MOLECULAR APPROACHES FOR FASTER AND MORE RELIABLE PATHOGEN IDENTIFICATION IN AQUACULTURE

Iris A. L. Silva 1#*, Inês Freitas #1, Morgana Angelo 1, Florbela Soares 1, 2, Rui Sousa 1, Pedro Pousão-Ferreira 1,2, Cátia Lourenço-Marques 1,2

S2AQUA Laboratório Colaborativo Sustainable and Smart Aquaculture

1 S2AQUA, Olhão, Portugal; 2 IPMA/EPPO, Olhão, Portugal.

*Email: **iris.silva@s2aquacolab.pt** #Contributed equally

Overview

Rapid and accurate detection

Before clinical symptoms

Molecular tools PCR and qPCR

Preventing the spread of infectious diseases

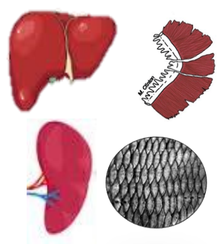
Distinguish closely related pathogens

Monitor the presence of pathogens in the environment

Workflow (~3h)

Samples

- Affected tissues

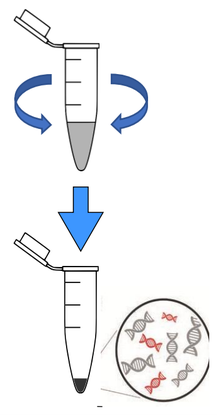


- Isolated bacteria



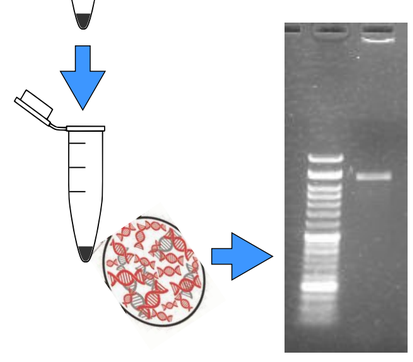
DNA/RNA extraction

- Commercial kits
- Automatized extraction



Pathogen identification

- Single PCR
- Multiplex PCR
- Quantitative PCR (qPCR)



Optimized protocols for molecular detection of pathogens impacting aquaculture

PARASITES

Amoebae

Amyloodinium ocellatum

Microsporidia

Monogenea

Tetracapsuloides bryosalmonae

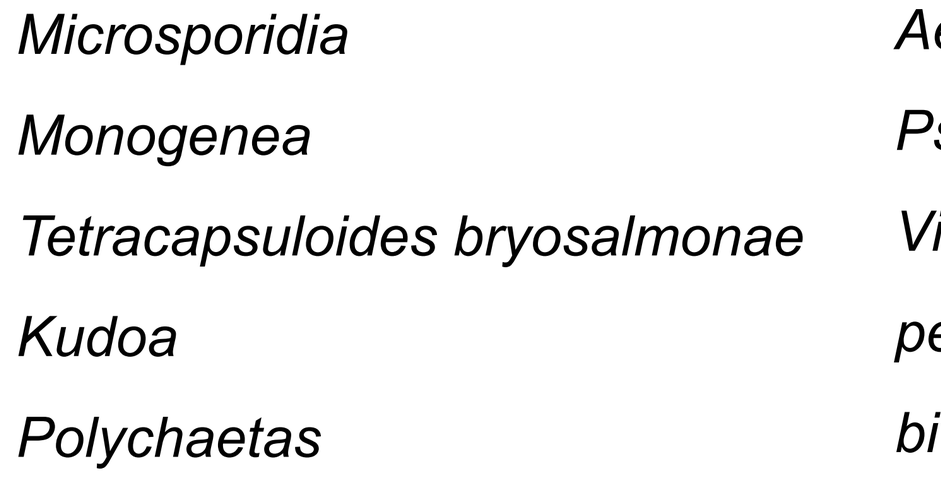
Kudoa

Polychaetas

Bonamia

Perkinsus

Monogenea ***Myxosporidium***



Parasite morphological identification by microscopy and molecular identification by single PCR.

