



Formulating purple eyeshadows presents unique challenges for cosmetics manufacturers. Image Source: Unsplash user freestocks.org

For Halloween this year, I need to find a bright, vibrant purple eyeshadow to match my costume. I thought a purple eyeshadow would be easy to find, but I quickly realized how finicky this color can be. I swatched sample shade after sample shade on the back of my hand, yet I still couldn't find the perfect eyeshadow. Products that looked highly pigmented and intensely purple in the pan would become streaky and sheer against my skin or would turn a strange shade of chalky grey.

Cosmetics manufacturers understand this struggle well. Creating formulations for purple eyeshadow has always been notoriously difficult. Even if your formula appears richly-colored when it's first mixed, this color might not translate well once it's applied. Today's modern spectrophotometers allow you to address your formulation challenges through instrumental color measurement, giving you the data you need to create the perfect blend.



Achieving color measurement accuracy for purple eyeshadow can be difficult because this color is rarely found in nature. Image Source: Pexels user kinkate

Why Purple Hues Are So Challenging

Formulating purple eyeshadow is challenging because the color purple is rarely found in nature, limiting available sources of pigmentation. While other shades, like reds or blues, can come from a variety of different sources (both synthetic and natural), there are only a handful of ingredient options for purple shades. Some of these ingredients offer a greater pigment payoff than others.

One of the few skin-safe ingredients that give off a purple tone is ultramarine, made from a rare clay called lapis lazuli. However, this shade on its own is more of a blue-violet than a true purple, making it largely unsuitable for standalone use.¹ To correct this problem, cosmetics manufacturers must turn to other pigment sources, such as carmine, a rich, red colorant made from the shells of the cochineal beetle.² Mixing these two together creates a highly-pigmented purple shade.

Unfortunately, these ingredients tend to be more expensive than cheaper alternatives, like iron oxide or synthetic ultramarine, which may not offer the same appealing hues. As such, creating economically viable and aesthetically pleasing purple formulations can be a laborious process of trial and error.



To test your purple eyeshadow formula, you need to swatch it on a variety of test strips using a spectrophotometer. Image Source: Wikimedia user FK1954

Creating and Evaluating Formulations

Spectrophotometers are invaluable to the cosmetics industry as they allow you to [test the color of your product](#) in virtually every step of the development and manufacturing process, from ingredient selection to the final formula's blend. In order to create the perfect purple eyeshadow, you'll want to test your product in at least three steps.

Evaluating Ingredients

Your first step to achieving your desired purple hue is to test your colorants before you create your final formula, determining which one offers the strongest and most appropriate pigment within your budget. For instance, you might have a choice between two different shades of bulk synthetic ultramarine, both similarly-priced. By testing these ingredients in advance, you might find that one shade is relatively pure, with rich blue undertones, whereas the other shade isn't nearly as vibrant.

Monitoring Formulation

Next, you can mix your ingredients together until you reach your ideal shade of purple. You might decide to use more ultramarine to create a violet tone or add more iron oxide to get closer to mauve. Spectrophotometers facilitate this formulation process by detecting even the most subtle changes in color between every test mix and allowing you to create a new color standard once your formulation has been perfected. You can even [compare your new shade](#) to other shades that are already on the market, ensuring that your signature purple is utterly unique. This will also make your

eyeshadows more appealing for your customers— they know that they won't be able to find these colors anywhere else.

Testing on Substrates

Finally, you can use spectrophotometers to analyze your new color both on its own and on a substrate to simulate product use. Even if your purple eyeshadow looks perfect in the pot, it's possible that it will apply too sheer or streaked on the skin. By applying the shadow to a substrate and measuring the color spectrophotometrically, you can observe how the color behaves in use. From here, you can detect whether there are any noticeable streaks in your product and whether the pigment remains strong after application. Using this data, you can tweak your product's formula by changing your source ingredients or altering ingredient proportions.³

The Best Spectrophotometers for the Task

A [powdery product](#) like eyeshadow requires a spectrophotometer with directional 45°/0° reflectance geometry. This tool measures color the way that the human eye sees it while eliminating environmental interference and the subjective nature of human sight. The [ColorFlex EZ](#) and [LabScan XE](#) are both ideally suited for eyeshadow color measurement. These sophisticated instruments are capable of producing accurate color data of solids, liquids, and powders, allowing you to easily analyze a full range of ingredients and final products.

[Contact HunterLab](#) for more information about our innovative range of spectrophotometers and world-class customer support services. Our expert staff can walk you through the benefits of each color measurement tool, allowing you to select the right instrument for your needs.

1. "The Use of Ultramarine Pigments in Cosmetics", September 2015, http://www.koboproductsinc.com/Downloads/SOFW_Article.pdf
2. "Pigments Through the Ages", <http://www.webexhibits.org/pigments/indiv/overview/carmine.html>
3. "Decoding Eye Shadow", November 15, 2012, <http://www.webmd.com/beauty/features/decoding-eye-shadow>