

REAL TIME ANALYSIS

At the International Association of Operative Miller's (IAOM) Southeast Asia District meeting Oscar Hidalgo of Ocrim, S.p.A. gave a presentation about the Multifunction Grain Analyzer (onlineMGA). The presentation — "MGA-Multifunction Grain Analyzer and Its Benefits in Milling" — was about Ocrim's Research & Development Group's new system, which was developed to satisfy the milling market's needs concerning the continuous control and management of the milling process. Hidalgo told the audience that Ocrim's goal was to "combine and facilitate the management of this process in two key stages: mixing wheat phase and conditioning phase."

Ocrim's Research & Development group developed the onlineMGA to improve the quality of the finished product, guarantee the constant time of the flour produced, obtain a higher flexibility of the plant and reduce the maintenance costs. The control, in real time, of the production process is gaining more importance among millers. Proteins and moisture are the wheat chemical parameters that are verifiable and manageable during the cleaning and conditioning phases.

"As we know, the milling industry is always in continuous evolution and so are milling plants," Hidalgo noted.

He said new requirements in this sector have arisen and interest is focused on performance solutions that only can be obtained through a more sophisticated automation and that can provide perfect solutions for the following market requirements:

- reducing labor costs;
- increasing production flexibility;
- increasing the quality of finished product;
- ensuring consistency of finished flours over time; and

Multi Function Grain Analyzer. Photos courtesy of Ocrim.



by Eloisa Martino

Multi-function grain analyzer provides control and data collection

- meeting regulatory requirements in compliance with the latest safety standards.

"An important thing in traditional technologies is the fact they only allow reading moisture on dry wheat — which has become a tradition — while not on wet (wheat)," Hidalgo said. "Also, protein content detection isn't always foreseen in milling plants due to higher costs and the amount of equipment needed for its control which can increase at the same time the entire investment and make its implementation hardly justifiable."

During his presentation, Hidalgo discussed the limitations of the traditional systems. He noted that:

- multiple devices are used to identify parameters of protein and moisture;
- there is an inability to detect on-line moisture content of a previously conditioned grain;
- it is impossible to obtain feedback on the dynamics of grain humidity in the second conditioning; and
- high investment costs ensure the full monitoring of proteins.

From this perspective, real-time control in production has increased its importance in all phases of the milling process.

When the onlineMGA is installed in a milling line, it is able to measure both proteins and moisture parameters. "On one side,

we have proteins monitoring that have a higher impact control in the qualitative side. This is to guarantee constancy, over time, in the flour produced,” Hidalgo said. “On the other side, we have moisture control during the different phases of water addition, fundamental for obtaining the correct conditioning of wheat, which is the most important phase in the entire milling process.”

Near infrared Spectroscopy provided a base for Ocrim’s development of the reading system on VIS-NIR technology. Hidalgo said this method provides better accuracy of the readings and a real-time surveying since it acts directly on water and protein molecules that the wheat contains.

VIS-NIR’s technology, which stands for Near-infra-red spectroscopy, utilizes the different transmittance spectrum, created by wavelengths within a defined range, through the analyzed substances. Unlike visible light, or other wavelengths, this technology can penetrate deeper into the substance analyzed, which allows greater accuracy in reading.

This all takes place on-line and allows the management of multiple feedbacks and actions in the system.

The onlineMGA can be employed in several critical points of the milling process due to the absence of bulky installation structures and, thanks to NIR innovative technology, is connected to an advanced machine control system. Hidalgo said that the onlineMGA guarantees high performances that surpass the simple control of the protein’s values and moisture management thanks to its combination with the automated management system and through the continuous and constant cereal analysis.

