

Pharmaceuticals continue to revolutionize the healthcare industry as more research and money is spent developing lifesaving drugs. With so many varieties and generic alternatives, laboratories and pharmacies must rely on color measurement tools for drug stability, accuracy, and safety. Even slight differences in generic alternatives must be carefully monitored to ensure that each dose is properly measured and consistent from batch to batch. Spectrophotometers offer the highest level of color measurement technology in the pharmaceutical industry and are an essential tool for quantitative and qualitative analysis.

## Dose Accuracy and API

One of the most important applications of color measurement in pharmaceuticals [is to ensure accuracy and proper API quantification](#). Drug formulations require multiple steps in development and as the combination of active ingredients and additives changes, quantification of each of these components is necessary for proper dosage. Color measurement allows for differentiation of these various elements to ensure accuracy in formulations in order to avoid dosage errors.

The frequency of medication errors associated with drugs formulations is unknown, but dosage errors can produce toxic results. Therefore, proper analysis and advanced color measurement quantification must be employed to support patient safety. Spectrophotometers can be used to create a standard or blueprint of specific formulations to verify that each compound is developed accurately for safety and effectiveness.

## Developing a Base Standard

Preparation of complex drugs requires many steps that can alter final formulation measurements. Developing a base standard for accuracy and comparison can ensure that final product specifications meet specified guidelines. Developing a validation system using spectral data allows for information to be stored in a database and used for comparison of like compounds. This is important for maintaining consistency from batch-to-batch and can be used to compare generic alternatives to brand name formulations.

Advanced color measurement instrumentation can be adjusted and calibrated to allow comparisons of drug compounds by matching spectral data with a standardized measurement formula. This method of analysis is highly accurate, repeatable, and non-destructive making spectrophotometers a preferred choice in the pharmaceutical industry. Spectral data can be stored in advance for multiple drug formulations, providing a database that ensure both quantitative and qualitative analysis for patient safety and reliability.

## Purity and Stability

Color measurement instrumentation applications extend beyond initial drug preparation and formulations. Spectrophotometers are also commonly used to detect impurities, which are necessary for meeting regulatory standards for pharmaceutical safety. This technology can also be used to monitor drug stability, ensuring that formulations maintain effectiveness and help detect any possible contamination.

*Purity:* Most drug formulas start with standardized ingredients. Liquids, powders, and plaques all require advanced color measurement analysis to ensure purity and safety. These products are carefully monitored to maintain compliance with the regulatory standards required for human consumption.<sup>1</sup> From APHA measurements of clear liquids<sup>2</sup> to impurity analysis of talc and other pharmaceutical additives, color measurement instrumentation is required to meet compliance and safety standards.

*Stability:* [Pharmaceutical stability](#) is a major concern in prescription drug analysis. Spectral technology can monitor changes in these compounds both during formulation and after. Continual monitoring of pharmaceuticals is used to monitor drug effectiveness over time, providing data that can help predict shelf-

life as well check for possible contamination. This information is needed to develop recall statuses and alert consumers of potentially harmful drug contamination.

Full article with photos available here:

<https://www.hunterlab.com/blog/color-pharmaceuticals/utilizing-color-measurement-for-the-quantitative-and-qualitative-analysis-in-pharmaceuticals/>