

FOOD INDUSTRY COLOR CONTROL

COLOR CONTROL OF MILK POWDER



Color Perception

Color is the first indication of a product quality, it is our first impulse in picking up our choice in the spread of brands in the supermarket shelves. In the manufacturing of food products, many manufacturers placed high importance on achieving consistency and right color. Beside the quality of a product, color plays a huge role in the branding of a company. Successful brands invest heavily to ensure that their corporate logos meet exacting specifications.

In the manufacturing of milk powder, color is influenced by the source of fresh milk, processing and storage. Ranging from light cream to a creamy yellow, maintaining a consistent and right color can be challenging.

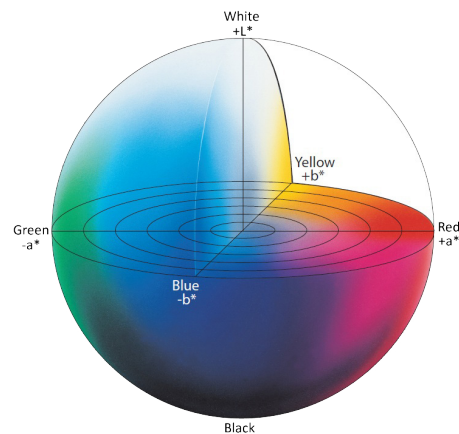
Color Assessment

There are two methods to determine and quantify color – visually or scientifically using color instrument. The human eye can detect small changes in shades and inspection is fast however, errors can arise out of fatigue and color communication is difficult due to personal interpretation and environmental factors like lighting and sampling. In color instrumentation, chroma meters and spectrophotometer are ideal as they provide an objective approach to color measurement. These color measuring instruments are widely used for incoming quality checks of raw ingredients, development of products in research and development facilities and production processes.



Scientific Color Measurement

Colorimeters like Chroma Meter measure color by using a lamp to provide a uniform illumination inside a sphere, the light will illuminate on the test sample which will absorb and reflect the light to a sensor component, thereafter a processor will compute and calculate the color data.



The data shown can be displayed in color spaces like CIE $L^*a^*b^*$ or CIE L^*C^*h which are commonly used color spaces in the food industry. This data can be used by food technologists:

- To quantify the color of a product for effective color communication.
- To archive as a record.
- To present it as a reference for incoming quality checks.
- For processing and trend analysis.
- For performance evaluation.
- For investigating factors influencing the change of color of a product.

Research and Development

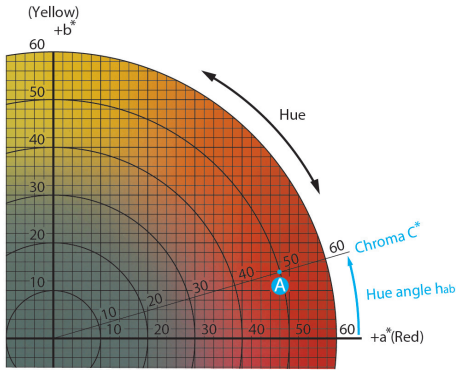
- To determine how a process affects the color of milk powder.
- To determine and achieve the optimal blending process of milk powder.
- To determine the shelf life of milk powder.

Process Control

- Monitor the color of milk powder.
- Monitoring the color change of milk powder during heating process.
- Grading of final product.

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Type of Color Analysis of Milk Powder

The color difference in the color of milk powder is most pronounced with respect to the b^* value (yellowness value). The L^* (white value) can be used to observe 'whiteness' changes in relation to time.

Milk powder ranges from light cream to yellow creamy shade, Whiteness Index (WI) and Yellowness Index (YI) can be used to monitor changes in shades to ensure a consistent product. Beyond, the CIE L^*a^*b and CIE L^*C^*h color spaces provided by a chroma meter, color data can be computed into many color indices and color spaces for in depth color analysis.

Type of Color Instrument Accessories

Chroma meters are portable instrument and can measure the samples directly. Granular or powder samples can be sampled with the aid of a granular material attachment or a petri dish. Compact chroma meters are ideal for on site measurement in the production floors and color variance can be detected fast and improve yield.