

New PTAB Color Score in 2018

Starting in 2018, PTAB will transition to a new color scale.

The old PTAB scale gave a 20 for fully mature, red fruit and 40 for orange, or rather immature fruit. While the scale has been used across PTAB stations for many years, we are introducing a new method of color assessment.

The new method uses a Minolta CR-410 color measurement instrument which produces a new color score called the **Hunter Hue Angle**.

The Hue Angle method distinguishes between colors using the angle along a color wheel with values going from 0 to 360 degrees, as shown in Figure 1.

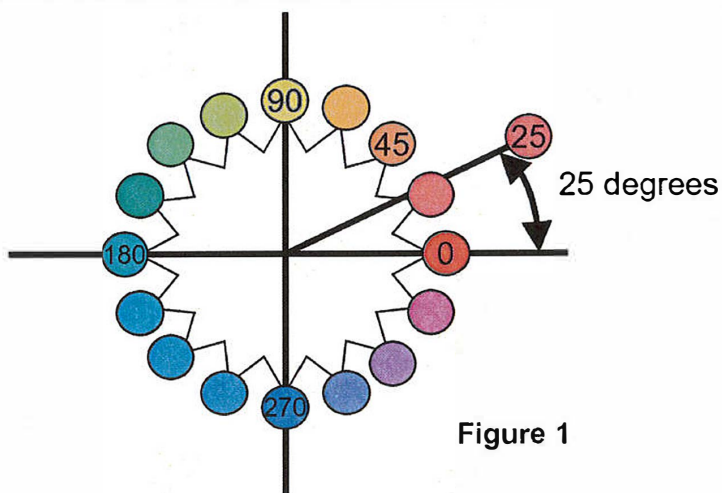


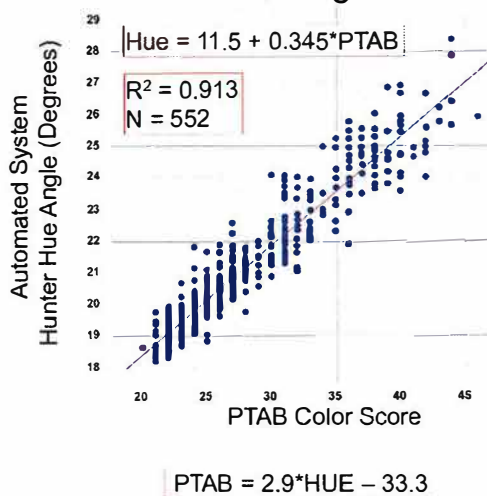
Figure 1

The Hue Angle of processing tomatoes typically ranges from 17 to 25.

While not a perfect conversion, it is possible to estimate an average PTAB color score from the Hue Angle score using mathematical formulas.

| HUNTER HUE ANGLE (DEGREES) | ESTIMATED PTAB COLOR SCORE |
|----------------------------|----------------------------|
| 17.5 | ~17.5 |
| 18.4 | ~20 |
| 19.1 | ~22 |
| 19.8 | ~24 |
| 20.5 | ~26 |
| 21.2 | ~28 |
| 21.9 | ~30 |
| 22.5 | ~32 |
| 23.2 | ~34 |
| 23.9 | ~36 |
| 24.6 | ~38 |
| 25.3 | ~40 |

Converting from PTAB Color to Hue Angle



2016 Study Data

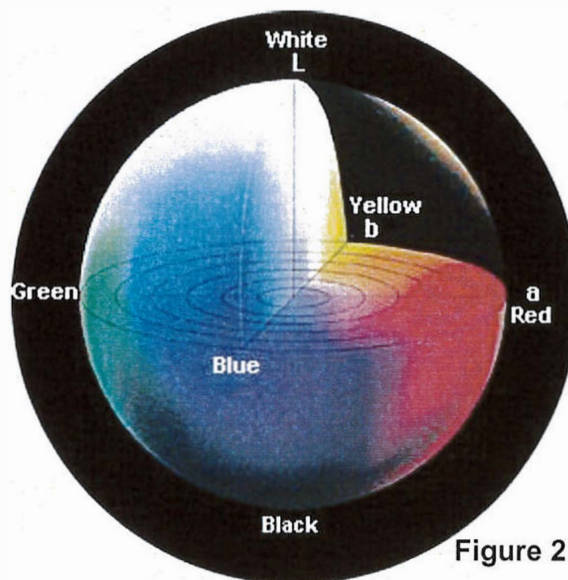
Measuring Tomato Color with Minolta

Color is an important indicator of maturity in tomatoes and is an important tool to managing product quality in the processing tomato industry.

The Hue Angle allows for an objective grading of color. It is a part of a larger measurement method, the **Hunter Lab Color Space**.

The Hunter Lab color score uses a combination of Hue, Lightness, and Saturation to describe a color.

Hue is what forms the base of the colors we can name, represented by the color wheel in Figure 1. Lightness is an added modifier that determines how bright or dark the color is. Saturation is an additional modifier that indicates how vivid or dull the color is.



While all three characteristics are used in the Hunter Lab color score, the maturity of tomatoes is characterized by hue angle moving from green to yellow to red. This is why it is used as the official grade of maturity in the new color assessment system.

As an alternative form of expression to hue, saturation, and lightness, color can also be expressed as in a rectilinear coordinate system. The x-axis is represented by a, the y-axis is represented by b, and the z-axis is represented by L, as shown in Figure 2.

L is the lightness of the color in the vertical direction. a and b values indicate color directions towards red, blue, yellow, and green.

The Lab color space is widely used in modern food production systems. By adopting this notation, we are able to standardize scores across quality control labs in tomato processing facilities.

If you would like to learn more about Hue Angle or the Lab Color Space, visit this link: https://www.konicaminolta.com/instruments/knowledge/color/pdf/color_communication.pdf