

Let's be honest: when choosing meat at the supermarket it is really the appearance, color, or the cut that influence our choices. Even if the sell-by dates are still good, brown- or greenish-hued meat is definitely a deterrent, and intuition is usually a good indicator that something is not quite right. Meat color measurement guidelines were designed for just this reason and what lies beyond the realm of human visual perception can tell us even more about the quality and freshness of our foods.



Color is the first thing that consumers consider when buying meat products. Visual perception helps buyers determine both quality and safety in their food products and greatly influences choice. Image Source: Flickr user Jason Rogers

Color Measurement in Meat Production and Research

The chemical and physical traits of meat are highly regulated by the United States Department of Agriculture (USDA).¹ Color measurement instrumentation provides a wealth of information for muscle-based foods, which is why this method of inspection continues to increase in popularity. However, meat color measurement guidelines provide only an outline for meat appraisal and adapting these methods to the specific needs of this industry is where the real challenge lies.

The desirable color of uncooked meat is typically described in a range of pinks or reds, whereas discoloration values will range from brown, grey, green, or yellow. However, "brown colors are often difficult to measure instrumentally, and for meat, it is often easier to measure a lack of redness or other normal color."² Understanding the capabilities of your instrumentation and setting instrument parameters to generate the most accurate data will ensure that regulatory standards are met and only the safest and highest quality meat products are produced.

Color Uniformity and Stability

There are many factors that affect the color of meats. From packaging to processing, developing a color scale for uniformity can be difficult since these changes are often unpredictable. Various processing techniques are often designed to improve visual color quality, but generally affect only the external color of the meat. Meat stability regulations require the measurement of color to be uniform throughout the meat sample for quality and safety. With so many acceptable variations in color, it is important to follow an instrumental color scale to achieve desirable results.



Color uniformity is an important part of meat color standardization. Spectrophotometers utilize color scale standardization to develop an average color reading in non-uniform sample measurement.

Image Source: Flickr user David J

Spectrophotometers exceed the range of normal color vision and aid in the development of [color scale standardization](#). With such a wide range of acceptable color variations, color measurement tools synchronize data in order to simplify color scale comparisons. These comparisons can then be used to monitor the stabilization process and achieve desired result as well as observe any changes due to over-treatment or decomposition. Whether developing a product for marketability or monitoring meat color for safety, the versatility of spectral technology makes this tool a necessity in any stage of meat production.

Spectrophotometry in Processing and Packaging

Color measurement regulations govern the processing methods for many meat products. From raw cuts and [grading systems](#) to [packaging safety and stability](#), spectrophotometers adapt to the non-uniform characteristics of meat. The ability to ensure a repeatable sample measurement requires the right instrumentation, one that will account for moisture levels and texture changes. With irregular sample measurements it is important to develop a color averaging system by taking multiple readings and calculating the average between variations. Spectrophotometers with large sample viewing areas are the best way to achieve accurate results throughout processing and to maintain both quality and safety meat products.



Meat packaging is designed to improve both the physical appearance and stability of meat products. Color measurement instrumentation monitors changes in meat products after packaging and new technology is working to improve these options.

Image Source: Flickr user Andrew Malone

Continual color monitoring is necessary to ensure that meat products are packaged correctly and maintain their stability after processing. Food-borne illnesses often occur after processing and can result from packaging errors. Not only does packaging play an important role in food safety, but it also works to preserve and enhance the appearance of meats. Furthermore, [color technology is opening new doors towards more sustainable meat packaging](#) options that offer continual monitor of food products. These new options extend the use of color technology to the consumer, making food safety and stability even more effective and reliable.

Versatility, Portability, and More

Spectrophotometers are one of the most versatile tools in meat color measurement and these instruments can span from production line to supermarket shelf. Available in portable, bench-top

and production in-line configurations, spectrophotometers offer a simple, dependable and cost effective method for meeting meat color measurement guidelines and ensuring product safety and quality. HunterLab is a recognized name within the meat industry and our development staff has worked with leading agricultural leaders to develop the highest level of instrumentation available to meet the various need of this industry. With over 60 years of experience, more companies trust HunterLab for their color measurement needs. For more information on our product line and options, [contact us](#) today.

1. "USDA Food Safety and Inspection Service," 2016,
<http://www.fsis.usda.gov/wps/portal/fsis/home>
2. "Guidelines for Meat Color Evaluation," 1991, <http://bit.ly/29oAvn6>