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WE CRAFT ASSURANCE

Moisture Analysis in Cookie & Cracker Production

APPLICATION BRIEF

Cookies and crackers are enjoyed by billions of people every day. Biscuits and crispbreads are available in a variety of diverse types and flavors.

Control of moisture in crackers is necessary in order to optimize the quality of the product and the production process. Too high a moisture content will adversely affect the texture and taste, and also shorten shelf-life. Too low a moisture content will result in crackers that damage easily and leading to wastage both before and after packaging. Additionally low moistures cause crackers to "burn" to a greater extent when they pass through the ovens, leading to an undesirable flavor.

SUMMARY OF THE PROCESS

Dough Forming: Cookies / crackers raw solids and liquid ingredients are transferred to mixing tanks. Ingredients are then mixed together in specific quantities as specified in the product's recipe. Crackers and cookies doughs are mixed with either vertical spindle mixers or high-speed horizontal drum mixers. The order that ingredients are added to the mixture is important.

Sheet Forming & Cutting: The dough used for both crackers and cookies is ostensibly the same. In the machining process, the dough is delivered from a hopper onto a conveyor belt and rolled thin by a series of metal gauging rolls. The thickness of the sheet is reduced by each of these rollers. Some manufacturers stack multiple sheets on top of each other in a process known as laminating.

The dough sheets are then rolled out further, allowed to relax, and then sent along a conveyor belt to the cutting machines. The edges of the dough sheets are cut smooth by rotary cutting machines, and excess dough is sent back to the hopper for reuse. After this stage, sugar, cinnamon or honey is applied to the top of the dough if the recipe requires it.

Baking: The cookies / crackers are baked in a tunnel oven. The dough is first transferred to a metal conveyor belt and then moved through the oven, which can be 100-300 feet (30-90 m) long. Baking takes place in three stages called development, drying, and coloring. In the development stage the dough sets, taking on the size and shape of the final product. The greatest amount of water is lost in the drying stage. In the coloring stage, the dough is changed from pale white to a light golden brown.

Post Conditioning & Packaging: After the cookies / crackers come out of the oven, they travel on a series of conveyors to cool. At some point in this process they are flipped over and then flipped back to ensure that cooling is throughout. The total cooling time can be twice as long as the baking time.

PROCESS SENSORS® CORPORATION

a KPM brand

Depending on the recipe, other coatings such as icings, chocolate coatings, sugar etc… can be put on the cookies / crackers after they have cooled.

The final step in the manufacturing process is packaging where cookies/crackers are packaged by weight for shipment.

QUALITY PARAMETERS AND MEASURING POINTS

Moisture Measurements: The on-line NIR transmitter is usually located several feet down line from the oven exit, whilst it might be useful to locate it closer to the exit from the point of automatic control of the ovens / inlet belt speed, it is not recommended, owing to the fact that NIR measurements are essentially surface measurements and a degree of equilibration needs to occur in order to obtain a stable and meaningful measurement.

A food grade **MCT466-SF Online NIR Sensor** is designed to meet the strict hygiene and safety requirements of a food manufacturing plant. It is a stainless steel enclosure with a local display and houses a Kel F or sapphire window.

A **QuikCheck Benchtop NIR Analyzer** is used either in the laboratory or at-line for quick, accurate and reliable samples testing.

VALUE AND QUALITY

Moisture measurements can be made on or off-line. Online measurements greatly improve efficiency; they eliminate the need for routine laboratory moisture testing and provide an instantaneous measurement so that necessary process changes can be implemented sooner.

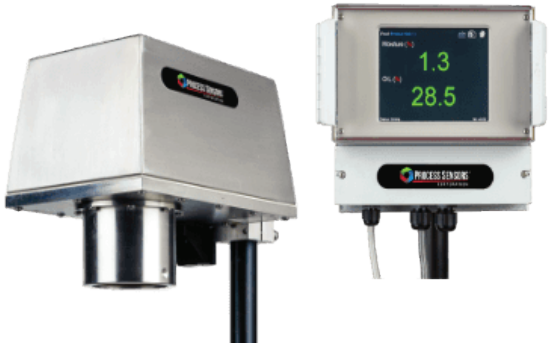
Offline moisture measurements are simple, sample a greater product area, and are quicker than using Infrared balances or oven tests.

Further analysis of the product after seasoning ensures a consistent product quality before packaging. This will ensure shelf life and ensure that the final product meets specifications.

The QuikCheck Moisture & Fat Analyzer is a benchtop NIR instrument ideally suited for analyzing product samples at-line.

QUIKCHECK MOISTURE & FAT NIR ANALYZER

- Easy setup, calibration, and operation.
- Results are returned to the operator in 5-to-10 seconds.
- Space-saving, ruggedized design fits smoothly into most at-line or lab settings.
- Little-to-no sample preparation required.



The MCT460 Series Online NIR Sensor (MCT466-SF shown here) helps operators control moisture to meet product specifications.

MCT460 SERIES ONLINE NIR SENSORS

- Monitor raw ingredients and in-line processes to maintain consistent product quality, increase yield, and minimize waste.
- Simple to operate, integrate, and standardize across multiple lines or locations.
- Rugged enclosure withstands harsh conditions. Washdown unit is also available
- Proprietary temperature-controlled detector ensures measurement stability.

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