

Color Measurement of Animal Feed

Introduction

Animal feed is a type of food formulated to compensate for the nutrient losses of an animal's natural diet. It requires careful selection and blending of ingredients to supply the necessary nutrients that maintain the health of the animals and improve quality of end products like meat, milk or eggs. Today, with the increased cost and limited supply of conventional grains, the need for affordable feed necessitated the use of Distillers Dried Grain with Solubles (DDGS) as an alternative. DDGS is a co-product of the dry-milled ethanol production process which is low in cost and high in nutritional values.



Color has been popularly used as a basic indicator of quality. Color correlates with the nutritional qualities of feed and is often used by buyers to determine the quality of finished feed product. In addition, color can give an indication of the maturity of the feed grain, storage conditions and the presence of toxins and contamination. For instance, an orange to red color appearance may indicate high tannin content in orghum. Grains with dark appearance may indicate excessive heat treatment or spoilage due to improper storage or end of shelf life. For the animal feed industry, color evaluation can help improve feed formulation and yield in animal feed production.

Color Management In Feed Manufacturing Process

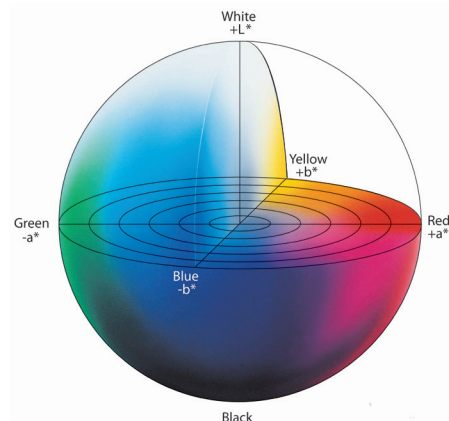
The manufacturing of animal feed requires color management throughout the process in order to achieve the right color all the time. Starting from ingredients preparation (corn, oil, soy, distilled grains, wheat, etc.), coating pre-application and after-heating process to the finished product before packaging. Animal feed requires a precise proportion of ingredients to achieve the right color, checking the color of ingredient can help minimize color variance in the final product.

After the heating process, a color discrepancy on this point may indicate a problem with the heating process. A feed that is overheated may appear darker or lighter when under-heated. These changes in color can be visually assessed, but has

its limitation. The visual method is subjected to individual perception of colors as our eyes are not good at differentiating between colors that are extremely close in appearance. Setting up a [color quality program](#) can help to control and minimize color variance.

For feed products with oil and fat based coating, the coating and pellet are measured separately just to ensure both ingredients are within satisfactory standard. Coating can influence the color and appearance of the feed pellet, measuring them separately can help determine whether the feed or the coating is off-color.

Measuring Animal Feed In The L*a*b* System



Excessive heating of feed ingredients can cause the binding of amino acids and protein to other compounds and reduce amino acid digestibility (especially lysine) and result in losses of protein quality. [CIE L*a*b*](#) is a common color space widely used in the animal feed industry to assess the extent of heat damage. It

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measures the degree of lightness (L^*), degree of red or green ($+/-a^*$) and the degree of yellow or blue ($+/-b^*$). For evaluation of DDGS sources for use in swine diets, it is ideal to come up with CIE L^* reading higher than 50 to ensure above average lysine digestibility.

With the help of a color measuring instrument like Konica Minolta Chroma Meter [CR-410](#), equipped with CIE $L^*a^*b^*$ colorimetric data, objective color evaluation of feed ingredients can be achieved easily. It is recommended to use accessories such as petri-dish or granular material attachment to achieve uniform measurement surface area to improve accuracy. The use of accessories can also help simplify measurement process and eliminate unnecessary wastage.

Konica Minolta Sensing offers a wide range of [instruments](#) for measuring and quantifying color of animal feed. To understand more about the basics of color and object color measurement, click [here](#) to download our free education handbook.

Alternatively, you can [email](#) or call us at 6563 5533 for a free consultation with our color specialists to help you select the appropriate models for your specific application.

