Sensegood spectrophotometer for color measurement and quality - consistency control in beauty products – cosmetics

Photo: Color quality control is the most important aspect in cosmetics industry. Range of beauty products: washable, permanent and semi-permanent make-up (PMU) (including hair dyes, tattoos) Source: Australian Academy of Science www.science.org.au

FDA defines a cosmetic as a product intended to be applied to the human body for cleansing, beautifying, promoting attractiveness, or altering the appearance. [1] Color is a key property of a cosmetics product to determine the attractiveness for consumers and, therefore, it's essential for successful marketing. Coloring agents can be added to cosmetics in order to color the product itself or to color a part of the body (skin, hair, nails or eyelashes). Cosmetics is a sector with a strong growth, due to increasing concern with body image motivated by the popularity of social media. [2]

Photo: Eye shadow color palette. How to measure and convey particular color from the palette? How to ensure the same color every time from batch to batch production? Sensegood spectrophotometer is the solution you should consider. Source: Pixabay user Annca

Unseen industry growth:

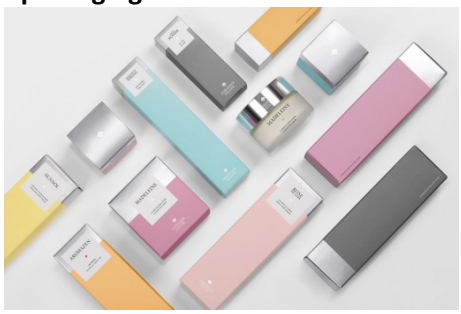
The global beauty industry is worth about $532 billion. (Reuters Plus) The cosmetic industry is growing faster today than ever before with an estimated market value of almost $805 billion by 2023. It is expected to grow at a compound annual growth rate (CAGR) of 7.14% from 2018 to 2023. [3] Cosmetic advertising, previously directed mainly at women, is now targeting a wider audience than ever.

Product development challenges:

The incorporation of color in cosmetic and personal care products is part art and part science. What seems like a simple and fun exercise in pigment blending is reliant on a complex set of decisions. Factors such as the regulatory environment, cost, and stability as well as physical and chemical properties like dispersion and oil absorption of each colorant, all play an essential role in determining success in product development as mentioned by Ms Kelly who is color cosmetic formulation expert, cosmetics technical manager at Sun Chemical

Corporation and Former chair – Society of Cosmetic Chemists. [4] Sophisticated spectrophotometers can be used to precisely measure color attributes using the CIE-Lab color space, which was created by the International Commission on Illumination (CIE). CIE-Lab measurements are commonly used to control quality of cosmetic pigments and finished goods.

Choose right color for your product's packaging:



Packaging: Adrienne Feller – Hungary. Image source: www.swedbrand-group.com

Color in your brand's packaging and products helps clarify and maintain the message of your branding, creating a key visual element in brand storytelling. Color in packaging can have practical applications, such as being used to protect formulations from light or discoloration, or even from exuding an odor.

When it comes to eye-catching packaging, color is clearly one of the most important characteristics to take into account. "A recent study found 85% of consumers attribute color as a primary reason for purchasing behavior," notes Roseanna Roberts, director of color trends for The Color Association of the United States (CAUS). [5]

Your beauty brand is often instantly recognizable by its color, so it's key to choose the right ones. "The color becomes the brand, and there are many cases of this in personal care," says Peter Prusak, head of marketing for Clariant Masterbatches North America. "A consumer can walk to the shampoo aisle and know where their favorite brand is from 20 feet away." [5]

Hence it is crucial to chose suppliers who understand color and use scientific approach in maintaining color consistency of packaging that is being supplied to you.

Importance of spectrophotometer in cosmetics industry:
We understand that making successive batches of cosmetics using the same procedure and ingredients would still result in slight variations in color shades from batch to batch. Maintaining a consistency of color between different production runs is a perennial problem for cosmetic firms.