BACTERIA

Photobacterium damselae subsp. *damselae* and *P. dam. piscicida*

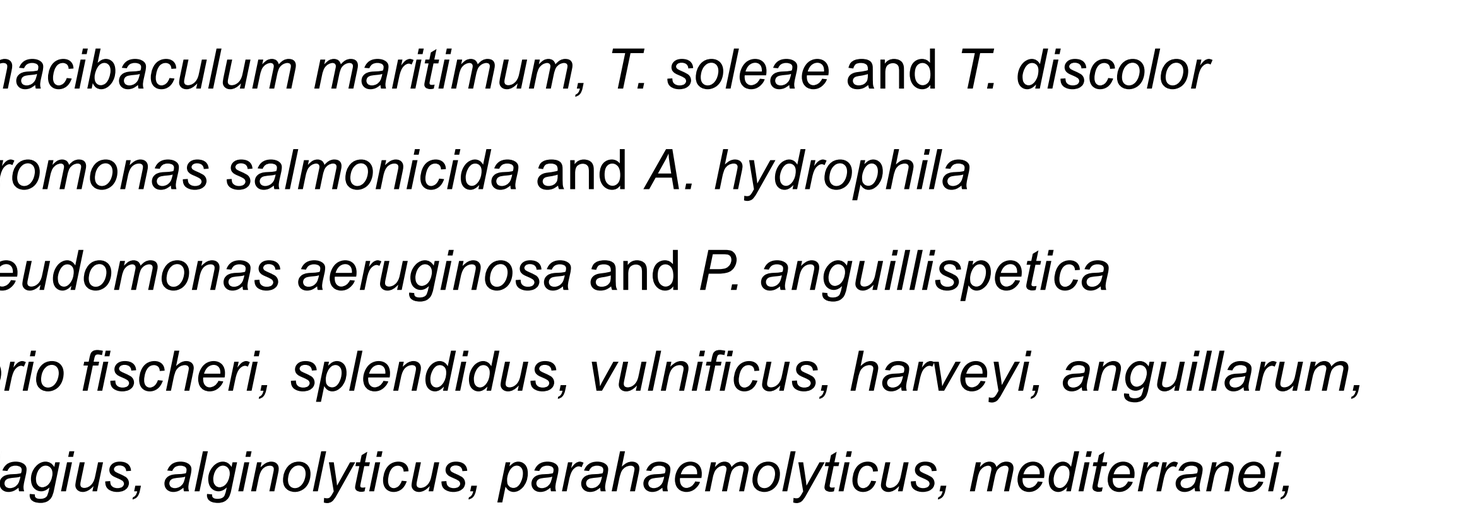
Tenacibaculum maritimum, T. soleae and *T. discolor*

Aeromonas salmonicida and *A. hydrophila*

Pseudomonas aeruginosa and *P. anguillispetica*

Vibrio fischeri, splendidus, vulnificus, harveyi, anguillarum, pelagius, alginolyticus, parahaemolyticus, mediterranei, bivalvicida, cyclitrophicus and aestuarianus

Pseudomonas ***Tenacibaculum*** **Multiplex *Aeromonas*** **Multiplex *Vibrios***



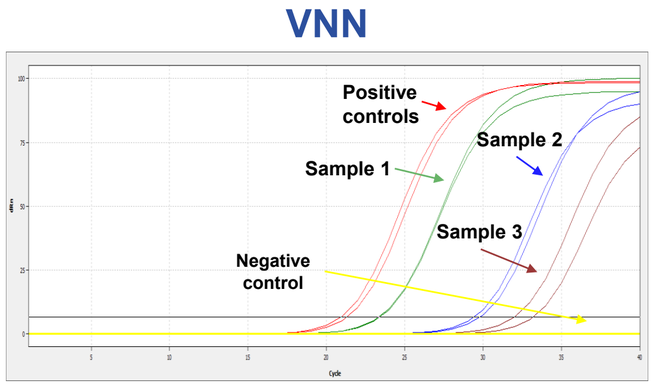
Molecular identification of bacteria using multiplex PCR.

VIRUS

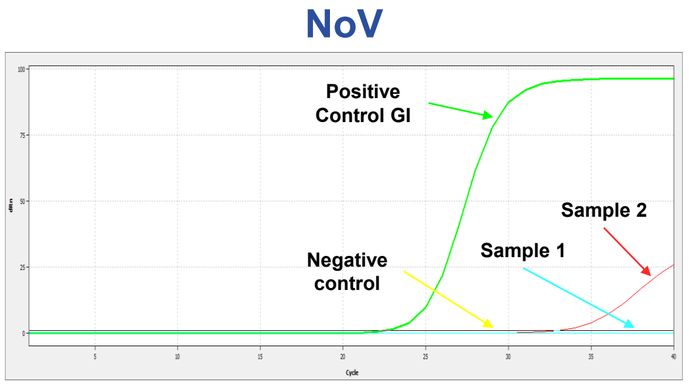
Nodavirus (VNN) in fish

Norovirus (NoV) in bivalves

VNN



NoV



Virus identification and quantification by qPCR.

These molecular approaches provide robust, high-throughput diagnostic capabilities that strengthen disease monitoring, improve response times, and support the development of more resilient and sustainable aquaculture systems through genomics-informed health management strategies.

S2AQUA services could help develop **new preventive and treatment methods** to control fish diseases, **reducing economic losses** for the aquaculture industry and **improving fish health and welfare.**

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S2AQUA - Laboratório Colaborativo, Associação para uma Aquacultura Sustentável e Inteligente
Av. Parque Natural da Ria Formosa s/n
8700-194 Olhão
PORTUGAL
Tlf: + 351 289 715 346 | geral@s2aquacolab.pt

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