Color measurement for quality and consistency control in beverages, food pastes and condiments using Sensegood spectrophotometer

Photo: Beverages. Image source: Pixabay user: silviarita

Juice emerged as a popular beverage choice after the development of pasteurization methods which enabled its preservation without using fermentation [1]. Juice being universally popular, however interestingly the largest fruit juice consumers are New Zealand (nearly a cup, or 8 ounces, each day) and Colombia (more than three quarters of a cup each day) [2].

Photo: Food pastes condiments. (Image license: creative commons)

Sweet and tangy honey mustard or tomato ketchup, mayonnaise, cheese cream, hummus, chocolate syrup, jams or any other salad dressings or condiments can add and enhance the flavor and visual appeal to the wide variety of dishes.

Importance of color measurement:

Photo: Color sales, but right color sales much better. Image source: Sensient Technologies, Wisconsin, US

Color is the first thing that customers see in a fruit juice. It is an indication of quality and freshness for the beverages. One can perceive taste and nutrition just by looking at the color of a juice or paste. Hence color is an important parameter for quality; and indication of oxidation or contamination. And most importantly, study reveals that the color can influence the perceived flavor. [3][4]

Sensegood spectrophotometer to maintain quality and consistency:

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. Large viewing area (sensor's field of view) and rotating sample platform averages out sample and produces accurate repeatable color attributes. As a result, consistency can be maintained and quality standards can be met with less waste, time, and effort.

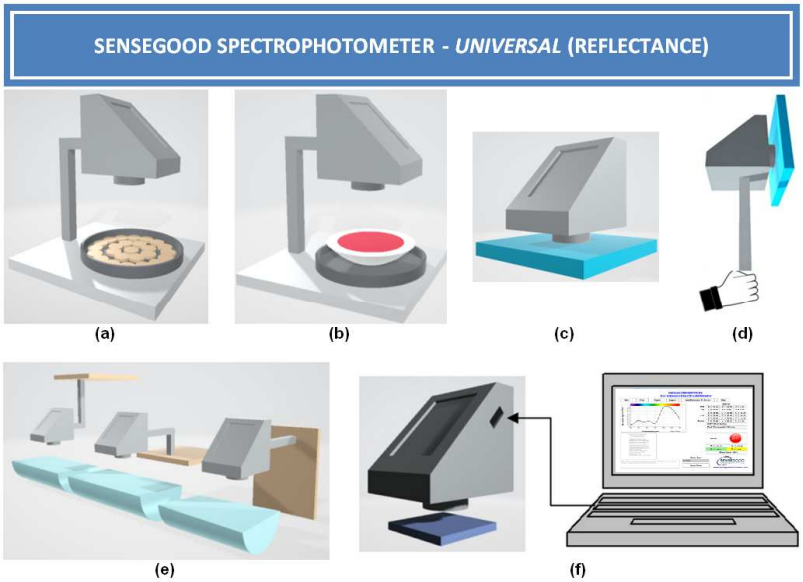
Citrus Color Index (CCI): 8.94
Citrus Number (CN): 51.92
Citrus Red (CR): 138.06

Tomato Color Index (TCI): 46.27

Sensegood spectrophotometer for quality and consistency control in beverages and food pastes

Photo: Color management and consistency control in beverages and food pastes using Sensegood spectrophotometer. Left – Measurement of Citrus related color attributes in orange drink. Ensure correct orange-redness of a juice. Right – Color measurement and quality control of tomato ketchup using Tomato Color Index (TCI). Samples were kept in white ceramic bowl and placed on Sensegood spectrophotometer's rotating platform.

Fruit processors rely on Sensegood spectrophotometer to determine and supply the right colored beverage or fruit paste. Sensegood spectrophotometer acquires color of citric fruits and juices, analyses and represent as citrus color index (CCI). Along with CCI, it also provides values for Citrus Number (CN) and Citrus Red (CR) index. Sensegood spectrophotometer's firmware works on citrus score algorithm developed by United States Department of Agriculture (USDA). [5] Similarly for tomato paste, it is equipped with Tomato Color Index (TCI). With indices like CCI, CN, CR, and TCI; manufacturers control their products' quality to ensure consistent appearance enabling forever market acceptance.



- ✓ 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)

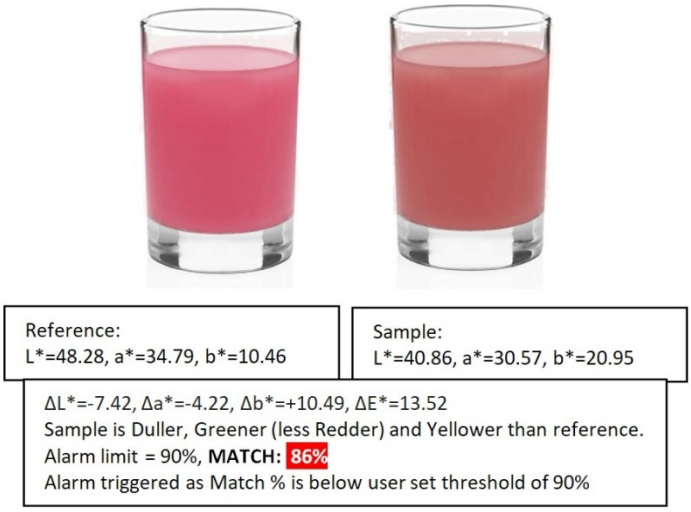
- ✓ Contact measurement: (c) (d)
- ✓ Non-contact measurement: (a) (b) (e) (Adjustable height)

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 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 the calibration. Hygiene is maintained, as non-contact measurement avoids any food contact and bacterial accumulation on sensor measuring surface. Sensegood spectrophotometer is the versatile device that is engineered to work as handheld/portable, benchtop/table-top or in-process/online color measurement instrument. It represents color in numerical data which can be conveyed across production units and supply chain to maintain consistency over wide spread market.



