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Health & Welfare

Biotech researchers say rapid test detects seafood pathogen Vibrio in just 30 minutes

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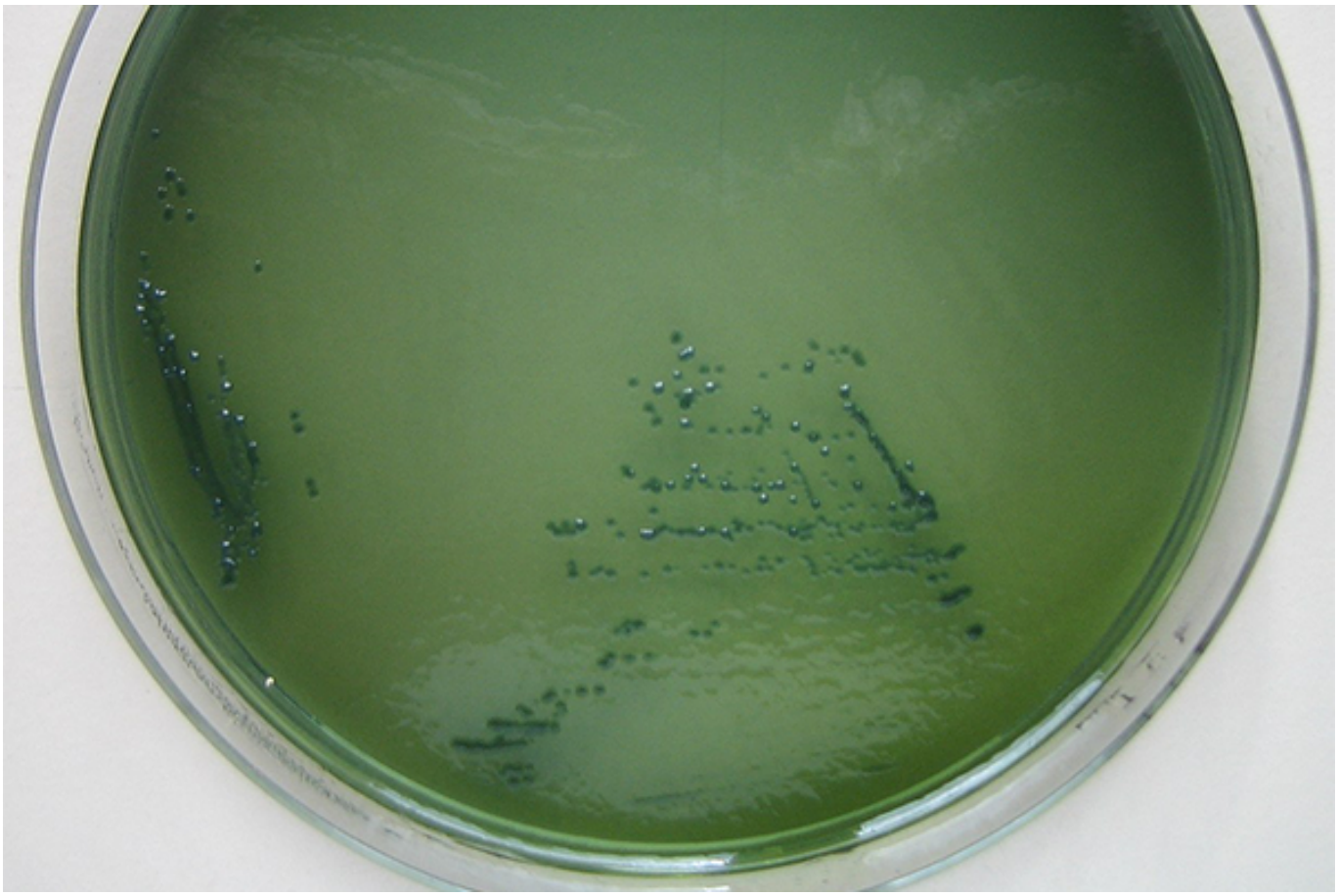
By Responsible Seafood Advocate

New rapid test for *Vibrio parahaemolyticus* in seafood offers quick, low-cost solution, potentially averting foodborne outbreaks

Researchers have developed a groundbreaking point-of-care detection method for *Vibrio parahaemolyticus*, a bacterium responsible for many foodborne illnesses. The new platform, leveraging recombinant polymerase amplification (RPA) and the CRISPR/Cas12a system combined with an immunochromatographic test strip (ICS), offers a “low-cost, simple and visually intuitive solution” for the rapid detection of this pathogen in seafood. This new method marks a substantial improvement in food safety and public health measures.

Vibrio parahaemolyticus is a Gram-negative, halophilic bacterium prevalent in marine environments and is the primary cause of acute hepatopancreatic necrosis, also known as early death syndrome, in aquaculture. It represents a considerable public health hazard, especially by consuming raw or undercooked seafood. The bacterium can contaminate seafood surfaces, leading to foodborne outbreaks. Current detection methods, which rely on microbial isolation, culturing, and biochemical



Researchers say a rapid test for *Vibrio parahaemolyticus* (colony of *Vibrio* in agar pictured above) in seafood offers a quick, low-cost solution to prevent foodborne illness.

identification, are too slow for effective point-of-care testing (POCT).

However, scientists from the Shanghai Academy of Agricultural Sciences have unveiled a novel detection platform that identifies *Vibrio parahaemolyticus* within 30 minutes.

“The platform utilizes a combined approach involving recombinant polymerase amplification (RPA), the CRISPR/Cas12a system, and an immunochromatographic test strip (ICS). It specifically targets the tlh gene of V*. parahaemolyticus*, facilitating sensitive detection. The procedure starts with extracting bacterial DNA from the seafood sample, followed by RPA for amplification. The CRISPR/Cas12a system then accurately identifies and cleaves the target gene, with the ICS providing a visual confirmation of the bacterium’s presence. This method achieves a detection limit of 2.5×10^2 fg/μL for plasmid DNA and 1.4×10^2 CFU/mL for the bacteria. It can detect *V. parahaemolyticus* in salmon sashimi at concentrations as low as 154 CFU per gram without sample enrichment.”

Minutes, not days: Partnership takes aim at rapid tests for shrimp diseases

With USDA research funding, Sherlock Biosciences and the Gloucester Marine Genomics Institute will commercialize diagnostic tests for shrimp diseases.

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This breakthrough overcomes the drawbacks of traditional culture-based methods, offering a faster, more accessible approach to monitoring seafood safety. The innovation could significantly reduce the risk of foodborne illness from seafood.

“Our innovative detection platform represents a significant advancement in the rapid and sensitive detection of *Vibrio parahaemolyticus*, proving especially valuable for ensuring seafood safety and preventing public health crises,” said Dr. Haijuan Zeng, the corresponding author and leader of the Biotechnology Research Institute at the Shanghai Academy of Agricultural Sciences.

This new method could lead to a rapid, cost-effective solution for use during food handling or at points of sale, shortening the detection timeframe and potentially averting foodborne illness outbreaks before contaminated products reach consumers.

Read the full study here (https://academic.oup.com/fqs/article/doi/10.1093/fqsafe/fyae008/7607783).

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