At Florensis, Scientists Protect Plant Health with Advanced Lab Testing

The team recently evaluated the eQo 1-Step ToughMix[®] Kit from Quantabio for a streamlined pathogen testing workflow, generating impressive results

You may not be familiar with the company called Florensis, but if you're the type to notice a beautiful begonia or a gorgeous gardenia, then chances are good that you have at some point admired one of their flowers

Founded more than 80 years ago, the family horticulture business is based in The Netherlands, with greenhouses, breeding facilities, and other locations in Germany, Spain, Portugal, Kenya and Ethiopia. Through its own channels and partnerships with other companies, Florensis is an international powerhouse in plant breeding. Its team of 2,500 employees is responsible for supplying some 4,000 varieties of plants to growers around the world.

While much of the horticultural world is an art, there is plenty of science behind Florensis's success. The company adopts innovative technology, such as the dozens of robots its team uses to stick 75,000 unrooted cuttings into trays every hour. And to ensure robust health in their plants, Florensis scientists also perform a great deal of laboratory testing.

Recently, Florensis scientists evaluated a new qPCR master mix that would help them make progress on two corporate goals: bringing more testing in-house, and increasing sustainability across the company. After a successful validation, the Florensis lab team is moving closer to bringing the eQo 1-Step ToughMix® Kit from Quantabio into its production testing workflow.

Tim de Meijer, Phytopathological Analyst, working with Quantabio's eQo 1-Step ToughMix

Quantabio

at Florensis

Plant Pathogen Testing

Florensis plants are kept on a steady regimen of routine testing, with occasional diagnostic testing performed as needed. Plant pathogens are the most important target: whether it's viral, bacterial, or fungal, there's no shortage of highly contagious and damaging threats to the health of crops and gardening plants. Every plant genus has a designated set of pathogens that must be tested for regularly.

Florensis

Historically, most of the testing has been conducted externally. But bringing those test capabilities in-house offers the opportunity to generate results more quickly – helping to keep the company's plants healthier - and to significantly lower costs. "We're trying to do as many tests in-house as possible," says Tim de Meijer, phytopathological analyst in the company's diagnostic laboratory. "When you look at reagent or material costs for PCR testing, they can be up to an order of magnitude lower compared to external laboratory fees when testing is done internally. For ELISA or Luminex testing, the savings are even greater." It's also a lot faster: it generally takes at least two weeks to get results from samples sent to an external lab, and if anything goes wrong in the process, new samples have to be sent and the clock starts again. "It can take more than a month to get results," he adds. "In our own lab, we can have results in as little as three hours."

"We had good results right from the start, without any optimization necessary."

Today, the Florensis lab has been outfitted to run ELISAs. Luminex xMAP[®] multiplex immunoassays, and PCR-based tests for plant pathogens. The team had already been using PCR reagents from Quantabio when they got a recommendation to try a new product: the eQo 1-Step ToughMix Kit. Unlike typical liquid master mixes, the eQo kit is lyophilized, delivered to customers as dried-down beads that can be reconstituted with a simple rehydration buffer when needed. This dry format gives scientists greater latitude for storage the dry beads can be kept at room temperature for months without sacrificing performance - and the rehydrated master mix includes a warm-start reverse transcriptase so it can be run on the bench at ambient temperatures, with no ice buckets needed. Lyophilization also means that kits can be shipped without dry ice, greatly reducing environmental impact and shipping costs.

At Florensis, the dry bead format solved a logistical challenge: deliveries can sit unattended for a few days before they're picked up by staff members. A previous master mix product had been delivered on dry ice and then sat out for a couple of days; the reagent was already ruined by the time anybody found it. With the eQo 1-Step ToughMix Kit, that's not an issue. "If you let it stand at room temperature it really doesn't matter," de Meijer says. "You don't have to worry about it, and that eases your mind."

Tough Tests for a ToughMix

But the eQo kit is about more than environmentally friendly shipping and stable storage: it was engineered to outperform the top-rated qPCR master mixes on the market. While the Florensis team had been happy with their previous product, de Meijer says that the eQo kit's performance was impressive. "We gave it a shot and it worked even better than the other kit," he says. "We had good results right from the start, without any optimization necessary."

But a good start wasn't good enough for the meticulous Florensis scientists, who put the eQo kit through its paces in a series of evaluations to ensure it would be up to the task of helping them keep plants safe from pathogens. They began with synthetic DNA designed to mimic viroids, and moved on to biological freeze-dried controls, focusing on analytical parameters such as reproducibility, data uniformity, and run efficiency. "All these experiments with the eQo 1-Step ToughMix Kit showed very promising results, with low duplicate deviation, great repeatability, and good efficiencies across the board," de Meijer notes. "We have been able to detect all the biological controls that we have had access to."

Implementation of the RT-qPCR assay into the lab's day-today testing operations will involve real plant samples and the completed RT-qPCR assay covering all 10 viroids from the genus Pospiviroid. A key benefit of the eQo 1-Step ToughMix Kit makes it ideally suited to this type of work: because it has been optimized for inhibitor tolerance, it can be used with crude samples. That's important at Florensis, where scientists avoid complex extraction workflows, preferring to crush leaves in buffer and isolate RNA directly from plant sap.

"I think it's one of the easiest kits I've ever used",

de Meijer says. "There are no separate primers, no separate enzymes, it's just all in one package. You add the liquid to the beads and it's ready to use, even at room temperature. It's a great benefit."

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