

# The Cinderella from Dübendorf

**DÜBENDORF.** QualySense is the star of the Dübendorf business incubator glaTec. The start-up has developed a complex device that is able to analyze grains one-by-one by quality parameters, such as nutrients or contamination. The invention could play an important role in fighting hunger.

## STEFAN KRÄHENBÜHL

The earth is hungry. About one billion people are malnourished in our planet, as recently reported by the United Nations. This is mainly due to the fact that not enough food is produced, which is associated with price increases. Since 2008, grain prices have grown rapidly. Currently, the price of a ton of wheat is about \$ 350, about 47% higher than in September 2008. Fighting this important issue is extremely challenging.

A special device, currently being tested behind the scenes of the EMPA incubator in Dübendorf (Switzerland), could represent a partial remedy to this problem. The startup company QualySense has developed a complex device that is able to analyze grains one-by-one by quality parameters. It classifies them by nutrients or contamination at very high-speeds and also sorts them into classes.

The wonder device, named QSorter, is a mixture of robotic and life-science technologies: it transports up to 150 grains per second and create an identikit for each single kernel. A high-resolution spectroscopy sensor is used to detect biochemical properties (e.g. protein, oil, sugar) and a color camera is used to detect external features (e.g. color, size, shape).

One interesting application of the QSorter could be the following: wheat lots that are contaminated by fungi are completely disposed. Every year, between 20% and 30% of some commodities are lost due to fungi infection. Conversely, not all lot is wasted with the QSorter; in its high capacity version, can be used to pick and reject only the contaminated grains and rescue the remaining healthy ones. This will save enormous quantities of food resources and counteracts speculative price increases.

## QSorter Explorer: the first QualySense product

The first product QualySense is commercializing is the QSorter Explorer series. The QSorter Explorer can be used for quality inspection purposes: grain samples can now be analyzed within a few moments. Visual inspection would no longer be required and use fewer instruments, resulting in a significant time reduction for inspection and food companies.

## A pilot project planned with Swissmill

Behind this brilliant concept there is the startup company QualySense. The EMPA-based startup is part of the GLATEC business incubator. According to the GLATEC director, this young company is the star of the incubator. He is convinced that "the idea has tremendous potential". Dr. Francesco Dell'Endice also confirms: "We expect a worldwide interest in the QSorter technology. Our goal is the global market", he says. The first units of the QSorter Explorer are now being completed and tested with selected customers in Europe and in USA. "We are now in the customer reference phases. Our first customers are willing to innovate along with us."

Corn, wheat, rye, rice and other grains - the basis for the research, operated by a cooperative research team, are stored in one of the closets there.

QualySense is mainly focusing on wheat, but also is exploring other pilot applications for corn, rice, oats and other grains that are being developed in cooperation with key partners in Europe and in USA. The EMPA laboratories and leading scientific institutions of the food industry, such as AGROSCOPE and the United States Department of Agriculture, are contributing to this exciting development.

«Failures during the reference and testing phases are critical. We work very closely with our first customers to solve problems immediately.»  
Francesco Dell'Endice

The QSorter is reminiscent of the Cinderella story. The good ones seeds stay while the bad seeds are thrown away.

With one difference: the QSorter can not only separate good from bad but can also classify how good or how bad the grains are. "We have achieved a number of successful results with various grains, nuts, and beans, and we were able to identify a number of very important quality parameters", says the inventor, Dr. Dell'Endice.

The quality measurements are done in two steps: a camera measures the visual characteristics of the products, for example, size and color; then, infrared light is injected in each individual kernel and dedicated algorithms analyze the content of biochemical constituents such as proteins, sugars, fats and oils.

In order to validate the non-destructive results QualySense regularly sends the investigated samples to specialized laboratories for traditional chemical analysis. The QSorter accuracies are very close to the standard destructive chemical methods.

## A radical change in the food industry

The scientific data produced by the QSorter are of great value for the global food industry. Dell'Endice and his team have discovered, for example, that nutritional properties vary largely around the mean values that are usually printed on the product labels, at both trading levels or at the supermarket.

"These results are very interesting to the food community and a number of companies are approaching us to test new quality concepts", says Dell'Endice. "The QSorter enables qualitative procurement. Common products such as grains, coffee beans, and nuts will be sorted, packaged, and marketed according to health related or nutritional properties". A number of projects focusing on this direction have already started more than a year ago.

It may take some time until the device of the Dübendorf based company can actually affect consumer's behavior, but the right strategic moves are being made as this could become a radical change in the food industry.

So far the company has successfully closed two financing rounds: in the second round a number of investors have also been rejected. The QualySense's board of directors is composed of Alberto Romaneschi, a former Nestlé Group Treasurer and a food industry insider, Geoffrey Scott, the CEO of Uster Technology who has established a standard in the cotton industry and brought its company to prosperity, Stefan Blarer, former Head of Global R&D in Syngenta, and Markus Schnurrenberger, an expert in commercial law.

Additionally, QualySense has won a number of awards including the Best 2012 Start-Up Swiss Park Award and VentureKick. These awards convinced the trained aerospace engineer Francesco Dell'Endice about the potential success of QualySense. This year, the entrepreneur is one of the 3 finalists for the 2012 Ernst&Young Entrepreneur of the Year @ award.

## Large scale testing starts this month

So far the team has mostly focused on completing the development of the QSorter Explorer. Nevertheless, testing for the high-capacity sorter is about to start. Swiss, Italian, and American key partners will assess the benefits of a high capacity QSorter. Grain breeders will select specific wheat grain varieties up to 100 kg. The QSorter will be used to sort this experimental lot according to consumer driven parameters and the segregated classes will then be milled into flour. Pasta, bread and other products will finally be produced and their quality assessed with respect to nutrients and taste. A comprehensive quality assessment will be also supported by chemical tests.

The outcome of this project will be monumental to validate QualySense's concept. As a start-up, it tries to build an excellent reputation: "Failures during the reference and testing phases are critical. We work very closely with our first customers to solve problems immediately and to implement the features that they request. It's an exciting experiment, which requires a lot of effort", says Dell'Endice, "but I'm convinced that all will go well".



QualySense CEO Francesco Dell'Endice with a QSorter model.  
Picture: Nicolas Zonvi