



Premium control

Spanish premium flour suppliers Emilio Esteban are raising already high quality standards to new levels while gaining more vision and insight into the milling process. An inline, near infrared process monitoring solution is improving knowledge by measuring flour directly in the process stream.

A flour production facility like the one at the Emilio Esteban flour mill in Spain typically produces around 100 kilos of premium grade flour every minute. That's not a huge output by industry standards, but plenty for the staff at the in-house laboratory to control as they strive to ensure that deliveries always match the high standards of discerning customers, including, amongst others, producers of baby food.

Company director Emilio Esteban sets out the business strategy in the current competitive business landscape: "There are basically two options. Either you go for high capacity and compete on price or you invest in high quality."

With a high quality strategy in mind, Este-

ban and his staff have acquired a helping hand - or 'eye' to be more precise - in the form of a new, in-line, near infrared analyser called the ProFoss.

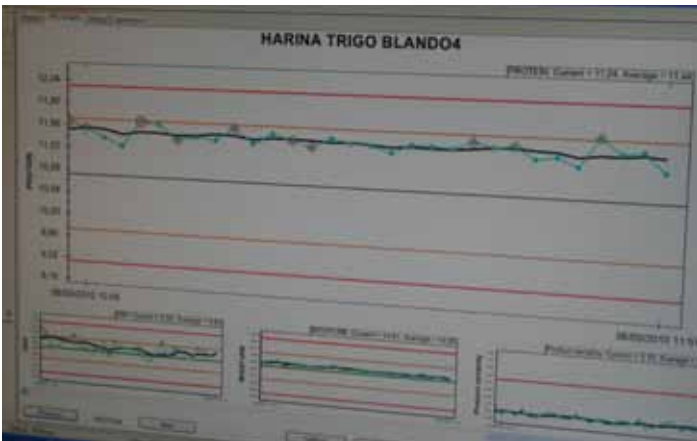
From laboratory to production

Mounted directly in production at the final steps in the milling process, the ProFoss monitors the flour as it flows through pipes at up to 25 metres a second. This avoids the need for a bypass stream to collect samples. The instrument is housed in a practical and robust stainless steel cabinet (ATEX approved). While it may not win any design awards, the wealth of information the ProFoss provides is something for any quality controller to get excited about.

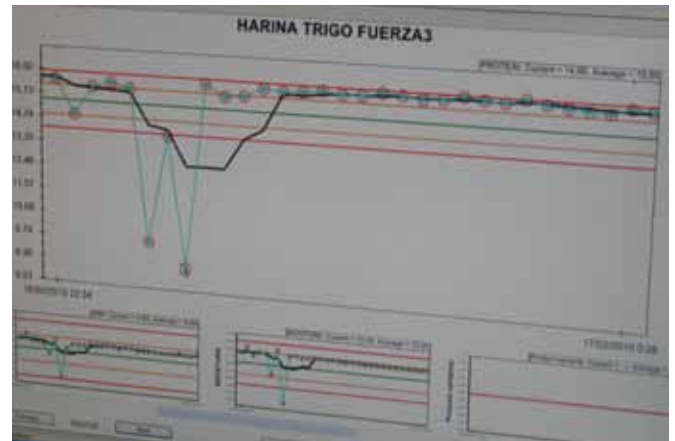
The analyser automatically monitors

moisture, protein and ash every few seconds and the regular results are fed back to a computer in the mill control room where they are displayed in a graphical form using FOSS ISIscan software. The charts resemble a seismic graph. A nice straight line indicates that the flour composition is on target, but with a tremor indicated if something starts to go off track. This allows anyone working in production to see at a glance whether everything is running to plan.

The new system does exactly the same job as the previous analysis instrument in the laboratory, but now measurements are made several times a minute instead of every few hours. It is this frequency that helps to keep production right on target.



According to plan: the computer screen in the control room gives an immediate visual check



Action required: A problem with the mix at the start of a new batch is immediately apparent, allowing rapid correction



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It also reduces the risk of variations in content of products when a new batch is started.

Esteban sums up the advantage of continuous measurement and the difference in comparison to the Infratec 1241 Grain Analyser located in the laboratory. “Infratec and ProFoss are completely different devices,” he says. “The reason for this is where they are situated. Infratec allows you to analyse samples arriving at the lab, but these don’t represent the whole process. ProFoss is another concept – it is placed inline and provides constant and continuous information, so in case there is any problem, you can react immediately, and that is the key.”

According to laboratory manager Antonio Caballero, the accuracy of ProFoss is equal to the Infratec when measuring protein, moisture and ash. Besides this, with ProFoss, he believes that traceability

has increased as the company now has a more comprehensive picture of quality. “I believe that improved control of the process will increase quality levels and give us a competitive edge,” says Caballero. “We will also improve traceability, as we know exactly how the process is working. And overall, we will increase the quality of our products.”

A new level of control

The greater insight into the process provided by the ProFoss now reduces the risk of customer claims. Esteban illustrates this with an example of how continuous measurements can have an immediate impact on quality control.

He describes how, in producing products, different grains are mixed and from this mix, flour with a specific quality is produced. ProFoss has already detected one situation where there was a sudden and unexplained change in protein content in

the mix. “Despite all the existing control measures, sometimes things can happen,” he says. “For example, it could have been to do with the mechanical flow system. Anyway, we saw a change in protein quickly. This helped us to solve the problem immediately and so we gained much closer control of the process.”

