

TECHNOLOGY OFFER

# SPOREFORMING PROBIOTIC STRAINS, METHODS AND USES THEREOF

This technology relates to the isolation, identification and characterization of novel sporeforming probiotic strain(s) with NSPase (Non-Starch Polysaccharides-active hydrolases) activity isolated from fish gut microbiota, methods and uses thereof.

## KEYWORDS

Aquafeeds

Probiotics

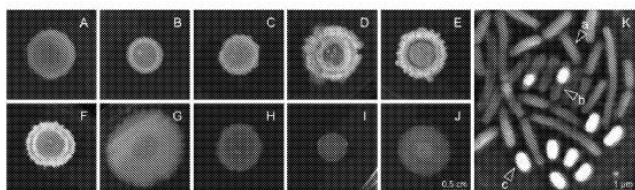
Non-Starch Polysaccharides

Fish gut bacteria

## DESCRIPTION

Aquaculture sustainability requires replacement of fish meal (FM) by plant feedstuffs (PF) in aquafeeds to reduce diet costs and environmental impacts associated with FM use. PF nutritive value is limited by the presence of non-starch polysaccharides (NSP), which cannot be hydrolysed by fish digestive enzymes, becoming a source of organic pollutants and negatively impacting fish performance and gut health.

This technology refers to an innovative solution using Probiotic bacteria (PRO) capable of producing NSP hydrolysing enzymes allowing the host to obtain energy from indigestible nutrients, reduce faecal matter production and NSP harmful effects in fish gut.



This technology will contribute to the development of efficient and ecological aquaculture resources, with a view to improving the health and sustainability of aquaculture, providing an industrially attractive probiotics for use in aquaculture systems.

## ADVANTAGES & INNOVATIONS

This technology presents an innovative solution responding to critical factors for the economic development of aquaculture:

- i) reduce the dependence on fishmeal in aquafeeds, and
- ii) increase the incorporation of safe and sustainable foods, available locally.

This technology contributes to the reduction of economic losses related to outbreaks of bacterial diseases, which frequently associated with animal production, contributing to the reduction of the use of antibiotics in aquaculture.

Additionally, the environmental impacts associated with the inclusion of high levels of PF and high fecal production associated with diets rich in vegetable raw materials are mitigated by the application of this technology.

Furthermore, this technology will support the development of new probiotics with potential for commercial exploitation in aquaculture.

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### INTELLECTUAL PROPERTY RIGHTS

#### Patents status

International Patent Application via PCT [WO2020084565](https://patents.google.com/patent/WO2020084565)

Priority date: 24.10.2018

Granted in US

Pending in EU, Chile



### STAGE OF DEVELOPMENT

TRL4 - Technology validated in lab

Further development for validation in large scale setups required



### COOPERATION OPPORTUNITY

Licensing agreement.

Product development and marketability.

Partnership for further validation in large scale aquaculture setups and for the optimization of probiotic/feed production parameters.

RD&I collaboration for validation in new target aquaculture species.



### RELEVANT PUBLICATIONS

Serra C.R., Almeida E.M., Guerreiro I., Santos R., Merrifield D.L., Tavares F., Oliva-Teles A., Enes P. 2019. Selection of carbohydrate-active probiotics from the gut of carnivorous fish fed plant-based diets. *Scientific Reports* 9, 6384. <http://dx.doi.org/10.1038/s41598-019-42716-7>



### CONTACT

CIIMAR - Technology Transfer and Business Development Office

[techtransfer@ciimar.up.pt](mailto:techtransfer@ciimar.up.pt)

### DEVELOPED BY

CIIMAR - CENTRO INTERDISCIPLINAR DE INVESTIGAÇÃO MARINHA E AMBIENTAL  
UNIVERSIDADE DO PORTO