



Monitoring the quality of vanilla extract is necessary for maintaining product reputation. Image Source: Flickr user Cooks Vanilla

Fall is finally here and pumpkin spiced lattes, Halloween decorations, and caramel apple scented candles are making their way into retail shops around the country. For me, fall is the time for baking and filling my home with the sweet smells of freshly baked pies or breads. Local supermarkets are ramping up their baking aisles with the quality ingredients consumers seek for all their fall baking needs and I am stocking up now as sales on these goods arise.

Much to my despair, after taking inventory in my pantry I realized that my vanilla extract had run dry after last year's bake-a-thon. This ingredient is a must in many of my most prized family recipes, so shopping for a quality extract is a top priority of mine. However, if you want the "real" stuff you will have to pay for it; pure vanilla extract prices have skyrocketed over the past several years due to a shortage of vanilla bean product on the market. This labor intensive crop already has a high market value, but the effects of the shortage are now causing prices to peak at more than \$600 a kilo and consumers are seeing this inflation first hand¹. As a result, we are now witnessing an increase in imitation vanilla products. But despite the rapid rise in cost, consumers like myself are still seeking out high-quality vanilla extracts and are willing to pay a higher price for improved flavor.

Current industry regulations fall short on monitoring the quality and purity of vanilla extract, but new advancements in instrumental analysis are showing promise for better methods of quality control, helping manufacturers produce extracts worthy of their high prices. Monitoring vanilla extract quality using spectrophotometric instrumentation is essential to ensuring only the highest quality are released into the marketplace.

Regulations and Variations in Vanilla Extracts

The Food and Drug Administration (FDA) does have regulations in place that govern the production of vanilla extracts. However, the current evaluation methods do not account for the many variables

that affect taste and quality. Currently, the FDA only requires two or more units of vanilla beans per gallon in a minimum of 35% alcohol to 65% water mixture for a product to be labeled as pure vanilla extract². Within this formulation, “pure” vanilla extracts may also contain various stabilizers, sugars, corn syrups, and/or [caramel color additives](#) to enhance the flavor, aroma, and visual appeal of the product. However, these additives can also affect both quality and taste. Because the FDA does not require the percentage of additives to be listed on the product label, consumers are unaware of what exactly they are buying.

There are also many variations in the way vanilla extract is produced. Extraction techniques and processes, as well as the grade of the vanilla beans themselves, all play a significant role in determining flavor and quality. Advanced instrumentation is crucial for developing the highest quality product and meeting the expectations of discerning customers. Understanding various processing techniques and analytical applications can increase both the value and appeal of vanilla extracts.



Variations in extraction and processing techniques affect the quality and flavor of vanilla extract and must be carefully monitored throughout production. Image Source: Flickr user Brian Boucheron

Spectrophotometric Applications For Quality Control

Spectrophotometric analysis can be used to set parameters for vanilla extract quality and can directly affect the economic value of the product. Spectrophotometers offer an [objective method of evaluation](#) for the vanilla processing industry and are able to detect adulteration, monitor quality, and assist in product grading and inspection.

Color in particular can be an important indicator of product quality and has a significant impact on both consumer use and perception. Off-colored product can suggest improper processing and unpalatable flavor, for example. It can also impart an undesirable hue on the food items being

produced, rendering it unusable. As such, spectrophotometric color measurement is essential to ensuring vanilla extracts conform to your standards.

Spectrophotometers provide the most accurate and precise color analysis method available, allowing manufacturers to gather the vital data necessary to monitor product quality throughout the manufacturing process. Out-of-spec product can be identified immediately, action can be taken to identify the source of the problem, and corrective measures can be implemented swiftly to minimize downtime. This is vital to ensuring that only the highest quality products enter the marketplace while optimizing efficiency. As supply and demand continue to drive competition and price and more stringent measures become necessary to promote brand name excellence and consumer trust, spectrophotometers are essential to ensuring products meet consumer expectations of flavor, appearance, and performance.



Translucent liquids require specific instrumentation and techniques for successful color measurement. Image Source: Flickr user Brian Boucheron

Liquid Color Measurement

[Liquid ingredients](#) like vanilla extract are translucent in appearance and require specific instrumentation and techniques for successful color measurement. Although translucent liquids allow light to pass through, the color saturation of the sample will diffuse the light at different levels. Both reflectance and [transmittance measurement methods](#) can work well depending on the translucency of the sample. If a sample exhibits a higher rate of transparency, transmittance methods are often recommended. Less transparent samples are best measured with a reflectance method of analysis that uses a directional $45^{\circ}/0^{\circ}$ geometry, although it is also possible to use diffuse $d/8^{\circ}$ sphere geometry as well. Simple tests can be performed to determine the translucency of a sample, which can help you select the best method of analysis.

HunterLab Quality

HunterLab has been a pioneer in color measurement instrumentation for over 60 years. Today, leading manufacturers around the world choose HunterLab spectrophotometers to ensure quality and brand-named reputation. We offer a wide variety of tools to meet industry regulations and quality control standards, helping our customers create the highest quality products. [Contact us](#) for more information about HunterLab spectrophotometers and let us help you find the right tools for your color measurement needs.

1. "Vanilla Extract – An Insider's View", April 17, 2010, <http://www.vanillaqueen.com/vanilla-extract-an-insiders-view/>
2. "CFR – Code of Federal Regulations Title 21", April 1, 2016, <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=169.176>