ParaFishControl

Impact of *Pseudomonas* H6 surfactant on the fish parasite *Ichthyophthirius multifiliis*

ParaFishControl Workshop "North European Fish Parasite Management Strategies in Aquaculture Farms"

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Laboratory of Aquatic Pathobiology

University of Copenhagen, Denmark

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Challenge and Impact

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➢ Challenge

Ichthyophthirius multifiliis (*Ich*) is a unicellular parasite that infects almost all freshwater fish species - production fish as well as ornamental fish.

It infects gills, skin and fins and elicits mortality

The parasite multiply intensively depending on temperature

➢ Impact

Ich causes high mortality in both production and ornamental fish species.

Without treatment, it can kill whole productions within a short time.

Economic losses for the fish farmers both due to fish loss and work labour.

Bottleneck for a production increase of commercially important fish species.

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Our approach and our team

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- **Brief description of the proposed solution**

It was recently shown that the fish pathogenic oomycete *Saprolegnia diclina* is sensitive to a viscosin-like surfactant from *Pseudomonas* H6

Aim: To determine if the surfactant of *Pseudomonas* H6 bacteria represents a safe alternative for treatment against *Ich*

- **Team involved in the development**

Laboratory of Aquatic Pathobiology, Department of Veterinary and Animal Sciences, Faculty of Health and Medical Sciences, University of Copenhagen, Frederiksberg C, Denmark.

Netherlands Institute of Ecology (NIOO-KNAW), Department of Microbial Ecology, Wageningen, The Netherlands.

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Our proposed solution (I - **AIM**)

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Limited prophylactic treatments available

Current control measures – repeated treatments with carcinogenic and environmentally harmful substances

Solution: To discover a safe alternative treatment against *Ich*

AIM: determine if the surfactant of *Pseudomonas* H6 bacteria represents a safe alternative for treatment against *Ich*

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Our proposed solution (II - **Results**)

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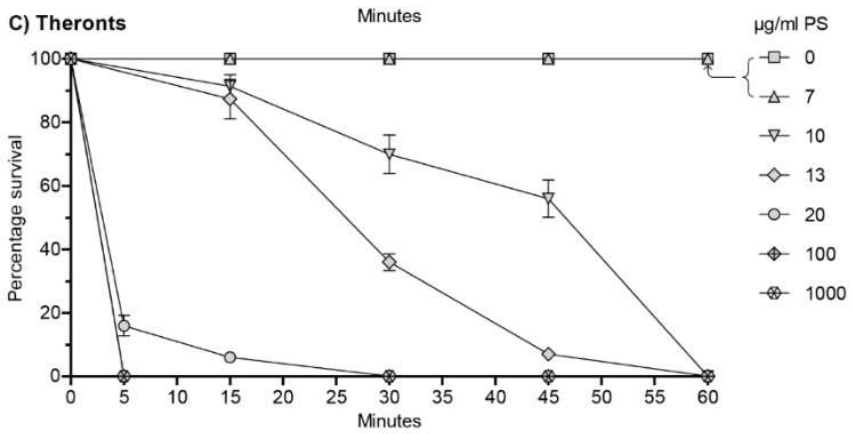
Results of the study from J.Fish Dis. 2018 vol. 41, pp: 1147-1152
DOI:10.1111/jfd.12810



- It works at low concentrations again external stages of the parasite
- The effective concentrations have no adverse effects on the fish

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Our proposed solution (III)