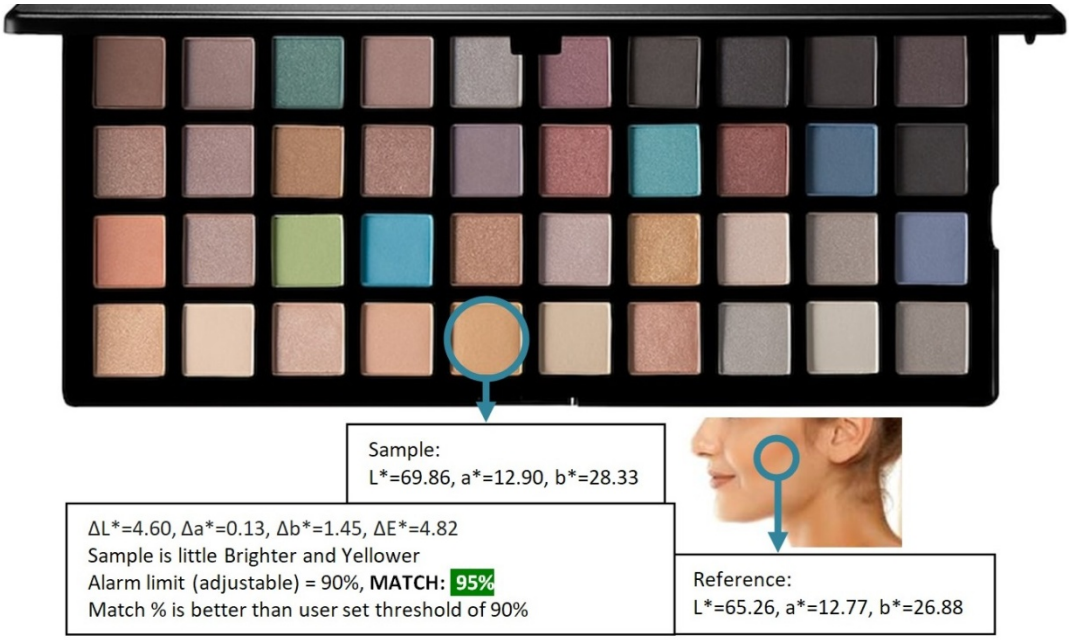
It is imperative that every batch offered for sale should be uniform in tint and in agreement with the manufacturer's own standard. A woman, who finds that her second box of powder or rouge differs in tint from the first, although sold under the same tint and brand name, is not likely to purchase a third. [6], [7]

The biggest cause of shade variation between batches of make-up is fluctuations in the color of the ingredients. For many years the only way to check that each batch was the correct shade was to visually compare it to a stored color standard.

Photo: Max Factor (founded in 1909) technician using a color-matching hood with a standard light source to check the colors of lipsticks taken from batch runs against master control samples (1961). Source: www.cosmeticsandskin.com appeared in article by James Bennett

Visual color matching is an art. However, when an individual sees a potential color match, because of the process of color vision, the nerve light receptors in the eye begin to fatigue. The result is that color matches begin to appear closer over time, usually after 15-20 seconds of viewing. Also viewing bright colors just before viewing deep colors can affect color judgment without enough time allowed for visual rest and recovery. There are also other factors like aging of the eye, stress and light source that affect the color match decision. Also scientifically it is proven that every individual has different expressive perception towards color.

Hence, it becomes difficult to make decision of accepting, reprocessing or rejecting the sample based on visual match. And this directly hampers the quality of the final product. While on other hand there are advantages of instrumental color quality control as it provides results with same accuracy, consistency and reliability. Spectrophotometer is an instrument used for color measurement and analysis. It provides numerical color data, a common color language amongst manufacturers and researchers. It eliminates subjectivity in color assessments, eliminates the variability among different analysts and maximizes accuracy and precision.

