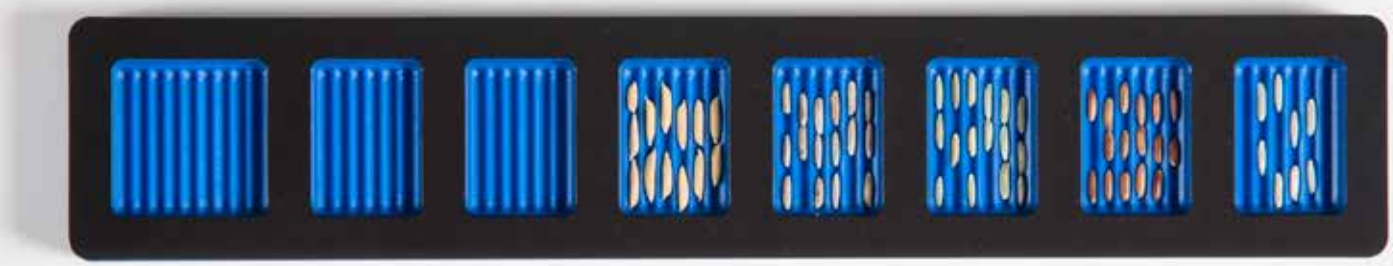
FOOD SAFETY AND INTEGRITY



Bühler and Microsoft announce partnership to develop digital solutions for a sustainable food value chain

Bühler is set to unveil ground breaking digital technologies that include minimising toxic contamination, reducing food waste and increasing end product quality across the whole food value chain as part of a new partnership with Microsoft.

The new digital solutions and services will be presented at the Microsoft booth at Hannover Messe in Germany. Watch this space as Milling and Grain will be live at the event to bring you the very latest developments on this new technology.

"Today's food value chains are facing tremendous challenges," says Ian Roberts, CTO at the Bühler Group. "Digital solutions will allow us to improve food safety and integrity and reduce food losses and waste. They enable us to be more efficient in production. In fact, with intelligent implementation of our digital capabilities we will make a major step towards meeting our goals of lowering waste and energy consumption in the food value chain by 30 percent," Mr Roberts adds.

For the agriculture industry to meet the global quality demands of the future, sustainability in all aspects of agricultural production is key," said Caglayan Arkan,

General Manager Manufacturing & Resources at Microsoft. "Microsoft's mission is to help leaders like Bühler take advantage of its data using our Azure cloud and Azure IoT technologies to accurately forecast trends in agriculture, improve food safety and provide better services for customers."

The Bühler-Microsoft collaboration comes at a time when the global food industry faces increasing environmental and economic pressure. By 2050, the planet's population is predicted to grow to nine billion. Providing sufficient nutritious food in a sustainable way is a major challenge we have only begun to address.

More than 30 percent of global energy goes into food production. However, around 30 percent of all food is lost or wasted, while 800 million people are starving. From today's perspective, we continue to challenge the limits of our agricultural systems, which will need to supply an additional 265 million tonnes of plant protein by 2050.

It is Bühler's declared aim, through smart partnerships, to create businesses that contribute

to solving these challenges. “With the digitalisation of the food industry we have a new, unrivalled capability we can bring to bear,” commented Mr Roberts.

The showcases to be presented at the Hannover industry tradeshow cover the whole value chain from farm to fork:

Gamaya – Improving efficiency and sustainability of industrial farms

Gamaya decision support and automation services help farmers optimise their use of water, chemicals, fuel and manual labour, while reducing environmental impact and improving the quantity and quality of produce.

Examples of analytics include the mapping and classification of weeds, early diagnostics of plant disease, pests and nutrient deficiencies, as well as prediction of yields. Enabled by a unique combination of technologies including hyperspectral and satellite imaging, data fusion and artificial intelligence, it improves the efficiency and sustainability of farming businesses through smarter decisions.

Breakthrough sorting solution – Saving lives and increasing yields

Maize, the world’s main cereal crop, can be affected by aflatoxin, a naturally occurring toxin that is highly carcinogenic. 500 million people worldwide are at risk of exposure to it. It is estimated to cause up to 150,000 cases of liver cancer a year and contribute to stunting in millions of children. The economic impact on farmers, food processors and the economy is significant. Bühler will be launching a breakthrough sorting technology for maize, making a major contribution to addressing this urgent challenge. This revolutionary solution will be presented for the first time at Hannover Messe with a working demonstration.

PreMa – Intelligent storage and handling

85 million tonnes of cereal grains are lost in storage and handling every year. Reducing this loss helps our customers and contributes to safeguarding more of the food the world produces. PreMa is an intelligent silo monitoring solution to ensure grain is stored under the correct conditions.

