

AUBURN UNIVERSITY

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Reference: Aquaculture probiotics

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Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities available, including funded research and joint proposals

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Probiotics for Disease Control in Aquaculture

Overview

Auburn University is seeking a licensee or development partner for probiotic *Bacillus* strains with demonstrated ability to mediate disease control in farmed fish. With the global aquaculture market projected to grow 5% per year throughout this decade, control of disease outbreaks will become increasingly important. Because of inherent problems with overuse of antibiotics, alternatives need to be identified. These naturally occurring bacteria strains isolated at Auburn have been shown to control commercially relevant diseases in multiple species of fish.

Advantages

- Reduced mortality has been shown for multiple diseases in multiple species
- Antagonistic activity has been demonstrated against numerous aquatic diseases
- Strains are amenable to scale-up and various types of formulation (including feed)

Description

High-density farming and rapidly changing water conditions place stress on fish, resulting in favorable conditions for disease. For channel catfish, Enteric Septicemia (*E. ictaluri*), results in domestic economic losses of \$20-\$30 million annually, with additional losses in Asia. Similarly, *A. hydrophila*, which also affects tilapia, was identified as the cause of a disease epidemic which resulted in over five million pounds of channel catfish lost in Alabama alone. *S. iniae* is estimated to have a global economic impact of over \$100MM.

Use of antibiotics has associated public health concerns, including generation of drug-resistant pathogens ([reference](#)). Thus, alternatives for disease control are needed. Probiotics is a promising approach, one that has significant activity in both crops and human health. A cross-disciplinary team has identified several *Bacillus* strains isolated from both soil and aquaculture environments that have been shown to mediate disease progression in farmed catfish and tilapia. These strains were easily administered to the fish via a pelleted feed formulation.

Results

- Pond studies showed: 1.) channel catfish mortality from *A. hydrophila* reduced from 70% to 10%; 2.) ~15% increase in weight gain (unchallenged), and 3.) improved water quality
- Initial screening has identified strains with activity towards *E. tarda*, *Streptococcus iniae*, *Y. ruckeri*, *F. columnare*, and *Saprolegnia ferax*
- Second patent pending technology suggests low cost additive to further enhance efficacy

Status

- Subject of issued US Patents [9,205,116](#) and [9,603,879](#).
- Applications pending in Brazil, Canada, Mexico, Thailand, and Vietnam.
- Bacterial strains with demonstrated efficacy are proprietary and available for licensing

References

Ado, et al. *Aquaculture Research*, doi:10.1111/are.13300 , 2017 ([Link](#))
Ran, et al. *PLoS ONE*, **7 (9)**, e45793, 2012 ([Link](#))

