SURVIVE & ADVANCE

Selecting Performance Analysers to Reduce Waste and Streamline Product Development

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Unsurprisingly, the modern grain industry - from producers to manufacturers - is under constant pressure from the private and public sectors to meet demands for quality, quantity, price, and sustainability.

Evolving consumer tastes raise the stakes more, creating demand for less common ingredients – further challenging supply chains already under pressure from climate change and world events. Modern ingredient performance analysis helps producers and manufacturers stay ahead of the curve, however, by streamlining quality control, reformulation, and new product development.

Rheology is the study of how matter flows. And performance-based testing in the food industry is often rheological testing. It can detect serious quality issues, such as sprout-damaged grain, when high-throughput compositional testing does not. Tools like rapid viscometers with programmable temperature ramping drastically improve the quality and quantity of performance data available. This data is essential to quality control and R&D for milling, extruded foods, malting and brewing, and the growing gluten-free and animal-free food markets.

With rheology technologies and data, processors can continuously check whether an ingredient is performing as expected, compensate for ingredient variability, and streamline new product development and reformulation. They can also quantify the effects of process inputs like heat, shear, and pH, as well as reproducibly synchronize testing across their supply chain.

Choosing a measurement system can be tricky, however. Here are some tips and general best practices to consider when selecting a performance analyser.

Beware the One-Trick Pony

Simply put, different ingredients do what they do under different conditions. So, the ability of a technology to support customized tests to suit a wide variety of applications is

important. Adaptability leads to better descriptive power, versatility, and value.

The ability to quantify ingredient performance means knowing exactly how abnormal an abnormal product is and making an educated and timely choice about what to do with it. Should it be rejected, or re-worked? If it's re-worked, how aggressively can it be blended with the normal product stream and still yield a normal product in the end? How will a substituted or added ingredient affect the performance of a dry mix? Visualizing the performance impacts of re-work or substitutions reduces waste and guesswork.

Descriptive power and flexibility of the technology is also particularly helpful during new product development. Growing market and customer demands for novel products using on-trend, sustainable ingredients – like sorghum, ancient grains, and plant-based proteins – provide opportunities for growth and differentiation in a crowded playing field. If an animal-free food start-up encounters delays in scale-up because of rigid technology or unreliable performance data, it could mean the cash dries up and the lights go out.

During product development or re-formulation, the goal is to conduct rapid, small-scale performance testing and use the data to inform processing conditions during piloting and scale-up. This streamlines the product development process, reducing the challenges and wasted food typical of moving production from bench to pilot to process.

Remember the Three R's: Repeatability, Reproducibility, and Rapidity

A performance analyser can provide detailed, descriptive results, but if the test isn't fast enough to act on those results, why bother? Likewise, if the test conditions aren't repeatable within each device, and reproducible across all devices of that type, then the results are effectively meaningless.

Fundamentally, repeatability and reproducibility (R&R, for short) allow users to trust the results from a given device. Reducing operator input in sample preparation and data analysis improves R&R even further. Optimizing the throughput of a test makes the information actionable and allows for continuous, high-throughput quality control, and aggressive waste reduction.

It Shouldn't Be Rocket Science

Testing equipment should be intuitive to operate and offer straightforward data readouts –reducing the need for in-depth expertise and training. Turnover among laboratory staff is a common problem and difficult-to-use instruments with difficult-to-interpret data can threaten the continuity of responsible quality control. Descriptive power and R&R are paramount, but easier is always better when it comes to the user experience.

To meet government and internal audit requirements for traceability and data archiving, any software that governs a device should also have robust, easy-to-use backup, and data management features.

Well-Built and Well-Supported

Investing in lab equipment is a consequential decision. Months or even years of carefully justified capital expenditure requests can be squandered if the device isn't robust enough to run smoothly for years on end. Lab equipment should be ruggedly built and be maintained by a responsive, competent, and affordable service department from the manufacturer familiar with the industry's needs.

An instrument that lasts a long time becomes part of the internal professional culture of its users. Being able to rely on a device's versatility, descriptive power, repeatability, reproducibility, speed, ease of use, and robustness allows users to make confident, informed choices that improve quality control, new product development, and research.

The food industry is changing rapidly. And agile, trustworthy performance measurement solutions will help producers and manufacturers better navigate the changes.