Sensegood spectrophotometer for quality and consistency control in beverages and food pastes

Photo: Determination of color match percentage in between production sample and saved standard reference (for beverages and food pastes in general). Color variation over different production batches indicate the process variations and inconsistent ingredient quality which results in taste inconsistencies and customer's decreasing willingness to purchase for the off colored beverages. To build and maintain a brand of repute; product's consistency is one of the most important parameter to be addressed.

Using Sensegood spectrophotometer, user can set desired sample as a reference and check match percentage value for production samples. 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 to pass, reprocess or reject the sample. 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.

Do more with Sensegood spectrophotometer:

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 has provision for averaging option in normal mode as well as in auto repeat measurement mode.

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.

SensegoodSmart utility:

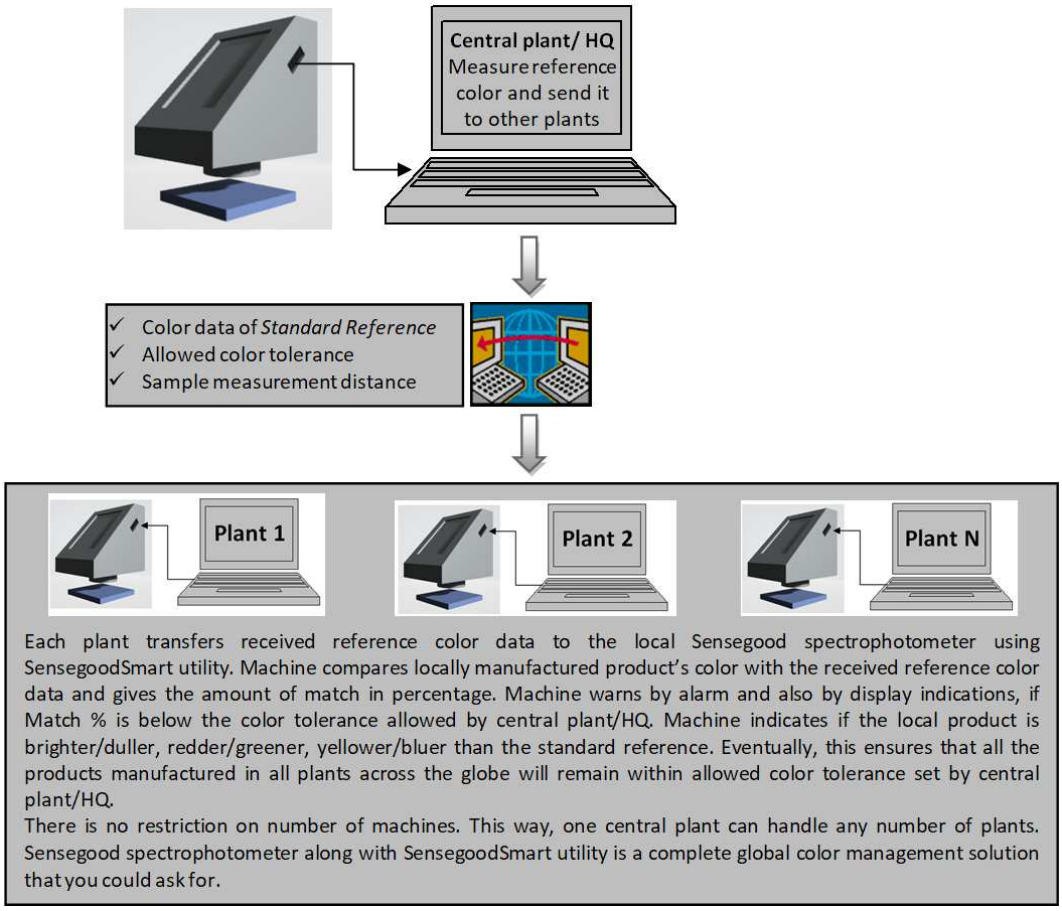


Photo: SensegoodSmart utility for color management across multiple production plants. Apart from this, SensegoodSmart utility enables user to store unlimited number of references to the computer. Any desired reference can be recalled and downloaded to Sensegood spectrophotometer whenever required. The 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.

Further read: Tea, Coffee

References:

[1] Ryan Ward, A Brief History of Fruit and Vegetable Juice Regulation in the United States (April 2011). Harvard Library Resource: Available at: http://nrs.harvard.edu/urn-3:HUL.InstRepos:8965558
[2] Singh, Gitanjali M.et al., "Global, Regional, and National Consumption of Sugar-Sweetened Beverages, Fruit Juices, and Milk: A Systematic Assessment of Beverage Intake in 187 Countries". PLOS One. 10 (8): e0124845. 5 August 2015 https://doi.org/10.1371/journal.pone.0124845
[3] Spence, C. On the psychological impact of food colour. Flavour 4, 21 (2015). https://doi.org/10.1186/s13411-015-0031-3
[4] Van Doorn, G.H., Wuillemin, D. & Spence, C. Does the colour of the mug influence the taste of the coffee?. Flavour 3, 10 (2014). https://doi.org/10.1186/2044-7248-3-10
[5] Citrus Handbook, Agricultural Marketing Service, USDA, Washington, D.C.

SENSEGOOD
INSTRUMENTS PVT LTD

www.sensegoodinstruments.com
Phone, WhatsApp, Signal, Telegram: +91 79 8484 8002
info@sensegoodinstruments.com

https://www.facebook.com/sensegoodinstruments
https://www.youtube.com/channel/UCtv4DiOC89iWeWblMSbaq6Q
https://www.linkedin.com/company/sensegoodinstruments