

In the chaos of working and raising a family, my husband and I often interact more like business partners than a married couple. Thankfully, last Sunday my husband and I escaped for a much needed 'date night' to reconnect and take a break from the daily routines of who was grabbing what from the store or taking a turn on carpool that night. For weeks I had been planning our dinner date and was excited to try a new Italian restaurant that opened in town. The ambiance and charm reflect an Old World feel and the candlelit tables were a definite plus, but the true test for Italian cuisine for me is in the sauce.

Processed tomatoes products are judged based on their color quality and texture. Superior products maintain color quality throughout the canning process. Image Source: Flickr' user Michael Mandarano

Genuine Italian food is known for its rich tomato-based sauces and homemade flavors, so I could not wait to taste and compare what this quaint little hole-in-the-wall had to offer. I was not disappointed! I always order 'extra' marinara sauce on the side to judge for quality and genuineness. When the vibrant red sauce appeared, the visual appeal did not disappoint. Appearance is one of the first criteria I use to base my opinion and just one taste had me sold!

Fresh tomato color and flavor are the keys to quality sauce, when paired with the right texture and flavor it is almost like a little taste of Italy right there on your fork. Although the restaurant owner would not share his secret recipe, he did provide a little tip that took me by surprise. He said that one of his tricks was choosing quality tomatoes...in a can! Did I hear that correctly? That bright red burst of flavor was just screaming 'fresh tomatoes', so of course I had to ask for the brand name. Now I can't wait to try out my own recipe and perhaps fool some guests of my own with a canned version of 'homemade'.

### **Starting with Raw Color Measurement**

Superior canned tomato products start with a high standard of raw ingredients. Color is the main factor for determining quality in raw tomatoes and can be attributed to the presence of lycopene, which gives tomatoes their vibrant red color<sup>1</sup>. Lycopene is measured based on a color rating scale that utilizes instrumental analysis to create a [colorimetric scoring system](#). Spectrophotometers are used to quantify color and create the measurements needed to relate product quality to a grading scale. This colorimetric scoring system has been developed through extensive research and analysis of tomato products at various stages of production to ensure color consistency and maturity. Advanced color measurement methods have revolutionized the tomato industry and lead to higher standards in all tomato-based products.



Raw color measurements are often used to predict final color outcomes in canned tomato products. Image Source: Flickr' user Yusaku Mizuno

There have been various changes in the color measurement of tomato products over the years. Prior to 1972, all color acceptability ratings of raw tomato products were determined visually through the use of color discs to compare an acceptable minimum color standard. The USDA has now developed a new standard of measurement, with color tiles replacing the colored disc as the standard measurement tool. These tiles can also be used to classify tomato color for grade development visually, but variations in individual color perception and the amount of time consumed by this process has now made this process nearly obsolete.

### **Tomato Grading and Color Analysis**

Like many agricultural products, canned tomatoes are subject to a grading system, which is regulated by USDA standards. Meeting specific criteria for these standards requires the use of instrumental analysis for color determination and variations in product appearance. "Minimum Red" for canned tomatoes is the minimum color acceptable for U.S. Grade C<sup>2</sup>. Determination of minimum red color is based on a comparison of the blended tomato mixture with the Munsell color system for tomato products to ensure color quality. Spectrophotometers quantify color numerically for the most accurate and efficient system of comparison.



Color consistency is important in canned tomato products and influences consumer acceptance and brand name recognition. Image Source: Flickr' user David Rowan

### **Addressing Challenges in Tomato Color Measurement**

Color is such a strong indicator of product quality that 30 of the 100 points awarded to the product is solely attributed to color alone. However, color measurement does present its challenges and can vary throughout the different stages of development and processing. Today's color grading system relies on spectrophotometric technology to gather consistent and accurate data efficiently. To meet the color standard for canned tomatoes requires [technology that minimizes human judgment](#). Spectrophotometers eliminate the margin of human error and quantify results in accordance with [USDA standards for tomato product grading](#).

Objective color measurement technology that aligns with the food industry standards and provides efficient and easy to use instrumentation is necessary for staying competitive in this growing industry. HunterLab spectrophotometers are designed to minimize variables and provide standardized measurements that correlate with tomato-based product standards. Our color measurement tools have been specifically created to simplify the process by using pre-calibrated standardized tiles that match industry grade regulations. We are committed to working closely with the USDA and industry regulations through the development of high level of equipment, and can meet the needs of changing market standards. [Visit HunterLab today](#) to find out more about the line of products we provide for exceptional tomato color analysis.

1. "Color Quality of Tomato Products",

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

2. "Canned Tomatoes (Including Stewed Tomatoes) Grading Manual", April 1990, <https://www.ams.usda.gov/sites/default/files/media/Canned%20Tomatoes%20Grading%20Manual.pdf>