TotalSense – Providing quick and objective quality control for rice

TotalSense is a mobile rice analyser that provides for quick and objective quality control. The customer submits a photo of a rice sample and receives a quality report, including an analysis of broken and discoloured rice grains. TotalSense reduces the time for rice quality checks by up to ten times.

Safefood.ai – Improving food safety through data-driven early warnings

Safefood.ai scans thousands of official databases, webpages, news and social media channels for events and rumours related to food safety. It identifies food and feed products affected and provides customised early warnings to food processors, enabling them to stay ahead of food safety risks.

Microsoft Manufacturing & Resources General Manager Caglayan Arkan added, "Collaborations like the one between Bühler and Microsoft will be essential to feeding our world and fuelling a better future for our natural resources and food production. With artificial intelligence and the cloud, we have the technology to address some of the biggest challenges facing the industry."

Mr Roberts concluded by saying, "The digital revolution is a huge opportunity for the food manufacturing industry. It has the potential to bring beneficial changes along the entire value chain, improving safety, transparency and efficiency, and reducing energy consumption and waste. We are only scratching the surface of this potential. The partnership between Bühler and Microsoft will equip us with tools to address some of the key challenges the industry and the world faces."

Maize is a vital, staple food crop in many regions of the world and a major component in animal feed, but it is particularly prone to aflatoxin contamination. Aflatoxin is classified as a primary human carcinogen by the International Agency for Research on Cancer.

Approximately 500 million people worldwide are at risk of exposure to it and it is estimated to cause up to 155,000 cases of liver cancer every year and contributes to stunting the growth of millions of children.

"Aflatoxin is one of the biggest global pains today. Climate change means that the problem is growing, so eliminating contaminated grains from the food chain more effectively, with less loss of healthy grain, is an urgent challenge," says Beatrice Conde-Petit, Food Safety Officer at Bühler.

Until now sorting maize for aflatoxin reduction has proved difficult and imprecise, relying on identifying indirect indications
of contamination. Testing for contamination based on sampling is inconclusive and time-consuming as contamination occurs in hotspots. Just two contaminated kernels in 10,000 are sufficient to make a lot unfit for purpose. Alongside health risks, the economic impact on farmers and food processors is significant.

Unprecedented accuracy

It is the first optical sorting technology able to identify aflatoxin based on direct indicators of contamination, while simultaneously using real-time, cloud-based data to monitor and analyse contamination risk.

It works by analysing the colour each kernel fluoresces as it passes under powerful UV lighting in the sorter. It is known that contaminated kernels fluoresce a specific bright green colour. LumoVision's proprietary, highly sensitive cameras detect precisely this colour of fluorescence. Within milliseconds of detection, air

nozzles deploy to blow contaminated kernels out of the product stream. The machine processes up to 15 tonnes of product an hour, eliminating up to 90 percent of contamination – a significant improvement on current solutions.

A cloud-based solution using infrastructure provided by Microsoft is a key enabler to reducing overall yield loss. Combining data from the cameras with data stored in the cloud allows a local, real-time analysis of the risk of contamination to be carried out. When the risk is minimal, sorting is halted while the machine continues to monitor. If the risk rises, sorting automatically restarts. Coupled with the cloud service, it reduces yield loss to below five percent compared with between five percent and up to 25 percent for other current solutions.

Transforming lives and livelihoods

"We are incredibly excited about this achievement. As an organisation we have strived to solve the problem of aflatoxin contamination for many years. Now, with today's technological advances we're able to bring this ground-breaking solution to market," says Ben Deefholts, Senior Research Engineer for Digital Technologies at Bühler. "With data science techniques and tools we can develop sorting algorithms, while connectivity and IoT solutions allow us to combine our optical sorting with real-time risk models," he adds.

Caglayan Arkan, General Manager Manufacturing & Resources at Microsoft adds, "Bühler has built a truly revolutionary and inspiring piece of technology – not only to the food industry but to the manufacturing industry on so many levels. Their revolutionary data-driven optical sorting system doesn't just predict a toxin in a food particle, but it can eliminate it altogether, by tapping into the breadth and scale of Microsoft's global Azure cloud, which is powerful and meaningful to keeping all of us safer and healthy."

With the technology, food, feed, and pet food manufacturers can protect their product from contamination, avoid the cost of expensive recalls and reputational consequences, while increasing yields and reducing waste. Grain handlers can upgrade the quality of their product to attract higher prices.

However, it is in regions of the world where there is no food safety regulation or where low resource communities have little choice but to eat contaminated food or go hungry, that it can have an even bigger impact, saving lives and improving livelihoods. The product is currently undergoing testing onsite with customer Capa Cologna, in Italy, an agricultural cooperative whose maize was affected by aflatoxin after drought conditions during the growing season in 2012.

Further testing will take place within the MycoKey network, a project funded by the European Commission to develop smart, sustainable solutions that reduce mycotoxins in food and feed.