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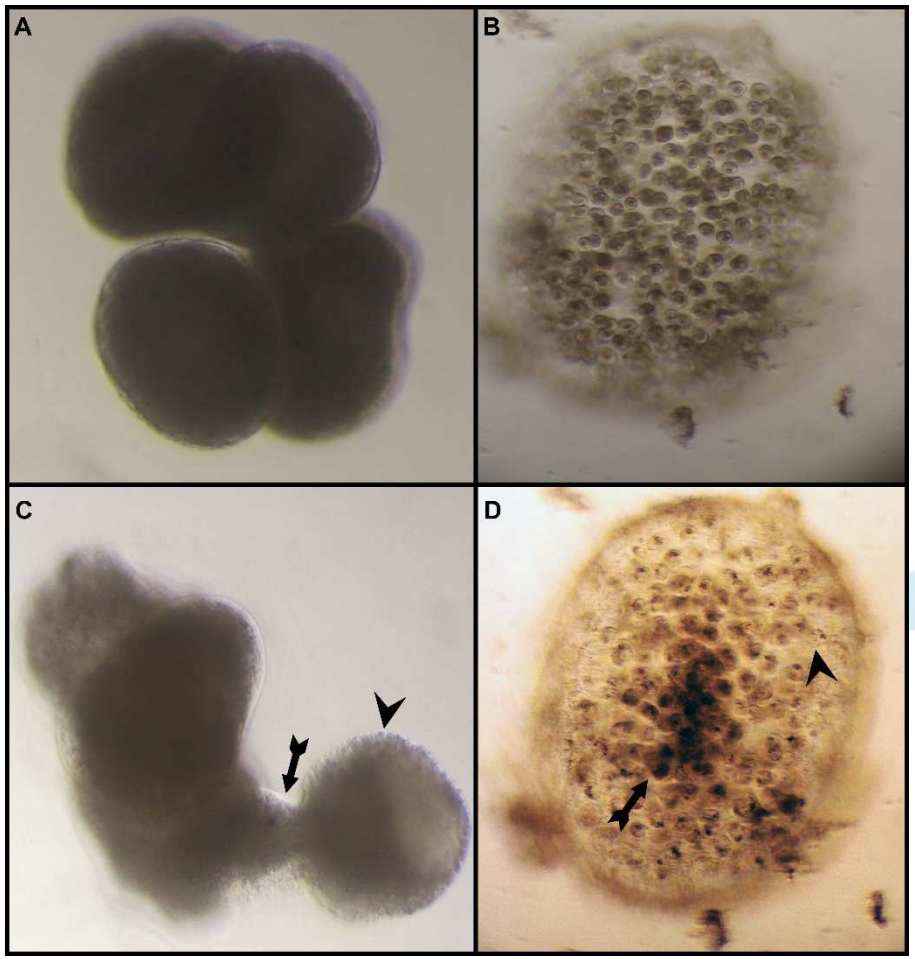
Visualization of *Pseudomonas* surfactant effects on *Ich*
From PFC paper
DOI:10.1111/jfd.12810



Pseudomonas lipopeptides kill the parasite stages

Our solution is to apply the surfactant as a sustainable compound against ICH in fish production systems

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Our solution vs currently employed solutions

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➢Our solution

More test are needed to determine safety

If safe, our product presents a safe and efficient way (efficient in low concentrations) of controlling *Ich*

Price not finally determined but it is estimated to be competitive compared to other options

Precision of auxiliary compounds is low

➢Currently employed solutions

Repeated treatments with formalin, hydrogen peroxide and peracetic acid

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Expected benefits for the industry

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- Improved health status of European farmed fish
- Improved welfare in fish farms
- Improved sustainability of European aquaculture
- Increased productivity in European fish farms
- Elevated economic result in European aquaculture

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Current status and next steps

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Patent application in action

EDP ref: P1600045PC00 – International PCT Application No. PCT/EP2018/081923

Novel upstart company established for utilization of the product

- SUNDEW – a biotech company based in Denmark
- Obtaining license to produce and distribute the compound

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Conclusions

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Bacteria within the genus *Pseudomonas* produce surfactants, which can be isolated and used for neutralization of fish pathogens

This study has shown that the surfactant has a potential as a biodegradable effective parasiticide against all free living stages of *Ich*

The substance is being patented and the biotech company SUNDEW will obtain a license and produce and distribute the product

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Thank You

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