“A fundamental feature point of uniqueness of this reading principle applied to our equipment is its ability to read moisture on dry and wet wheat,” Hidalgo said. “This peculiarity is reflected in the use of this equipment in both first and second conditioning. This is possible because the reading principle acts directly on the water molecules without being disturbed by external conditions, as happens with previously



Representing Ocrim at the conference were, from left, Denny Hernandez, Fabrizio Baccinelli, Oscar Hidalgo and Mrs. Emanuela Pagliari.

mentioned measuring devices/systems.”

Hidalgo noted that following the detection of these two parameters, the onlineMGA can identify four independent but complementary situations for managing the process of dampening, conditioning and mixing of grain before milling:

- Addition of water for proper dampening and subsequent conditioning, both dry and damp wheat;
- Monitoring and correction of the protein content of the mixture in ongoing process;
- Data storage for conditioning in ongoing process; and
- Data storage protein content for lot in process.

Hidalgo noted that the most innovative aspect is the employment of the onlineMGA in the second conditioning. This removes the problem concerning measurements on an already wet product. Hidalgo said that a continuous retroactive adjustment can be carried out on the amounts of water added in both dampening phases in order to obtain a percentage of moisture required, constant in time, of the wheat put into the milling process.

“With the Multifunction on-line Grain Analyzer, Ocrim demonstrates, once again, a creative approach by giving an innovative response to the need of the market in detecting, in a reliable way, the basic parameters for a proper management during the mixing and condi-

tioning process of wheat,” Hidalgo said. “This was possible thanks to the development of this equipment, the first of its kind, which combines the ability to read on-line both proteins and wheat moisture, whether wheat is dry or wet, in the most accurate way.”

To maximize the potential benefits that this device provides, it is necessary that it be integrated with the central control management system. This interaction allows the exchange of information and this, the complete automation of every single phase.

Hidalgo noted that the loop for regulating the addition of water is operated, in part, locally through the dedicated on-board electronics, and partly through communication with the central management system.

The local management equipment is responsible for:

- reading the incoming grain moisture;
- calculating the correct dosage of water parameters, as the final humidity set point, parameter provided by the central management system and product range that is detected by measuring systems placed in the stream.

The combination of this information leads to the definition, in a dynamic way, of water flow that needs to be added to achieve the desired moisture increased.

The loop for handling grain mixture is operated in a totally automatic way

by the central management system. “Starting from comparison between a desired set point value and measure protein content in ongoing lot, the management system can intervene on gravimetric weight, increasing or decreasing the extracting capacity of various grains to reach and keep the protein’s range required,” Hidalgo said. “In this case, the reading is dynamic and is continuous throughout the stage of the production process and is applicable to each point of the mixing process.”

The onlineMGA also can be constructively employed during the raw material reception at the plant. Positioned at the reception before storage, the device can measure the percentage of moisture of the whole product lot, allowing the immediate control and valuation of the incoming grains, the company said.

This system continually monitors the process in all its phases, resulting in data

production and storage. By means of Ocrim’s @mill management, all the parameters obtained during the various sessions can be recorded and combined with the various lots of operation and storage, providing traceability of the product.

“Through these read-outs, in fact, it is very easy to gather and store data collected during the processing of the various lots. Data storage is done in the central management system,” Hidalgo said. “This database enables the user to gather data on the product and processing stages to meet legislative requirements relative to traceability.

“Properly processed, this data is also a fundamental support for analysis of the whole process and actions undertaken with the process. Today, cost evaluation assumes an increasingly dominant aspect in industrial management. Through this system, Ocrim provides information for the proper evaluation.”

Another distinguishing aspect of the onlineMGA is the remote assistance Ocrim can provide.

“Using an Internet connection, Ocrim, from its headquarters, makes real-time intervention, diagnosis, corrections and/or changes in parameters, inserts of new parameters and/or any kind of assistance is requested by the end user,” Hidalgo said.

“Indeed, we are convinced that the first step to ensure the reliability of a product is the use of high quality components, which is the basis of our ‘made in Italy’ philosophy. Secondly, it is fundamental to be always on the side of the customer, and there is no better way than to be in real time.” 

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