



Health conscious consumers are increasingly seeking out fruit juices to replace less nutritious beverages. Image Source: Pexels user Snapwire

Growing awareness of dietary dangers has profoundly changed the way many of us think about food. We increasingly seek out wholesome alternatives to indulgent treats and natural versions of artificially-enhanced favorites in efforts to maintain nutritional balance. Now, even companies that have historically acted as tasty diversions from healthy living are jumping onto the bandwagon in order to satisfy our ever-growing desire for healthier consumption. Fast food chains are offering low calorie menu items. Cereals that were once packed with artificial colors now derive their hues from natural sources. Fruit snacks that used to derive their sweetness from refined sugars now use, well, fruit.

However, one of the biggest focal points in the quest for healthier foods is in fruit juice beverages. In recent years, artisanal fruit juice producers offering all manner of small-batch, vegan, organic, and raw juices have sprung up around the country, serving health-conscious consumers premium products. And specialized companies aren't the only ones who have seen the potential natural juices hold; last month, McDonald's announced that it will be changing its Happy Meal juice option, replacing 100% juice Minute Maid with Honest Tea's watered down fruit juices to lower sugar content.<sup>1</sup> Meanwhile, Capri Sun, a lunchbox staple, unveiled four new product lines "made with all-natural ingredients and no added sugar."<sup>2</sup> "As a mom, I understand the importance of having options when choosing what to serve to kids," says Melanie Huet, Vice President of Capri Sun. "Many parents are looking for natural ingredients and less sugar in their kids' diets."

At a time when fruit juices are rapidly displacing less nutritious alternatives, the time is ripe for making your mark in growing market. However, with more interest comes more competition and juice producers must create products of the highest quality to stand out in a crowded field. Spectrophotometric color and haze measurement is an essential ingredient to making the most appealing fruit juices possible and capitalizing on the aesthetics of your product.



Studies demonstrate that color is the single most important factor influencing consumer perception of fruit juice taste. Image Source: Unsplash user The Creative Exchange

### The Impact of Color

Color is the first thing customers see in juice and it dictates their experience of your product more than virtually any other factor. Color is of the highest importance whether you are creating a traditional fruit juice, a new, healthier version of a traditional juice, or introducing a novel new product that introduces your customer to new flavor combinations. It guides perception from the first glance, suggesting how the juice will taste and even the nutritional attributes it will have. And, indeed, color can be an important measure of quality; color can indicate variety and ripeness of fruit, reveal oxidation, and expose potential contamination. In other words, color is often a real indicator of taste and safety.

However, color is also instrumental in shaping perception of taste and quality *regardless* of actual taste and quality. [A study published in the \*Journal of Consumer Research\*](#), for example, found that price and brand name had no impact on taste perception of orange juice. Color, however, did. When given two cups of identical juice – one with food coloring and one without – participants reported significant taste differences. In fact, color was the single most important determinant of taste. This research is supported by subsequent studies, which have found that the color of juice correlates

with specific taste perceptions; reddish orange juice is considered to be sweeter and more palatable than green-tinged juice, which is perceived as sour.<sup>3</sup> These data highlight [the premium humans place on color in informing experience](#) and bolsters the argument for prioritizing color quality in the fruit juice production process.

### The Importance of Haze

Depending on the variety of juice you produce, haze may also be an important attribute that must be controlled for in the production process. While some fruit juices are expected to be crystal clear or entirely opaque, others may be more desirable in hazier versions. This haze may be derived naturally or via specific additives that enhance appearance. According to [HunterLab's True Measure blog](#):

In a fruit drink, whether there is any natural fruit juice or not, the appearance of haze can be created by the presence of oil flavor emulsions and/or clouding agents such as citric acid. These are added on purpose to create a hazy appearance in some flavors of fruit drinks such as pineapple, lemonade, grapefruit and guava where the consumer expects some scattering.

Monitoring haze can be a critical step in product quality control for both aesthetic and practical reasons, as haze level can both shape perception and potentially indicate process errors or contamination.



Spectrophotometrically measuring the color of both raw ingredients and final products gives you end-to-end quality control. Image Source: Unsplash user Kaizen Nguyễn

### Measuring Color and Haze in Fruit Juices

Today's sophisticated spectrophotometers are ideal instruments for measuring the color of fruit juices. Spectrophotometers are designed to measure color the way the eye sees it while removing the subjective interferences inherent to human sight, creating an objective, quantifiable basis of color data analysis and facilitating batch-to-batch comparisons.

In order to implement a complete end-to-end color quality control system, you should measure [the color of raw ingredients](#) as well as the final product. This is vital in both the recipe development stage, allowing you to perfect your color standard, as well as within production in order to ensure all products adhere to that color standard. As Tom Stothard writes:

The fruit can be measured right at the start before processing to make sure that there is no issue with the fruit itself as this would prevent any time or money being wasted on processing produce that is sub-par. The juice at the end of processing should also be analyzed before being shipped to ensure the presence of a juice with all the characteristics it should possess. Of course, to be as accurate as possible, testing could be done after any additional ingredients are added.<sup>4</sup>

By measuring color at various stages of production you are able to quickly identify and correct unwanted color variations to ensure only correctly colored juices are released into the marketplace while also adhering to any USDA standards applicable to your product. Which spectrophotometer you choose will depend on your specific requirements, most importantly if you require a transmission or reflectance instrument, or an instrument capable of both.

If your fruit juice requires haze measurement, selecting a spectrophotometer capable of measuring both color and haze is essential for your quality control process. Traditionally, color and haze measurements have been separate tasks, even if performed using the same instrument. [The HunterLab Vista](#) is a revolutionary spectrophotometer designed to capture transmission color and haze data in a single measurement, optimizing accuracy and efficiency. This instrument gives you the highest level of insight and control, helping you perfect your fruit juices with ease.

#### HunterLab Solutions

HunterLab has been a leader the color measurement for over 60 years. Today, we offer a comprehensive line-up of [portable, benchtop, and in-line spectrophotometers](#) designed to help our customers develop and produce products of the highest quality. Our commitment to technological excellence has led us to develop innovative solutions to the challenges inherent to [the beverage industry](#), expanding your ability to implement rigorous quality control protocols and create the most appealing products possible in an increasingly competitive marketplace. [Contact us](#) to learn more about our renowned spectrophotometers, customizable software packages, and world-class customer support services and let us help you select the right tools for your needs.

1. “McDonald’s Will Put Watered-Down Juice Boxes in Happy Meals So They’re Healthier”, September 15, 2017, <http://www.grubstreet.com/2017/09/mcdonalds-makes-happy-meals-healthier-with-watered-down-juice.html>
2. “Capri Sun Now Offers Products Made with All-Natural Ingredients and No Added Sugar”, September 15, 2017, <http://www.businesswire.com/news/home/20170915005076/en/Capri-Sun-Offers-Products-All-Natural-Ingredients-Added>
3. “Color Influences Sensory Perception And Liking of Orange Juice,” January 17, 2014, <http://www.flavourjournal.com/content/3/1/1>

4. "How to Measure the Color of Fruit Juice", November 3, 2015, <https://www.linkedin.com/pulse/how-measure-colour-fruit-juice-tom-stothard/>