Working while raising kids means I occasionally stop at the drive-thru—and while I'm immune to most menu options, french fries are the notable exception. I've tried to make my own, but they just don't compare with the perfect flavor, color, and crispiness of fast-food varieties.

Consumers often wonder about the secret behind this phenomenon. Why are good fries so hard to replicate? As my clients in the food industry can attest, part of the answer lies in instrumental analysis. Color measurement instrumentation not only helps processors develop quality frozen foods and meet USDA regulations[1], it is an important factor in promoting consumer acceptance.

Fast food restaurants utilize color evaluation to create the highest quality product and increase consumer acceptance and choice. Image Source: Flickr user waferboard (**CC BY 2.0**)

Finding a Color Average

Today, spectrophotometers are the primary tool used in monitoring the color standards for frozen french fried potatoes[2]. Color measurement instrumentation provides a comparative analysis that is far **more accurate than the human eye alone**. Once collected, data can be numerically quantified to develop a standardization scale in relation to USDA regulations.

Multiple color measurement readings will allow you to create a **color average** and develop the most accurate ratings. These ratings can then be used for quality standardization of both frozen raw potato color and fry color. Advanced spectral technology uses a rotating measurement system to calculate multiple readings of a specific sample area over a set period of time. Color averages can then be used repeatedly to determine frying times and reduce color variations from batch to batch and in various processing plants around the globe.

Multiple color measurement readings allow for more accuracy and uniformity. These systems are an important part of creating a color averaging system. Image Source: Flickr user J R (CC BY 2.0)

Non-Uniform Sample Measurement

Measuring color standards for frozen french fried potatoes does create certain challenges. The standardization chart includes a variety of cuts that correlate with different color parameters. From short and thin to thick and crinkle cut, textures and uniformity vary greatly. Spectrophotometers must be adaptable enough to account for these various texture changes, allowing for as much versatility as possible in color measurement sample variations.

Non-contact measurement systems are typically preferred when it comes to non-uniform samples. These systems decrease the interference from sample contact and provide the most accurate data for color averages. Advanced spectrophotometers use state-of-the-art technology to control light measurement readings without surface contact, providing more accuracy and avoiding product

contamination or damage. This form of instrumental analysis has revolutionized food production in **non-uniform samples** and streamlined the process for greater accuracy and speed.

Non-contact color measurement systems provide the highest level of accuracy when it comes to non-uniform sample measurements. Image Source: Flickr user Jen Russo (**CC BY 2.0**)

New Technology for the Best QA

Not all spectrophotometers are created equal, and that's why it is important to understand the features required by your field. The food industry, in particular, has a wide variety of regulations. But spectral technology offers a range of **quality analysis** options, with advanced instrumentation that has been carefully engineered to meet diverse standards.

HunterLab is a leading name in color technology and industrial food analysis. We offer spectrophotometers specifically designed for non-uniform sample measurement and provide the support need to calibrate and utilize these tools for a variety of production needs. For more

information on monitoring the color standards of frozen french fried potatoes or other non-contact measurement uses, **contact us today.**

1. "United States Standards for Grades of Frozen French Fried Potatoes", February 8, 1967, **https://www.ams.usda.gov/sites/default/files/media/Frozen_French_Fried_Potatoes_Standard%5B1%5D.pdf**
2. ".USDA Munsell Frozen French Fry Color Standards", April 5, 2016, **https://support.hunterlab.com/hc/en-us/articles/208321666-USDA-Munsell-Frozen-French-Fry-Color-Standards**