



# Food industry colour control

## Colour control of chocolate

Chocolate is made with cocoa and variable amount of sugar and milk. Not only is it a very popular standalone food item, it is also a commonly utilised flavour and component in many other foods for consumption. Flavour, texture and colour 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.

### Colour perception

The overall appearance of a chocolate is influenced by colour 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 recrystallisation of cocoa butter into small crystals when exposed to high temperatures.

Under these conditions, chocolates are deprived of a smooth appearance, bright colour and gloss. Fat bloom can occur from a fault during any stage of the chocolate production process such as tempering, forming and cooling or improper long-term storage of the finished good.

### Colour assessment

Colour changes on a piece of chocolate are mainly evaluated by visual or instrumental techniques. Visual assessment is fast however, colour 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 colour instrumentation, chroma meters and spectrophotometers are ideal tools for colour measurement. These colour measuring instruments are widely used for quality checks, development of products in research and development facilities and production processes. Chroma meter or spectrophotometer measure colour 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 absorbed and picked up by the sensor.

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



CM-5 Spectrophotometer for colour measurement, widely used for quality checks, development of products in research and development facilities, and production processes.

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## Processing of chocolate

Colour measuring instruments are used in the research and development and process control.

For research and development, colour instruments can be used:

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

In process control, stage instruments can be used:

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

## Colour 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 colour quality characteristics (whitening of chocolate surface) which is, most probably, a consequence of colour changes induced by conditions during equilisation of chocolate temperature, after the cooling phase, as well as any inappropriate storage conditions.



**Contact us for a solution to control colour in your chocolate production process. From hand-held colorimeters to high precision all-in-one bench top systems, we have a solution to suit your specific needs and throughput.**



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