Applications Note

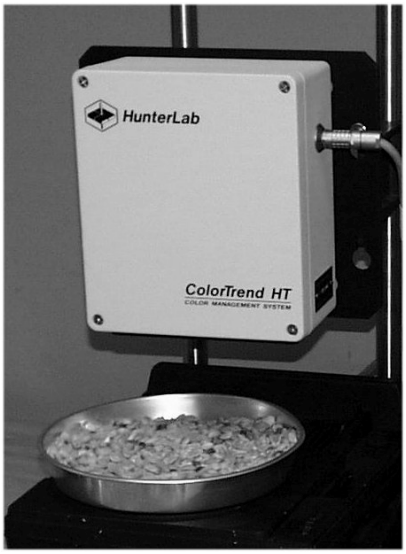
Insight on Color **Vol. 10, No. 11**

Using the ColorTrend HT for On-Line Measurement of Nuts

The color of peanuts, mixed blends, and tree nuts can be assessed immediately after roasting or cooking, while still on the line, using the ColorTrend HT. Such measurements provide information about product quality and sufficiency of cooking or roasting. Color measurements can help reduce costs associated with color complaints and can indicate when there is a process upset, such as a temperature set too high or too low. On-line measurements allow you to react quickly to such upsets and to measure product constantly, rather than just reading intermittent laboratory samples.

There are a number of process variables that can impact the color of nuts. Typically, control parameters such as operating temperature, line speed, and dwell (or resident) time all have an effect on color. In order to determine how these variables affect color, it is important to first get real-time measurements of color that can be tracked accurately and consistently from the beginning stages of a run through to the finished product. This information helps determine the causes and effects of process variation, allowing prompt corrective action to minimize off-quality product, increase production throughput, and maximize equipment usage. As a result, plant operating costs are ultimately reduced and overall product quality is improved. On-line measurements also result in reduced laboratory labor and material sampling costs as the laboratory quality control function is reduced to infrequent auditing.

Typically, the ColorTrend HT sensor is mounted above the conveyor belt just after the roaster or oven. (Mounting over the oven band is not recommended.) The nuts pass under the sensor in layers or piles and the instrument measures the nuts that it "sees" and provides colorimetric data that is updated frequently.



There are several items that should be considered when installing the ColorTrend HT over a nut line.

1. The nuts should completely fill the area being measured and multiple layers of nuts should be available under the sensor. When the height cut-off feature is used, the sensor can automatically disregard the belt color to eliminate interference of that color.
2. To optimize sample presentation, a plow or other planing device that can flatten and spread the product to a constant depth is recommended.
3. Hitching to the laboratory instrument (D25 or LabScan XE) is advised when the ColorTrend HT is used to constantly track the product color while occasional laboratory samples are measured to validate the on-line measurement.

HunterLab has tested the ColorTrend HT on a number of nut lines. Summary information on significant trials is provided below.

Roasted Cashews

For roasted cashews, the values obtained from the ColorTrend HT tracked well with D25 readings after hitching and readings were taken using a 5-second update period. The acceptable product L* range was 48-53 units. Based on the resident roasting time, the ColorTrend HT was able to detect a change in oven temperature in about ten minutes.

Roasted Peanuts

Color of roasted peanuts for snack foods, candy ingredients, peanut butter, and other peanut products is important. For instance, a two degree roaster temperature change can result in up to a two unit change in L*, which is related to the taste of peanut butter. For roasted peanuts, the L* value is usually between 50 and 70, the a* value is between -10 and 10, and the b* value is between 40 and 60. If the L* value were lower (35, for instance), you might be alerted that the roaster is scorching the nuts. Bed depth varied by about one inch during the trial, affecting the L* value by about one unit. An update frequency of 5 seconds is recommended, which means that all measurements made in that 5 second period are averaged together for the final data provided.

For Additional Information Contact:

Technical Services Department
Hunter Associates Laboratory, Inc.
11491 Sunset Hills Road
Reston, Virginia 20190
Telephone: 703-471-6870
FAX: 703-471-4237
www.hunterlab.com