Health & Welfare

Bacterial mixtures from live-feed microalgae shows promise as alternative to antibiotics for aquaculture

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By Responsible Seafood Advocate

Bacterial mixtures from live-feed microalgae can combat fish pathogens, pointing to potential alternative to antibiotics in aquaculture

A new study shows that mixtures of bacteria from live-feed microalgae are capable of inhibiting fish pathogens. This breakthrough could potentially reduce the use of antibiotics in aquaculture and have broader implications for disease management in fish farming.

Like other intensive productions, aquaculture is vulnerable to bacterial disease outbreaks, traditionally managed with antibiotics. But rising antibiotic resistance and the ineffectiveness of vaccines in fish larvae have prompted the search for alternatives. One promising approach is using beneficial bacteria, or probiotics, to combat pathogens – a strategy that's becoming more widespread in animal farming and horticulture.

A new study finds that bacterial mixtures from live-feed microalgae can combat fish pathogens, offering a possible alternative to antibiotics in aquaculture. Photo by Jimmy Ramírez (https://www.pexels.com/photo/fish-pens-on-open-sea-10436680/).

The study aimed to develop non-antibiotic, biological methods for disease control in aquaculture. Researchers created an in vitro assay to test the pathogen-fighting potential of mixed bacterial communities from the live-feed microalgae *Tetraselmis suecica* and *Isochrysis galbana*. Believing that combinations of beneficial bacteria offer stronger protection than individual strains, the team focused on identifying effective bacterial consortia.

“To test if the pathogen could be inhibited by a mixture of other bacteria, we needed a measure of the growth (and growth inhibition of the pathogen), so we tagged the fish pathogen with a green fluorescent protein,” said Lone Gram, corresponding study author and professor at the Technical University of Denmark. “By measuring this – and the reduction in fluorescence – we could identify bacterial communities that inhibited the pathogen.”

Responsible Seafood Innovation Award finalist AQUIT is pressing for disease management in aquaculture without antibiotics

A feed supplement protein produced by AQUIT in Chile helps farmed salmon ward off disease while improving their overall health and growth.

Global Seafood Alliance

The researchers found that bacterial mixtures could inhibit *Vibrio anguillarum*, a common fish pathogen, and went on to isolate pure cultures from these mixtures. Notably, some bacteria only showed pathogen-inhibiting effects when combined, not individually – highlighting that certain strains are more effective together than alone.

“We have shown that it is possible in microbiomes (in our case, the microbiome of algae used as live feed in aquaculture) to find mixtures of bacteria that can inhibit the pathogen,” Gram said. “Thus, paving the way for engineering microbiomes that can inhibit bacterial pathogens and reduce the need for use of antibiotics. We can then reduce the spread of antibiotic-resistant bacteria.”

Read the full study here (https://doi.org/10.1128/spectrum.00421-25).

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