

FOOD INDUSTRY COLOR CONTROL

COLOR CONTROL OF CHOCOLATE



Chocolate is made with cocoa and variable amount of sugar and milk. It is considered one of the most popular types of food and flavours in the world with vast amount of food stuff created using chocolate. Flavour, texture and color are essential attributes in chocolate manufacturing. Maintaining consistency is challenging and is equally important to get its quality right. In order to make chocolates perfect, manufacturers place high importance to its appearance.

Color Perception

The overall appearance of a chocolate is influenced by color and gloss. It deserves appropriate attention during storage as the surface of chocolate will turn greyish (“fat bloom”) under unfavourable conditions. The term fat bloom is the whitish haze that forms on the surface due to recrystallization of cocoa butter into small crystals when exposed to high temperatures.

Under these conditions, chocolates are deprived of a smooth appearance, bright color and gloss. The turning of grey of chocolate principally appears as the result of errors during defined phases of the production processes such as tempering, forming, cooling or as a consequence of extremely long storage.

Color Assessment

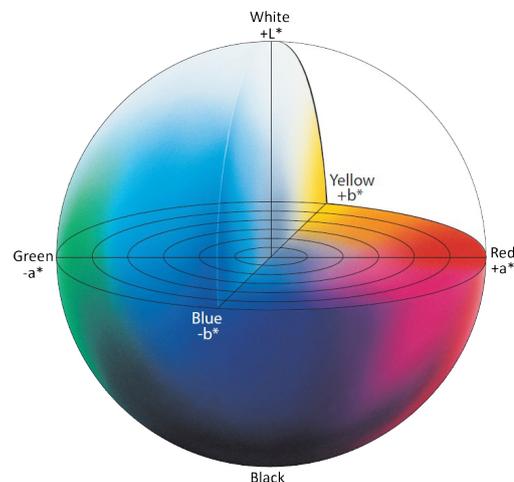
Color changes on a piece of chocolate are mainly evaluated by visual or instrumental techniques. Visual assessment is fast however, color quantifying due to personal interpretation is different and environmental factors also plays a part, non-controlled light source can cause error during visual assessment.

In color instrumentation, chroma meters and spectrophotometers are ideal tools for color measurement. These color measuring instruments are widely used for



quality checks, development of products in research and development facilities and production processes. Chroma meter or spectrophotometer measure color using an integrating sphere. The sample is placed on the aperture of the integrating sphere and using a controlled illumination/light source to illuminate the sample, the light reflected by the sample is absorb and pick up by the sensor.

The reflected light is analysed and the data is displayed in color spaces like the CIE L*a*b* which is a common used color space used in the food industry. With this color data, food technologists can quantify, blend and control the color of the product.



Processing of Chocolate

Color measuring instruments are used in the research & development and process control. For research and development, color instruments can be used:

- To track changes in formulation
- Analysing factors influencing the change of color of a product
- Determine a color of the product
- Determine and fine tuning the formulation
- Identify proper storage condition
- Design packaging colors

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In process control stage instruments can be used:

- To monitor the color and texture of the blending process
- Monitor the ambient equalization of chocolate temperature after the cooling phase
- Grading of final product
- Ensuring the color consistency of the packaging

Color Analysis

Beside the CIE L*a*b system provided by a chroma meter, the whiteness index (WI) could be used as one of the parameters of the defining of color quality characteristics (whitening of chocolate surface) which is, most probably, a consequence of color changes induced by conditions during equalization of chocolate temperature, after the cooling phase, as well as any inappropriate storage conditions.