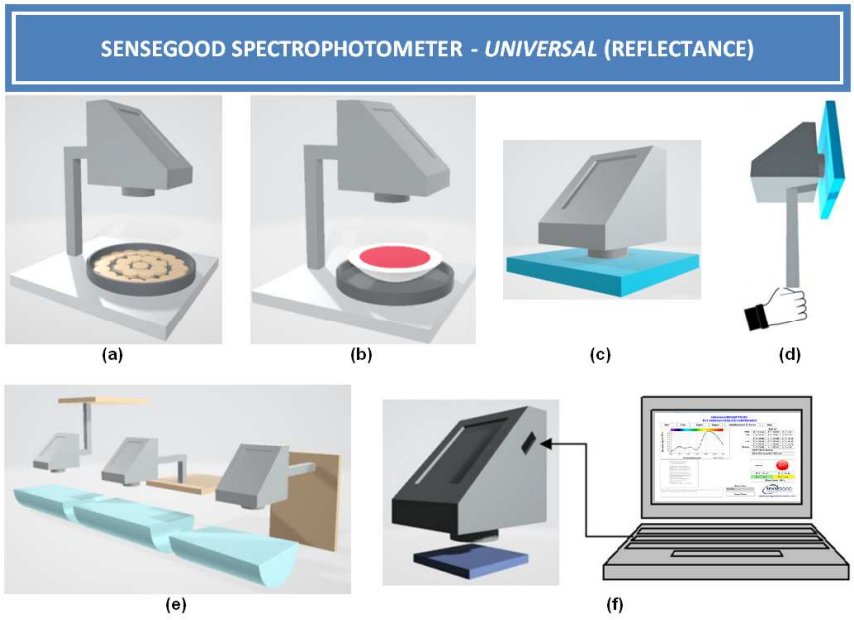


Sensegood Spectrophotometer for color management in beauty and cosmetics

Photo: For manufacturers: Sensegood spectrophotometer helps in repeating formulations every time in batch to batch production. Standard color reference can be stored using Sensegood spectrophotometer, and can be used anytime to compare with the production sample. It provides information regarding attributes in color space. Addressing comparative analysis of standard reference with sample and differences in color components ensures color consistency of your product. From right selection of ingredients to finalizing the appearance of finished product; Sensegood spectrophotometer is the perfect solution you could desire for.
For cosmetics artists: Skin color measurement: Sensegood spectrophotometer measures facial and palette color, and assists in finding the best suitable match which results in utmost customer satisfaction.

Sensegood spectrophotometer for cosmetics color quality control:

Maintaining the authenticity of true color representation of cosmetic product is the first preference for any manufacturer. Sensegood spectrophotometer is an analytical color measurement instrument that is widely accepted in the industry and research fraternity for reliability. From raw material to final product, it comprehensively evaluates the color attributes of various samples, including solids, liquids, powders and pastes. As a result, consistency can be maintained and quality standards can be met with less waste, time, and effort. Sensegood spectrophotometer is the versatile device that is engineered to work as handheld/portable, benchtop/table-top or in-process/online color measurement instrument.



- ✓ Benchtop/ Tabletop: (a) (b) (Rotating sample platform)
- ✓ Handheld/ Portable: (c) (d)
- ✓ Online/ In-process: (e)

- ✓ Solid: (a) (c) (d) (e)
- ✓ Liquid: (b) (e)
- ✓ Paste: (b) (e)
- ✓ Powder: (a) (b) (e)

- ✓ Contact measurement: (c) (d)
- ✓ Non-contact measurement: (a) (b) (e) (Adjustable height)

Works with:
- ✓ 5V adapter (cell phone charger)
- ✓ Power bank
- ✓ Computer/ Laptop (f)

- ✓ Averaging
- ✓ Auto repeat measurement mode
- ✓ Color match percentage
- ✓ Color indices (whiteness, yellowness, …)

- ✓ *SensegoodSmart* – computer interface software utility

Sensegood spectrophotometer compares color of sample with saved standard reference giving match value in percentage. If matching is poor; below set threshold, it provides audible alarm and display indication on LCD to alert operator. Hence operator can quickly react and take appropriate action. The information assists for the prompt corrective action which eventually leads to quick process parameters control, increase in the throughput and maximization of equipment usage. This surely results into low operational cost with improved product quality, consistency and market acceptability.

Photo: Batch to batch consistency in whiteness of face or body cream can be measured as Whiteness index in Sensegood Spectrophotometer. Source: KSB Sverige AB. Gothenburg, Sweden www.ksb.com

Sensegood spectrophotometer provides wide varieties of indices like whiteness index and yellowness index. Measured CIE L*a*b* values indicate strength of color parameters like: bright or dull, red – green and yellow – blue respectively. Measured color is also represented as reflectance graph, peak wavelength and color temperature on color touch LCD. Sensegood spectrophotometer is non-messy non-contact type instrument which has benefit of measuring sample's color from a distance. Because of this, sensor's optical assembly remains scratch proof enabling long life in retaining calibration. Non-contact measurement avoids any chemical contact and contamination on sensor measuring surface.

Sensegood spectrophotometer also incorporates continuous auto measurement mode. In this mode, it wakes up at user selectable intervals, takes measurement, compares the sample color with the saved reference, displays percentage match, and alarms to the operator with beeping sound in case if the matching percentage is below preset threshold. It also has provision for averaging option in normal mode as well as in auto repeat measurement mode.

Photo: Color of lipstick doesn't look exactly the same as the product itself, the shade and intensity may look different when applied. Image source: stocksnap user Matthew Henry.

Further it is commonly known fact that after manufacturing cosmetics; the shade, intensity and appearance may be drastically different when cosmetics applied to the body. To evaluate this, the product is often applied to standard substrate which simulates the real world performance. Color appealing attributes of such substrates collected over various batches compared against desired standard reference using non-contact Sensegood spectrophotometer to eliminate any off-colored batch going into the market.

