DigiEye

Putting Colour in Context

There could be Food or Drink that cannot be measured for colour using the DigiEye System...

..it's just that we haven't found any yet!

The Challenge of Managing the Colour of Food

The visual aspect of food, in terms of its colour and overall appearance, is acknowledged as one of the most important factors influencing the consumer's purchasing decision.

There is a direct correlation between colour appearance and the product's quality, maturity and the perception of being 'fit for purpose'.

This clearly has a significant impact on how produce and ingredients are quality controlled for colour throughout the supply chain.

This process has become increasingly challenging as the retail sector becomes more and more competitive, supply chains become more complex and disparate, and time and cost pressures escalate.

In order to minimise wastage, maximise retail revenues, protect a brand's integrity and realise supply chain efficiencies, it has never been more important to control colour from source to store.

Historically, the prevailing method of quality control has been pure visual assessment, largely with uncontrolled and inconsistent viewing conditions in terms of the viewer, light source and angle of observation.

This subjective approach prompted the use of instrumental colour assessment of food, but this also was found to be restrictive and unreliable due to the incongruous variety of food products such as irregular shape and form, inconsistent surface texture and inherent sheen.

A colorimeter or spectrophotometer can only measure a limited area of the product and averages the colour of the selected area, largely with unsatisfactory results.

In addition, and crucially, this isolated and unrepresentative area bears no correlation as to how the human eye sees colour or the overall appearance of the product.

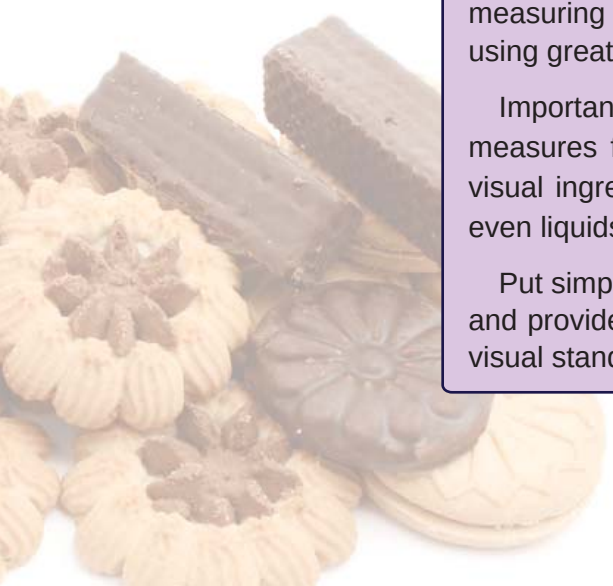
> *"DigiEye is an invaluable application for companies in the food sector, helping to ensure the consumer is able to buy consistent and reliable product."*

The Solution : DigiEye - Measuring Colour in Context

The DigiEye system from VeriVide is different; digitally capturing and measuring texture, colour & appearance with an amazingly high resolution, using great precision, and with methods that are consistent and repeatable.

Importantly it measures colour in context, not in isolation. DigiEye measures food in context with other product in the batch, with the other visual ingredients of the product and within the context of the packaging, even liquids within transparent bottles.

Put simply, it measures the colour in context - **as seen by the consumer** and provides quantifiable, consistent visual assessment against an agreed visual standard.



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What is DigiEye?

DigiEye is a digital colour imaging system with many proven applications throughout the Food Sector and has been specifically designed to offer industry the ability to consistently and reliably measure colour and appearance, using a non-contact method.

The DigiEye System includes a characterised SLR camera, enabling capture of outstandingly detailed images, recording colour data at millions of points. This, combined with a calibrated monitor and printer provides accurate visual on-screen representation of the product and printed colour accurate photographic images for use as master product standards

Product images are captured in the enclosed 'DigiEye Cube' eliminating all ambient light. This ensures the product image is captured in consistent lighting using both angled & diffuse light and giving authentic representations of the product.

The system has the versatility to measure objects as small as a grain of wheat and with a total field of view of around 40 cm x 50 cm, it can accommodate a wide array of food types.

These images of wine & herb sauce, soup and yogurt have been imaged with the DigiEye system.

From these images colour data can be obtained for areas of specific interest as well as for overall visual appearance.

The colours of the different visual components can also be measured as percentages of the total.

How it Works

Samples are placed upon a neutral grey background within the DigiEye Cube, allowing the image to be captured in a controlled, consistent and standardised environment.

The lighting used closely matches the CIE D65 lighting and can be used with different illumination geometries.

The two images of biscuits, immediately on the left, were taken using the DigiEye system and illustrate the differing visual appearance obtained from using angled and diffuse lighting.

