



The color of OTC medication influences how consumers perceive its quality. Image Source: Shutterstock user Corinna Haselmayer

A man suffering from a bout of heartburn walks into his neighborhood grocery store hoping to find an antacid that will relieve his symptoms. He heads straight for the over-the-counter medication aisle, but he sees that there are almost two dozen different brands of antacid sitting on the shelves. He isn't sure which one to choose. Should he go with the antacid tablet that is a calming shade of pale pink? Or is the bright green tablet a better choice?

According to research, many customers in this position would pick the pale pink option. In a study published in the *International Journal of Biotechnology* in 2010, researchers at the SIES College of Management Studies found that people were more likely to perceive a pink medication as sweet and pleasant, whereas they perceived green medication as sour or bitter.¹ This may be because many people associated the color green with acidity, which would be unappealing for those suffering from acid reflux.

This study is part of a growing body of evidence showing that color can dramatically impact perception of medication efficacy and overall user experience. As a result, [color becomes a significant factor in consumer behavior](#) and, consequently, the commercial success of medications. This phenomenon is particularly relevant for over-the-counter medication manufacturers. Unlike prescription drugs, which are recommended to patients by doctors, over-the-counter (OTC) medications rely heavily on consumer perception for sales. As a result, OTC medication manufacturers must rely on spectrophotometers to ensure that their products are as aesthetically pleasing as they are effective.



With so many OTC medication brands on the market, it's important for manufacturers to create colorful products that stand out. Image Source: Shutterstock user mayakova

The Impact of Color on Customer Perception, Adherence, and Habits

Households in the United States spend an average of \$338 per year on OTC medications, and 81% of adults say that they use OTC drugs as a first response to most medical problems.² However, the OTC drug market is competitive and [pharmaceutical manufacturers](#) must take color into consideration when developing their products in order to ensure optimal appeal, as color consistency has a significant impact on consumer behavior. For example, one study published in *JAMA Internal Medicine* in 2013 found that patients who have epilepsy were less likely to adhere to their medication schedules if the color of their medication changed during the course of treatment.³ In fact, patients were 53% less likely to take their medication on time if they were given a different-colored pill than they were used to, potentially compromising treatment outcomes. As such, it's critical to ensure color consistency in all medication products to facilitate adherence.

Additionally, consumers associate different colors with treatment of different conditions. In a groundbreaking study, psychologist Dr. Max Lüscher examined the connection between drug color and the treatments people associated with them.⁴ While conducting his famous color psychology test, Lüscher found that people most commonly associate orange or yellow with stimulant drugs,

olive green or light brown with laxatives, and cough suppressants with light blue or maroon. As a result, some OTC drug manufacturers choose to create products that align with these color associations; colors act as a kind of visual shorthand for the consumer.

In some cases, drug manufacturers can even reinvent consumer color associations. When Pepto-Bismol first hit the market nearly 100 years ago, it was an unusual shade of pink that consumers hadn't seen before. The source of the hue was the product's active ingredient, bismuth subsalicylate, which is naturally pink in color.⁵ While the pink color became strongly associated with the brand itself, it also came to signify antacid medication as a whole. Today, many antacid manufacturers will go out of their way to dye their products pink, even if they use active ingredients that are a different color. This is because studies have found that using a color other than pink can confuse customers, who have come to so strongly associate pink with antacid medication that they may believe non-pink medication is used to treat a different ailment.



Pink medications are often perceived as tasting sweeter compared to green, red, orange or yellow medications. Image Source: Shutterstock user Yuriy Golub

Spectrophotometers Can Help You Achieve Color Consistency

Spectrophotometers play a critical role in creating the ideal pharmaceutical hues and [maintaining them from batch to batch](#), assisting OTC drug manufacturers throughout product development and manufacturing processes. First, pharmaceutical manufacturers can use spectrophotometry during the formulation stage in order to develop the perfect color for every product in their line. Using spectrophotometric data, you can set unique color tolerance standards for each product. From here, your future products can be compared to this guideline to ensure color consistency. Whether you formulate a dusty pink-colored antacid or a bright yellow allergy medication, the spectrophotometer's software can tell you with great accuracy whether your product falls within the color tolerance that you've set. As such, operators can be quickly alerted to unwanted color

variation, allowing for corrective action. In pharmaceuticals, this is essential not only for aesthetic reasons but because incorrect coloration could indicate incorrect formulation or processing, both of which may have serious health implications.

OTC medications, of course, come in many different formats, from pressed pills to capsules to liquids, which each has their own unique properties that influence color measurement. As such, the spectrophotometer you choose must be appropriate for the material with which you are working:

- **Liquid Medications:** The color of [liquid medications](#) can be measured using reflectance or transmission instrumentation depending on whether the product is opaque, transparent or translucent. HunterLab's [UltraScan Pro](#), [UltraScan VIS](#) and [Vista](#) instruments are all capable of measuring liquid products and each have unique benefits.
- **Pills and Capsules:** When measure [pills and capsules](#) , you'll first need to consider whether your products are opaque, translucent or transparent, just as you would with a liquid product and choose either a reflectance or transmission instrument suited to your needs.
- **Powdered Medications:** For color measurement of [powdered medications](#), or for powders that will eventually be pressed into pill or cream form, a Directional 45°/0° reflectance geometry is preferable as it measures color the way the eye sees it. Hunterlab offers a range of instruments designed to handle loose powders and pressed powder plaques, including the [LabScan XE](#), includes an automated zoom lens that allows you to measure [very small samples](#).

With the right instrument, you can achieve greater insight into pharmaceutical color than ever before and implement the most rigorous color quality control processes possible to promote product appeal, ensure product safety, and facilitate customer adherence.

HunterLab Reliability

For more than 60 years, HunterLab has worked closely with the pharmaceutical industry, helping manufacturers establish and adhere to color standards. Using advanced spectrophotometers and color measurement software, OTC drug manufacturers can now ensure that every product is correct and consistent in appearance, whether you are working with liquid medications, pills, capsules, or powders. [Contact us](#) today to find out more about our state-of-the-art spectrophotometers and let us help you find the perfect tool for your unique needs.

1. "Color Psychology in Medicine", <http://munsell.com/color-blog/color-psychology-medicine-jill-morton/>
2. "Statistics on OTC Use", <https://www.chpa.org/MarketStats.aspx>
3. "Variations in Pill Appearance in Antiepileptic Drugs and the Risk of Nonadherence", February 11, 2013, <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/1487287>
4. *Pharmaceutical Dosage Form*, April 19, 2016, https://books.google.com.mx/books?id=JP_LBQAAQBAJ&dq=drug+quality+perception+color&source=gbs_navlinks_s

5. "Packaging Defines the OTC Market",

2005, <http://www2.uwstout.edu/content/rs/2005/article9.pdf>