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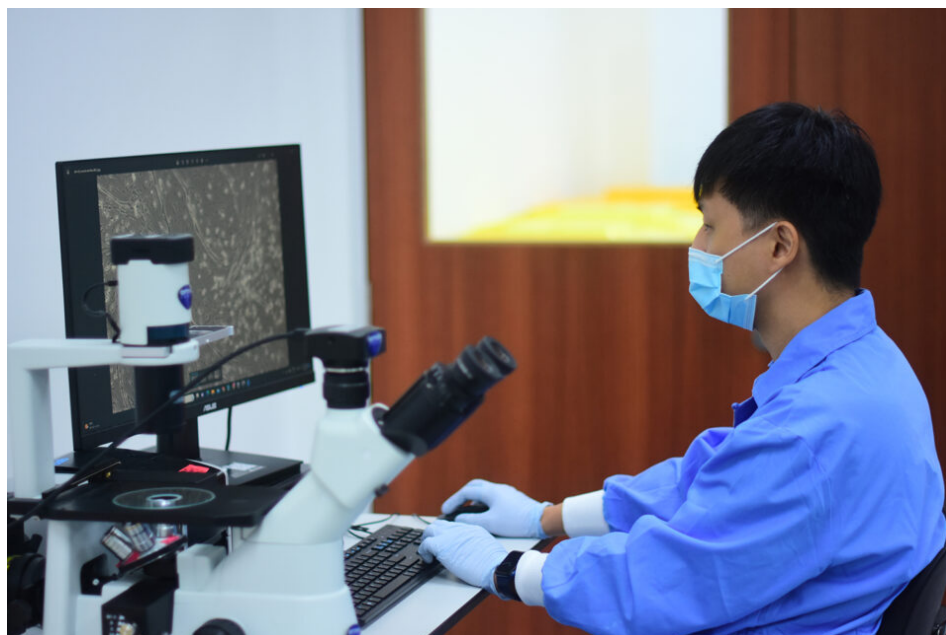
Health &
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Multitasking: Singapore company is employing a technology once used for cancer research to enhance pathogen detection in aquaculture

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By Lauren Kramer

Umami Bioworks' Arbiter 'advanced PCR' tool seeks to boost seafood supply chain safety and traceability



Umami Bioworks' Arbiter versatile new tool aims to improve safety by detecting pathogens faster and cheaper while addressing other needs. Courtesy photo.

Mihir Pershad is just months away from launching a new testing tool that could make seafood supply chains safer, more transparent and more efficient.

Arbiter, developed by Singapore-based UMAMI Bioworks, is designed to quickly and cost-effectively detect foodborne pathogens and quality indicators in seafood. Currently undergoing testing with a packaged seafood company and a seafood processor, Pershad – the company's CEO – said the device delivers better, cheaper and faster assessments than conventional PCR (polymerase chain reaction) tests. It could also play a role in improving seafood traceability, thanks to its capacity to verify species identification.

In developing Arbiter, Pershad and his team employed a technology originally used to characterize cancerous tumors and modified it for the seafood industry. Essentially, it's a faster, more advanced version of a traditional PCR test, he said.

"Our testing structure looks for pathogens by their genetics, or the quality of a fish by the level of a certain gene RNA," said Pershad. "As the gene RNA degrades, so does the quality of the fish."



(<https://link.chtbl.com/aquapod>).

Arbiter initially targets the core set of pathogens required by food regulators for seafood import and export. But UMAMI is also building a broader bank of additional pathogens that farmers or suppliers may want to test for, too. According to Pershad, it takes two to three months to add new pathogens to

the test. The technology is so sensitive that it can detect pathogens at extremely low concentrations, as well as quantify their presence.

“It will detect a pathogen before signs of sickness are even evident, which means farmers could potentially harvest earlier and use the data to make decisions about the quality and the grading of the fish,” he said.

Arbiter can also verify species identification, helping to reduce seafood fraud. For retailers, Pershad said, it offers a valuable checkpoint in the supply chain, ensuring that they are selling the species advertised – and preventing cases where, for example, a low-cost fish is mislabeled as a more valuable one.

Improper use of PCR causes more harm than good



PCR testing is a valuable tool for detecting pathogens, when done correctly, but relying on it solely is not consistent with adequate biosecurity.



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Arbiter is a high-resolution, fluorescent microscope paired with a software that reads barcodes attached to different genes, delivering data that flags potential concerns. According to Pershad, preparing tissue samples takes just 15 minutes of labor, with samples loaded onto a well plate for analysis.

“The labor doesn’t scale per sample, so you could take samples from 50 net pens, checking one fish from each pen, and run all of them at the same time,” he said. “The results would give you the species identification, any pathogen detected and quality markers.”

UMAMI is still determining what approach will work for different customers. Options include partnering with testing providers or offering the machine and its software directly to customers, who could generate the data onsite in six hours.

“That’s a more compelling option as it would streamline operations for customers,” he said. “At the testing centers, backlogs can create delays. We want to make this instrument as plug-and-play as possible and ensure it’s accessible to a broad range of customers.”

Arbiter will have cost and labor advantages well beyond those currently available with traditional PCR tests, he added. For starters, the cost per test is less than (U.S.) \$1 per target – at least five times cheaper than traditional PCRs. The costs will also decrease as more tests are done in parallel.

“Traditional PCR tests require skilled labor, and that labor scales linearly,” said Pershad. “Arbiter will take 15 minutes of labor time – whether you require just one sample or a whole plate of samples. It can detect much lower pathogen thresholds and deliver an actual count, whereas traditional PCR tests provide only quantitative results.”

For now, testing partners are shipping samples to UMAMI Bioworks for analysis. The company plans to use the resulting case studies as proof-of-concept data and begin onboarding additional customers in the next few months. Ultimately, Pershad hopes to bring large seafood farms, seafood retailers and brands into the fold and provide insight on how Arbiter might help meet their needs.

“Those customers could be farmers, processors or purchasers, and we’re having conversations to understand where Arbiter will have the most value,” Pershad said. “We’re open to speaking with additional parties who could become pilot customers and help us demonstrate this tool in additional contexts.”

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