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Health & Welfare

Electric company: Handheld CQR aims to crack fish-health code

13 January 2020
By Hank Hogan

Seafood Analytics' device employs FDA-cleared for human use electrode technology

A Detroit, Mich., company hopes to help aquaculture producers become more proactive with this handheld device that can assess fish, shrimp or other species. Photo courtesy of Seafood Analytics.

Those engaged in aquaculture face a problem – fish don't talk. Neither do shrimp or any of the other aquatic species for that matter. Their silence makes determining their health status a difficult task.

“Right now, we don’t know that they’re sick until they die. But a lot of times they’re sick and they’re eating less and they’re growing less and we don’t really know it,” said Chuck Anderson, vice president of Seafood Analytics.

The company, based in Detroit, Mich., hopes to help producers become more proactive with a handheld device that’s suitable for assessing fish, shrimp or other aquaculture species. Called a Certified Quality Reader, or CQR, the device has electrodes that when pressed against the specimen send an electrical signal through the animal. The readout of that signal provides valuable information that, in effect, makes the fish answer health-related questions.

“You simply touch the side of the fish and in less than a second you get a measurement. Those measurements can be body composition or a health index,” said Keith Cox, Seafood Analytics co-founder.

Behind that simple description lie years of work, which began when Cox conducted research in college. The response to an electrical signal has been used for decades as a tool to determine body composition and health of humans. Indeed, the CQR is a U.S. Food and Drug Administration-certified class II medical device for human use that has been repurposed for use on aquatic animals, Anderson said.

When passed through a fish, shrimp or any other living organism, an electrical signal changes based upon the fat or other attributes of the animal. Those changes can be related back to standard wet chemistry lab tests, providing a correlation between what is detected electrically to such body composition components as percentage fat, water or protein.

There’s good agreement between the electrical and chemical tests, with the first having accuracy levels of 96.7 to 98 percent when compared to the second group, according to Seafood Analytics. The validation of the electrical approach was carried out in conjunction with Oregon State University, and results of the electrical signal method have appeared in scientific papers.

The traditional gold standard approaches to measuring body composition suffer from such drawbacks as being slow and requiring specialized chemicals, facilities and expertise. The method touted by Seafood Analytics, in contrast, is fast and doesn’t need anything more than the device itself and the animal being measured, according to Cox.

The Certified Quality Reader device has electrodes that when pressed against a specimen send an electrical signal through the animal. Photo courtesy of Seafood Analytics.

In addition to those benefits, the CQR offers other advantages, he pointed out. The data gathered is stored on the machine with the ability to separate it into lists. These lists can be based on any desired differentiator: species, tank, or anything else. Thus, fish can be monitored by tracking their vitality indicators or calculated results like overall health grade. The data gathering and number crunching happens without the need to write anything down or perform labor-intensive calculations.

Keeping the data in lists that distinguish between groups makes it possible to determine the impact of salinity, pH, ammonia level or one of the other 23 environmental factors that could play a role in an animal's development. To that can be added such factors as different feeds and feeding schedules.

"It's a way to do all kinds of trials for husbandry," Anderson said.

To help carry such studies out, Seafood Analytics approach is an automated solution. The data from the device is uploaded and pushed into a database. Thus, the data collection device can be portable, with the more demanding analysis done on a more computationally powerful system. According to Anderson, the measurement device can store up to 8,000 readings and can run for days between charges.

Seafood Analytics is just entering the aquaculture market, with the measuring unit and software leased for $199 a month for a year term. This includes firmware and software upgrades at no extra charge. "We also provide expert consulting as part of the service," Anderson said.

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Anderson – who pitched the company and its technology at the most recent **Fish 2.0** (https://www.aquaculturealliance.org/advocate/exit-stage-right-fish-2-0-offers-final-set-of-winning-innovators/?__hstc=236403678.a43630d529db9f1879f88ee1ced3a163.1681100802570.1681100802570.1681100802571.1&__hssc=236403678.1.1681100802578&__hsf competition – added the company has been selling the same technology to the poultry processors for some time and several are currently using the technology. Anderson said that aquaculture companies are now looking into using Seafood Analytics' products commercially, but the details are confidential. Researchers have used or are using the devices in their investigations, though.

For instance, students of Daniel Benetti, director of the aquaculture program at the University of Miami, have used the equipment to test tilapia and flounder. The version of the device used at the University of Miami does not have some of the latest improvements that help automation, such as the ability to store data in lists, according to Anderson. Still, the experience of Benetti and his students has shown that an electrical signal assessment of the health of fish or the quality of seafood during processing could be worthwhile.

"It is unquestionably very useful," Benetti said of the electrical measurement approach, "and undeniably necessary as a tool to assist in quality control in the seafood industry with great benefits to all segments."

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