any picky toddler to try new foods. But this love isn't limited to the juvenile palate—just look at diners, restaurants, and fast food establishments across the country. From specially formulated bottled products to mass produced foil-lined packets, ketchup has embedded itself in American cuisine.

But with high demand for the condiment comes a volume of production that requires rigorous quality control. The competitive nature of the market has made it imperative for manufacturers to choose the best color monitoring systems to ensure that their fresh tomatoes translate into high-quality ketchup products. With advanced spectrophotometry and tomato color classification image analysis, you can develop a highly efficient system for condiment production, ensuring both quality and consistency.

### **Using Color Analysis to Determine the Quality of Fresh Tomatoes**

Because color is a sign of quality in fresh fruits and vegetables as well as in the foods that are processed from these ingredients, the final color outcome of any tomato ketchup is, of course, directly related to the color quality of your fresh tomato product, with “color and color uniformity contribut[ing] directly to quality and marketability”<sup>1</sup>. [Measuring the color uniformity](#) of fresh tomatoes can also be used to identify ripening disorders such as YSD (yellow shoulder disorder)<sup>2</sup> that can degrade the quality of tomato ingredients.

Tomato color classification image analysis simplifies the color grading process by providing quantifiable data that identifies both high and low-quality products which are otherwise undetectable to the human eye. With advanced spectral technology, light absorption values can measure the lycopene and beta-carotene contents of your product to detect major tissue quality issues and reduce the number of YSD tomatoes in production batches.



Spectrophotometers use light absorption data to determine the quality of fresh tomato products and help identify ripening disorders. Image Source: Flickr user U.S. Department of Agriculture ([CC BY 2.0](#))

### **Tomato Grading and Color Scales**

Color not only provides the visual appeal necessary for consumer acceptance, it is the foundation for the USDA Processed Products Standards and Quality Certification program, which classifies tomatoes and tomato-based products according to the color quality of the fruit, setting a graded scale for color saturation<sup>3</sup>. These color scales do more than provide the basis on which final color outcome is predicted—they are also used for [lycopene content analysis](#) and nutritional value justification.

And, as new technology continues to increase the value and efficiency of tomato production facilities, spectrophotometers have become the tomato industry's basis for evaluation.



Advances in spectral technology offer the ability to look beyond skin color assessment and can provide data on ripening conditions and nutrition value content. Image Source: Flickr user darwin Bell ([CC BY 2.0](#))

From the first HunterLab D-25 A spectrophotometer, which set the original “gold standard” for [establishing tomato scores](#), to the advanced capabilities of spectral technology today, these instruments have increased the quality and production standards of many of the world’s major ketchup manufacturing plants. Today, spectrophotometers are used to evaluate raw tomato ingredients, monitor color changes throughout processing, assess changes in color due to storage conditions and/or thermal exposure, and [set tolerances for final color outcome](#).

### **Leading the Industry in Color Evaluation**

HunterLab was the first company to receive USDA approval for the instrumental analysis of tomato color and continues to be a leading name in color measurement among manufacturers of ketchup and other tomato-based products. Our commitment to innovation in this field has led to improvements in tomato growth and efficiency as well as new research on the measurement of nutritional content and value. Major ketchup producers rely on HunterLab for tomato color classification analysis and for spectrophotometers that ensure the marketability and quality of their products. For more information on HunterLab and our commitment to color measurement and evaluation in the ketchup industry, [contact us today](#).

1. “TACT proves accurate, user-friendly in digital image analysis of color in fruits, vegetables”, February 24, 2009 [http://www2.ashs.org/pressrelease/index.php?option=com\\_content&view=article&id=1009:color-test-enhances-tomato-analyzer-software&catid=3:journal-of-ashs&Itemid=5](http://www2.ashs.org/pressrelease/index.php?option=com_content&view=article&id=1009:color-test-enhances-tomato-analyzer-software&catid=3:journal-of-ashs&Itemid=5)
2. “TACT proves accurate, user-friendly in digital image analysis of color in fruits, vegetables”, February 24, 2009, [http://www2.ashs.org/pressrelease/index.php?option=com\\_content&view=article](http://www2.ashs.org/pressrelease/index.php?option=com_content&view=article)

[&id=1009:color-test-enhances-tomato-analyzer-software&catid=3:journal-of-  
ashes&Itemid=5](#)

3. "Color Quality of Tomato Products",

2008, [http://ucanr.edu/sites/zann\\_test/files/28712.pdf](http://ucanr.edu/sites/zann_test/files/28712.pdf)