Diffuse illumination removes specular reflections of products with glossy and curved surfaces enabling reliable colour measurement of food product such as tomatoes and apples. Angled illumination allows the varying surface structures and textures of food products to be clearly displayed, measured and evaluated.

Direct and immediate product comparisons can be made of samples in different global locations and over differing periods of time. This, for example, has proved invaluable for research of product shelf life and colour stability of food products.

The ability to communicate images and data electronically facilitates quick and dependable visual product comparisons, with the associated opportunities of increased consistency and reliability of food product and ingredients.

ANGLED ILLUMINATION

Highlights surface details. Ideal for accurate appearance.

DIFFUSE ILLUMINATION

Flattens the images. Ideal for colour measurement.

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What DigiEye Offers You

Features	Benefits
Non-contact colour measurement, surpassing the capabilities and restrictions of the spectrophotometer.	Increases tremendously the types of food stuffs that can now be accurately colour measured.
A totally enclosed area for sample image capture.	Eliminating the detrimental effects of ambient lighting. Controlled & consistent lighting ensuring controlled, reliable & repeatable results.
'Colour Clustering' - measurement of the differently coloured visible elements in a food or mixture.	Unlike a colorimeter or spectrophotometer, which averages colour data, DigiEye can calculate the percentage of each visible colour. Supplying quantifiable quality control data for each element in context with the total sample.
Global electronic communication of product colour, shape, size & texture together with unequivocal colour data.	Visual consistency across multi-location production units and improved product reliability as colour data and images can become part of the product specifications.
The system has easy to use controls, suitable for all levels of computer proficiency.	As the camera settings are largely controlled by the DigiEye Software, there is no requirement for prior photographic knowledge.
Ability to measure powders and liquids without the need to dispense or decant product.	Measurement of colour as seen by the consumer, e.g. liquid within a transparent bottle or the colour or the consistency of yogurts or ice cream as the lid is peeled back.
Colour Replacement feature	Digitally change the on-screen colour of the product to assess the alternate colours of new and existing products, e.g. changes in the colour of icing on biscuits or cakes.
Easy retrieval of master production standards.	Removes subjective manual visual assessment during production. The system enables timely detection of non-standard product, creating opportunities for a reduction in retailer returns & significant waste and cost reduction.
Measures 'Colour in Context'	Measure the colour of the total sample, multiple areas of the sample or specific small areas thereby optimising brand integrity & sell-through revenues. Validate colour as seen by the consumer.

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Applications within the Food Industry

Visual Quality Control across multiple production locations against master product standards.

Measurement of visual coverage area of coatings, such as icing, enrobing and dusting.

Post-harvest storage and shelf-life trials; recording visual compositional changes with differing storage methods & time periods.

Assessment of the effects on product colour during trials for removing shellfish from the shells.

Visual and numeric colour value analysis, keeping product within established tolerances.

Measurement of colour and appearance changes using differing process methods.

Colour measurement and analysis of product, such as yogurts & sauces without separating the components.

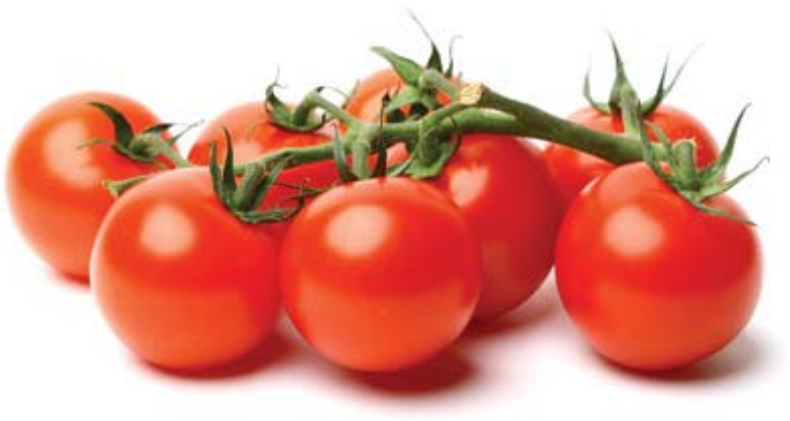
Percentage measurements of visible proportions of product, e.g. mixed vegetables, salads and cakes.

Production of images used in the specifications of frozen fruit and vegetables.

To mention but a few . . . .

Colour in Context

"I believe DigiEye is well placed to become the default colour measurement system for the Food Industry."



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The DigiEye Colour Measurement & Imaging System is manufactured in the UK by VeriVide Limited, the lighting and digital colour assessment specialists.

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