The color of honey can have a significant impact on consumer perception. | Image Source: Unsplash user **Sonja Langford**

It's not often that the intrigue and specter of criminal activity enter the honey world. However, when it comes to manuka honey, it's a different story. Manuka honey, derived from the manuka tree, is one of the rarest and valuable kinds of honey in the world. Renowned for its touted medicinal properties and rich, complex flavor, manuka honey fetches significantly higher prices than standard honey, spurring the emergence of a global counterfeiting industry.

Approximately 1,700 tons of manuka honey are produced annually in New Zealand, "representing almost all the world's production." Yet 10,000 tons of honey product labeled as manuka is being sold each year around the world, with 1,800 of those tons sold in the UK alone.[1] The problem has become so widespread that specialized testing methodologies have now been developed to differentiate between true manuka honey and counterfeit or adulterated versions.[2] These authentication methods have the potential to save the honey industry (and consumers) millions of dollars each year. But until global implementation of such testing is realized, large-scale counterfeiting is likely to continue.

The primary way manuka consumers seek to identify manuka honey is by color. The product is known for its creamy to dark brown hues, hinting at its strong, distinctive flavor. As such, replicating this color is imperative to passing off counterfeits as the real deal. This may be done using a variety of methods, including adding syrups or other colorants to lighter kinds of honey to approximate the distinctive appearance of manuka. It is perhaps the strongest example of how valuable honey color can be and why color standards matter.

A Matter of Color

Manuka honey is not the only honey customers primarily evaluate based on color. In fact, honey color is perhaps the most important variable in guiding consumer choices, as it ostensibly hints at the flavor one can expect from the product. As Aubert and Gonnet wrote as early as 1986, "A very dark-colored honey is suggestively associated with a very flavored product, while a light-colored honey suggests more subtle and refined fragrances."[3] However, these assumptions are not always consistent. Indeed, "The link between the color and flavor of honey is often accidental."

Despite the accidental nature of this link, consumers tend to have strong preferences when it comes to honey color. These are the result of both individual and cultural tastes. For example, American consumers tend to prefer lighter colored honeys while German, Swiss, and Austrians often prefer darker varieties.[4] This, however, may be changing with the emergence of artisanal honeys and increased interest in rare and novel food products.[5] Additionally, while color is not a perfect predictor of flavor, it can be an important indictor of quality. Color that deviates from expectations may indicate the intentional or unintentional addition of additives, processing errors, or contamination.

Honey can range from the palest white to rich amber. | Image Source: Pexels user **Pixabay**

The Honey Color Scale

In order to evaluate honey color in a standardized way, the USDA has developed a specialized classification system consisting of seven categories, ranging from water white to dark amber.[6] This color scale is used across the industry to help producers determine whether their honey is meeting aesthetic expectations as well as allowing for meaningful comparisons between product appearances. While honey color does not factor into USDA quality grading, it is an important tool for honey producers as they seek to create aesthetically desirable products that meet the demands of today's consumers.

Traditionally, the color of honey has been evaluated using a Pfund color grader, a glass wedge whose color ranges from light to dark. "The honey is placed in a wedge-shaped container and compared to the scale, and the place where the color matches is measured from one end of the wedge."[7] Today, a number of companies offer their own color grading apparatuses that also rely on visual comparison of honey to color samples. These methods are inherently subjective, as factors such as ambient light, perceptual differences between observers, and even slight color variations in color grading equipment can interfere with an accurate assessment.

Customers in different geographic locations have different honey preferences. Image Credit: Flickr User **Jason Reidy**

Toward Objective Honey Color Analysis

In order to overcome the challenges posed by visual inspection, an increasing number of honey producers are turning to spectrophotometric analysis. These high-tech instruments allow you to capture objective color information to accurately determine a product's place on the honey color

scale. Additionally, this precise data may be used to ensure batch-to-batch consistency, guaranteeing that each product is of similar quality.

The versatile optical geometries of spectrophotometers mean that they are capable of analyzing the appearance of both liquid and solid kinds of honey. Additionally, the ability to capture both transmitted and reflected color means that spectrophotometric instrumentation makes it possible to analyze a full product range at every step of manufacturing with the same instrument. As Rachel Stothard writes, "Having a machine that can accommodate both measurements means quality analysis can be as versatile as the product."["How to Measure the Color of Honey", July 16, 2015, http://www.colourmeasure.com/knowledge-base/2015-07-16-how-to-measure-the-colour-of-honey]

But spectrophotometers also allow you to go beyond color measurement. In addition to hue, the clarity of honey is one of the primary determinants of both visual appeal and product quality. In fact, clarity accounts for 10% of the USDA's quality rating of filtered honey. The current classification system is based on "the apparent transparency or clearness of honey to the eye and to the degree of freedom from air bubbles, pollen grains, or other fine particles of any materials suspected in the product." By integrating haze measurement in honey quality assessment, producers can easily determine product clarity. This information can be invaluable in identifying problematic process variables as well as evaluating new process variables as you seek to improve clarity. Today's sophisticated spectrophotometers allow you to capture both haze and color measurement with a single instrument and even with a single measurement.

HunterLab Quality

HunterLab has been a pioneer in the field of color measurement for over 60 years. Today, we offer a comprehensive range of fine spectrophotometric instruments designed to help our customers obtain the critical data they need to evaluate the quality of their products and optimize consumer appeal. Our analytical tools provide simple and accurate methods for determining honey color and haze in a variety of user-friendly formats. Contact us to learn more about our innovative spectrophotometers, customizable software packages, and world-class customer support services and let us help you select the perfect instrument for you.

1. "Food Fraud Buzz Over Fake Manuka Honey", August 26, 2013, http://www.theaustralian.com.au/news/world/food-fraud-buzz-over-fake-manuka-honey/news-story/e58d5d067d615b20c71bd04864f4397c
2. "New Tests Confirm New Zealand Manuka Honey is For Real", May 16, 2017, http://www.stuff.co.nz/business/farming/92636284/new-tests-confirm-new-zealand-manuka-honey-is-for-real

3. “Color Grading of Honey”, 1986,

   http://www.fiitea.org/foundation/files/1986/S.%20AUBERT,%20M.%20GONNET.pdf

4. “Honey Color Facts: Plus Our Favorite Honey”, December 2, 2013,

   http://besthoneysite.com/honey-color/

5. “Marketers Wax Enthusiastic Over Bees and Honey”, October 15, 2013, http://www.nytimes.com/2013/10/16/business/media/marketers-wax-enthusiastic-over-bees-and-honey.html

6. “United States Standards for Grades of Extracted Honey”, May 23, 1985,

   http://www.honey.com/images/downloads/exhoney.pdf

7. “The Color of Honey”, June 22, 2010, https://honeybeesuite.com/the-color-of-honey/