



US producers of maple syrup are adjusting to changing USDA regulations. Image credit: Flickr user Ano Lobb (CC BY 2.0)

Americans sometimes fail to differentiate between genuine maple syrup and the flavored corn syrups found at pancake houses nationwide, slathering both onto their breakfasts with abandon. But if you're a US producer of maple syrup, that's not your only disadvantage. There's also the fact that Canada provides 75% of the world's maple syrup products<sup>1</sup>—and boasts a trade group that maintains strategic syrup reserves for the purpose of regulating the global market<sup>2</sup>. This leaves American producers as perpetual underdogs.

Perhaps in an attempt to compete with our neighbors to the north, the United States Department of Agriculture (USDA) recently adjusted its maple syrup grading standards, with the goal of giving consumers a clearer picture of the quality of syrups produced within the US.

But as you've probably discovered, these new standards pose a challenge for producers. The overlap among color designations, which range from golden and amber through dark and very dark, gives you a fair amount of discretion when grading your products. And while this discretion sounds like an advantage (and while it is certainly understandable in view of maple syrup's viscosity and translucence), it can leave consumers puzzled—and producers in search of a more consistent method of quality control.



New USDA guidelines divide maple syrup into four color categories. Image credit: Flickr user Mark Goebel ([CC BY 2.0](#))

### **The Challenge of the USDA's New Standards**

Contrary to what customers seem to expect, the USDA's new standards don't designate different *quality* ratings so much as different flavors, from light to strong. But providing the most accurate flavor information requires you to grade your maple syrup according to the color of the final product—a perception which can vary due to the translucence of the syrup itself.

The perceived color of a translucent liquid is a function of light that reflects off the product plus the light that is transmitted through it. You can attach one grade to your maple syrup, but consumers could easily view the product under different lighting conditions, creating perceptions of lightness or darkness that do not match your grade.

So what can you do about it? The answer lies in a better method of color measurement.

### **New Methods of Color Measurement for the Food Industry**

The food industry as a whole has historically relied on the "CIE" system that defines a standard set of lighting conditions and a standard observer to define food color along a 3-dimensional set of axes. Some processors have also turned to the L-a-b system, which measures a product's degree of lightness (L), its degree of redness or greenness (+/-a) and its degree of blueness or yellowness (+/-b). The "Munsell" color-order system is an additional option and measures a food color's hue, value and chroma. With all of these systems, however, the food product's color is measured under a standard light source and illumination conditions. These standard systems and conditions may not correlate with the lighting conditions under which an end user views the food product—and can produce a skewed color specification that seems at odds with the consumer's perception.

For maple syrup and other translucent food products, including jellies and jams, fruit juices, and some types of sauces, spectrophotometric analysis of the product's color provides a more exact definition for quality control and grading purposes. Spectrophotometers measure the ratio of reflected and transmitted light in relation to a reference standard. These tools have historically been

too expensive and bulky for easy use in a production environment, but [newer handheld and benchtop spectrophotometers](#) are now available and can accurately account for both translucence and reflectance in goods like maple syrup.

[Products like the HunterLab UltraScan VIS](#) are a perfect match for this application. The instrument measures transmitted and reflected color and adjusts measurements for translucent haze. It also meets CIE and other measurement standards for accuracy and includes embedded firmware that filters out distortion due to light scattering and other skewing effects that are typical of transparent or translucent samples.



Spectrophotometers can provide objective color analysis of maple syrup. Image credit: Flickr user vivek jena ([CC BY 2.0](#))

### **Meeting Consumer Expectations with Spectrophotometric Technology**

To give consumers the taste characteristics they expect when purchasing your products, it is critical that you designate maple syrup grades properly. The CIE, L-a-b, and Munsell color designation systems can result in a variable characterization of syrup colors in relation to taste. But spectrophotometers allow you to grade products within specifications and boundaries that match consumer expectations.

HunterLab is a leading producer of spectrophotometers [for the food industry](#), with several models of handheld and benchtop instruments that can be used in all areas of processing and production. We also offer educational materials and support to ensure you're able to fully utilize your equipment. [Get in touch](#) to learn more about which products are best for your needs.

1. "Statistical View of the Canadian Maple Syrup Industry 2014," November 2015, [http://publications.gc.ca/collections/collection\\_2016/aac-aafc/A71-40-2014-eng.pdf](http://publications.gc.ca/collections/collection_2016/aac-aafc/A71-40-2014-eng.pdf)
2. "Inside Quebec's Great, Multi-Million-Dollar Maple-Syrup Heist," December 2016, <http://www.vanityfair.com/news/2016/12/maple-syrup-heist>