

The color of coated pills isn't just about aesthetics—it can impact [how consumers identify and use medications](#). For example, the authors of one study on the impact of pill appearance on consumer perception noted that a “change in the shape or color of medications may contribute to patients’ stopping treatment.”¹ This may be in part because users depend on the color of the pills to tell them what to take and when, as many users identify their pills by their color rather than their name. Pharmaceutical companies also increasingly employ color to [protect against counterfeiting](#), a major issue as [the \\$431 billion counterfeit pill industry continues to grow](#).² Due to the critical role of color plays in pharmaceutical use for both consumers and companies, color management becomes an essential part of the overall quality control process.

However, working with coated pill samples can bring up a number of difficulties. Of particular concern is being able to analyze a sizable representation of a batch and gain accurate data from a non-uniform sample surface. Choosing the correct spectrophotometric instrumentation is necessary to overcome these challenges and obtain meaningful data from color measurement.

The Challenges of Color Measurement in Coated Pills

Pill color has always been an essential component of medicine. In the Middle Ages, some would even coat pills in silver and gold to make them more aesthetically appealing. However, these individuals learned the hard way that adding a coating to tablets can make the medicine inert, as the old silver and gold coverings kept them from breaking down in the patient’s digestive tract.³ Today, pill manufacturers are much more careful about how their coatings can impact the efficacy of medicine. These coatings are carefully created to ensure they will dissolve easily and quickly so users can get the maximum benefit out of their medications.⁴ There is a wide variety of coatings that manufacturers may use, resulting in an extensive range of color combinations. Even as the manufacturers decide to update their coatings, they need to ensure the color of a specific medication remains consistent.

The nature of pills themselves, however, present a number of unique challenges to the spectrophotometric color measurement process:

- **Non-Uniform Samples:** Even the largest of pills does not have a big enough surface to measure color with a spectrophotometer that requires direct contact. This means that accurate analysis of color requires using a non-contact spectrophotometer to measure multiple pills at once in order to obtain meaningful color data. However, samples made up for multiple pills are inherent non-uniform, which means many spectrophotometers are not able to accurately analyze sample color without significant sample preparation.
- **Sample Size:** In order to ensure that a sample is representative of the batch as a whole, multiple pills should be measured simultaneously. However, many spectrophotometers are not designed to measure large samples, which may mean that operators must use a larger number of samples or that they take the risk of allowing a very small number of pills represent the whole batch.

In the past, overcoming these challenges often required laborious workarounds, relying on extensive sample preparation and leaving the process open to human error. Today, however, advances in technology have resolved these issues, ensuring that manufacturers can take advantage of objective color measurement.

Full article with photos available here:

<https://www.hunterlab.com/blog/color-pharmaceuticals/overcoming-the-challenges-of-color-measurement-in-coated-pills/>