



Degree of Bake: Biscuits, Crackers or Cookies

Real-time On-Line Measurement of Degree of Bake/Surface Brownness

Taste, texture and appearance are all key quality attributes that determine the success of a food product in the market. Testing of the product during the manufacturing process for moisture and color is important to ensure final product consistency and “freshness”. Typically, manufacturers utilize off-line color testing to determine the surface brownness or degree of bake of a product, which can be time consuming and does not provide instant outputs to a PLC or control system.

Nordson’s approach is to combine Degree of Bake (DOB) with its traditional NIR on-line measurements such as moisture or oil content to provide a simultaneous measurement of all parameters in a single instrument. In a world where food yields have become ever more important, improved control of moisture and color offers financial benefits such as:

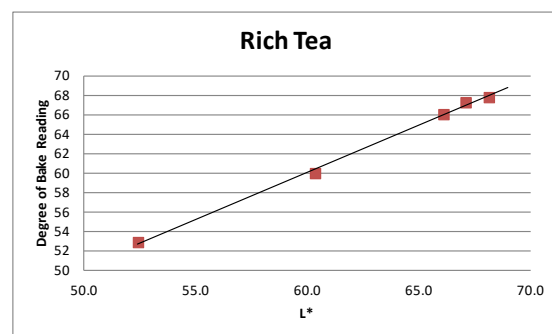
- Reduced startup times and therefore scrap
- Production of more consistent within specification product (minimize “checking”)
- Improved operating efficiency

The DOB measurement is designed to closely imitate the response of the human eye to changes in brownness and the readings used as highly repeatable and dependable real-time feedback to the process controller. If necessary, they can also be calibrated to provide a reasonable correlation to the L or L* colorimetric measurement, in a similar way to the Near-IR measurements, though there maybe occasions where this may not be desirable. In particular, the DOB measures perceived “brownness” as opposed to brightness (L or L*), which means the gauge will distinguish between samples that are different in brownness to the naked eye but the L or L* reading may not indicate this difference by the same amount. Conversely, the L or L* reading may also show a difference between 2 samples that look visibly similar in brownness.

Measurement Performance

DOB measurement data from a number of biscuit types of varying surface brownness, ranging from pale “straw” color to dark brown is presented below. The photographs show the range of brownness for each type with their corresponding DOB reading listed, and the graphs show calibrated DOB readings compared with their corresponding L* reading.

Rich Tea



APPLICATIONS NOTE

Ginger Biscuits



Cinnamon Biscuits



Summary



The data shown in this note demonstrates the Nordson Degree of Bake measurement is capable of generating meaningful measurements of surface brownness on a variety of biscuit (cookie) types. It can readily detect over baked or under baked product which when combined with the moisture measurement of the biscuit itself, can provide real-time feedback to the process operator for process optimization.

The DOB measurement is suitable for biscuits with no inclusions, including added surface sugar, nuts or cocoa powder. For darker biscuits than that shown in the pictures or biscuits containing cocoa Applications TSG should be consulted.

For questions or support go to: <https://ndc.custhelp.com/>