Apart from products' color itself, attractive eye catching packaging color is equally important as discussed. Sensegood spectrophotometer assists in determining consistency for every supplied batch of packaging products for your cosmetics; be it boxes, containers, bottles, jars, spray pumps or dispensers.

SensegoodSmart utility:

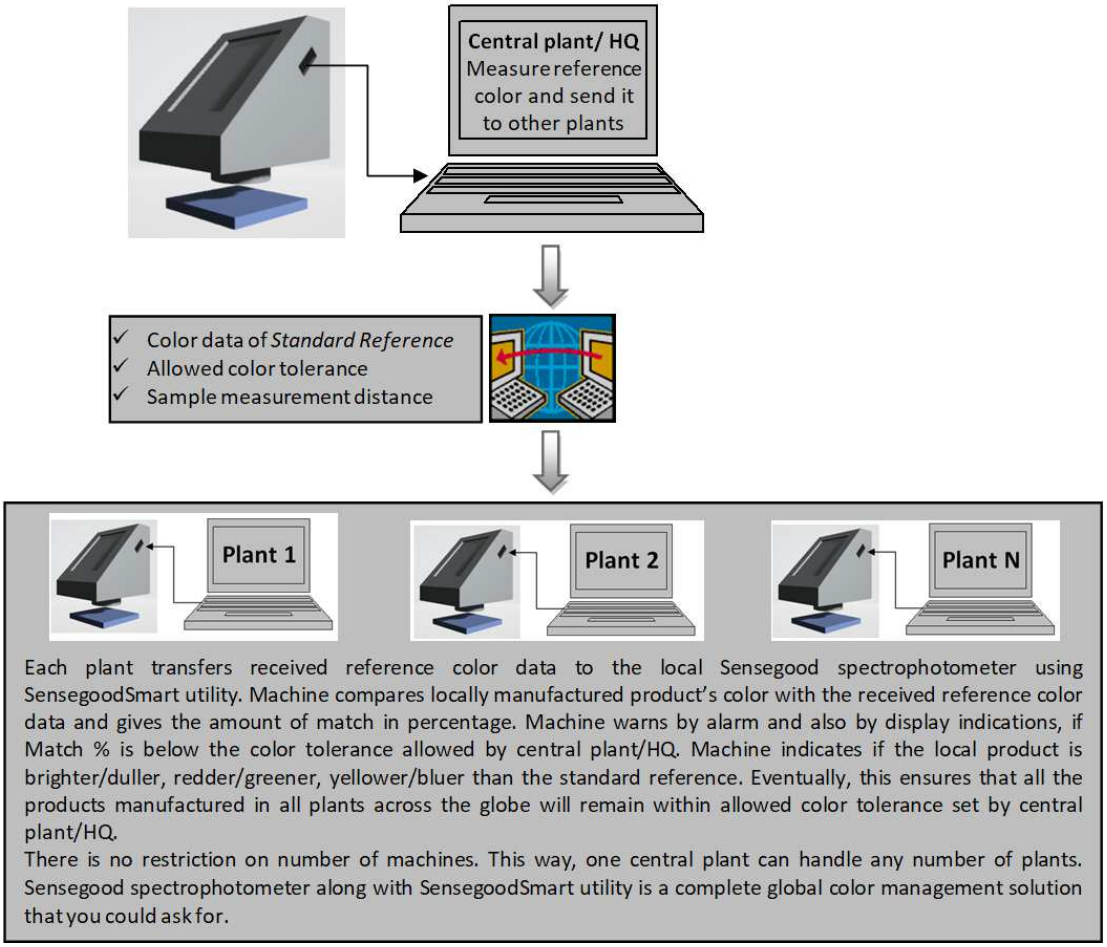


Photo: SensegoodSmart utility for color management across multiple production plants. Apart from this, SensegoodSmart utility enables user to store unlimited number of references to the computer. Any desired reference can be recalled and downloaded to Sensegood spectrophotometer whenever required. The utility provides all color related analytical information on single screen. This feature is even more desirable when using Sensegood spectrophotometer for in-process/online applications.

Sensegood spectrophotometer provides computer interface software *SensegoodSmart* which lets you to convey numeric color data across all production plants that may be located at multiple places across the globe. Each production plant uses Sensegood spectrophotometer to compare color attributes of the product manufactured in their plant with the numerical color information received from central plant or management. This enables them to reproduce each product consistently across all the plants. This feature is highly desirable for wide spread industry with plants at various places. It also assists in color consistency in packaging material supply chain.

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[6] Cosmetics and Skin Colour Matching, James Bennett, 3rd April 2018, www.cosmeticsandskin.com
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Other recommended reads for the researchers:

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