Closer control fits well with the company’s business approach which combines both tradition and modernity, epitomising the Spanish saying ‘estar metido en harina’ - total commitment to a project or idea.

Although it has only recently been installed, the ProFoss system has already provided a higher level of knowledge in production and has effectively set a new standard for quality control in the ancient art of producing flour.

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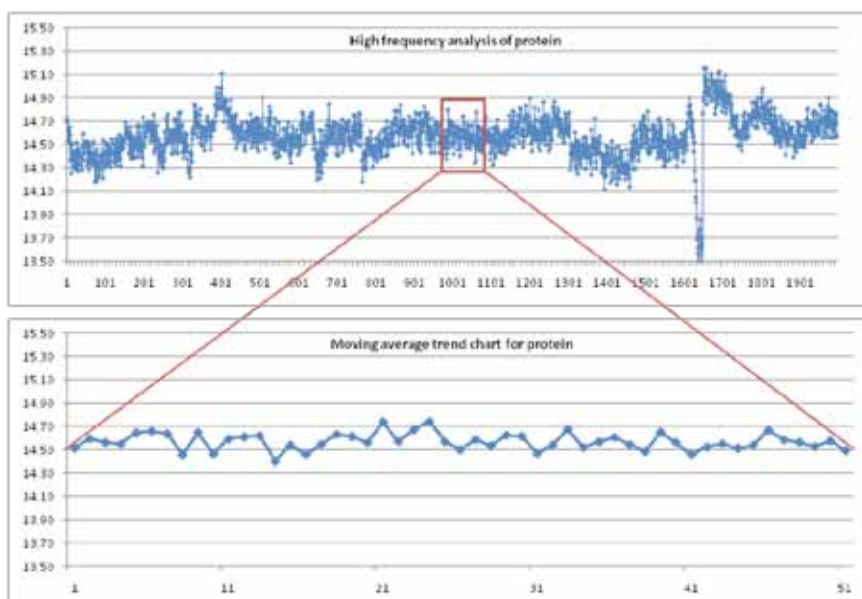
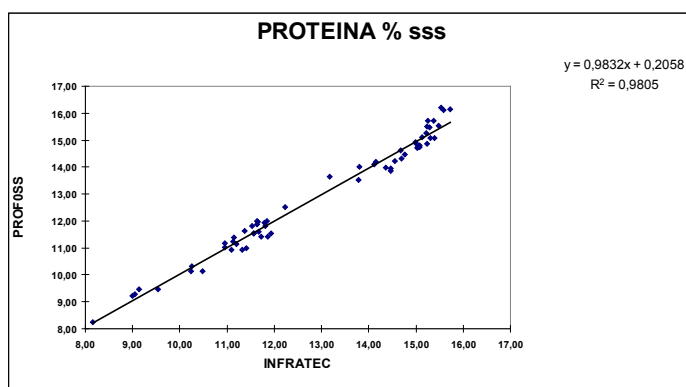
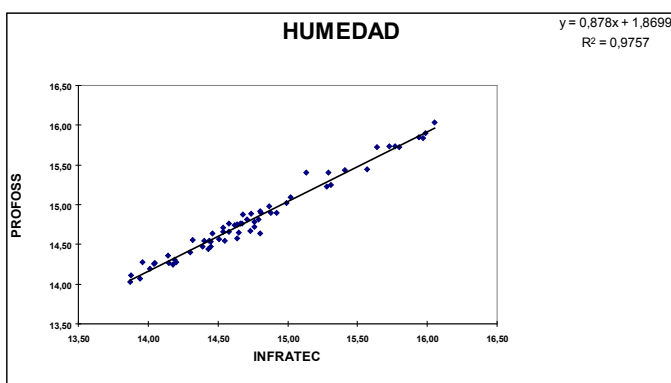
Comparison with bench top analysis

An obvious consideration was whether the accuracy of measurements with the ProFoss would be comparable to the existing desktop Infratec 1241 grain analyser used in the laboratory. Laboratory manager, Antonio Caballero conducted a study which indicates very similar performance for both instruments. The graphs below show a comparison of results for protein and moisture. Even though the performances of the two solutions are very similar, the frequency of measurement with the ProFoss system allows trends and irregularities to be spotted more quickly.

The ProFoss can also help to spot smaller variations in the process, as shown in the trend chart. This is because using a bench top instrument to check a process is subject to the risk of operator error. Mistakes can lead to a wrong measurement result and if this is used for process adjustment, it can have a major influence, often ending with final product out of specification. The worst part is that this can continue until the next sample is analysed perhaps one or two hours later. So, although the performance of NIR laboratory instruments is traditionally determined by the standard error of prediction (SEP), in real life, the performance is limited by a combination of sampling errors, sample preparation errors and analytical errors.

In contrast, ProFoss takes direct measurements inside the process. Sampling errors and sample preparation errors can therefore be minimised to almost zero. Monitoring process variations using a trend chart and a moving average function enables the detection of process variations that are significantly smaller than the SEP of a laboratory analyser. Even if one result is wrong for some reason, this has no influence on the overall result because a new result will be generated few seconds later. It is even possible to exclude 'bad' results, for example, when no flour is in the line.

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Trend chart



Emilio Esteban

The Emilio Esteban facility is located in the heart of the grain growing region of Castilla y León. The company was founded in 1941 by Emilio Esteban's grandfather and has developed a well established image based on the effective production of premium quality products.

www.emilioesteban.com