# PROBIOTIC TREATMENT OF LIVE FOOD ORGANISMS FOR ATLANTIC BLUEFIN TUNA LARVAE : Microbiological & Immunological Criteria

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## Abstract

A probiotic treatment of live food organisms with *Pediococcus acidilactici* MA18/5M did not affect the growth of Atlantic bluefin tuna larvae. At 15 days post hatch (dph), the larvae fed with the treatment had a lower expression of the genes coding for glutathione peroxidase and interleukin-1β, and less evenly diverse microbiota, compared with the control group. This may indicate a positive effect of the probiotic on larval health and anti-inflammatory/antioxidative status, which needs to be confirmed.

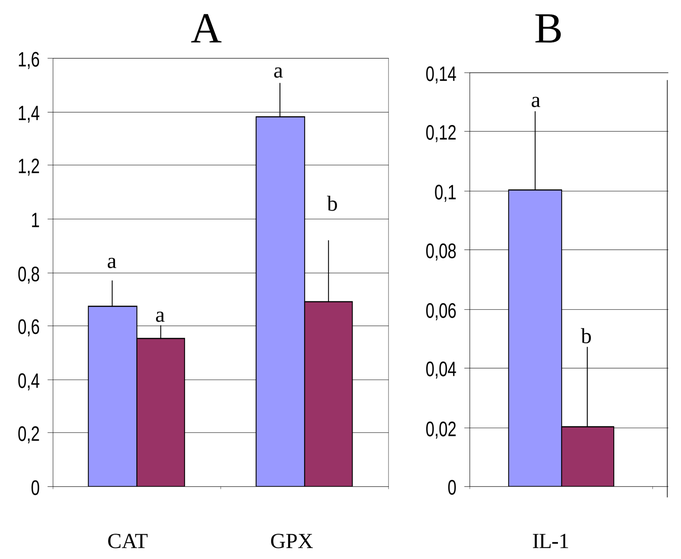
## Introduction

Dietary probiotics were used to improving health of many fish larvae, and they may be considered for developing the larval rearing of Atlantic bluefin tuna larvae. Among the most likely mode of action of probiotics in fish larvae, the attention has been focused on the modulation of intestinal microbiota, and on the improvement of the immunological and antioxidative status of the larvae. Here is presented a preliminary insight into the possible application for tuna larvae.

## Materials and methods

Tuna larvae were reared as described in the oral communication Coves_218_9. The live feed, rotifers and *Artemia*, were enriched with Ori-Green +/- Bactocell (*P. acidilactici* MA 18/5M; $10^{11}$CFU.m$^{-3}$). Tuna larvae were sampled at 15dph for RNA and DNA extraction. The relative gene expressions were estimated by quantitative RT-PCR, and the bacterial diversity was characterized by PCR-DGGE of the hypervariable region V3 of 16S rDNA.

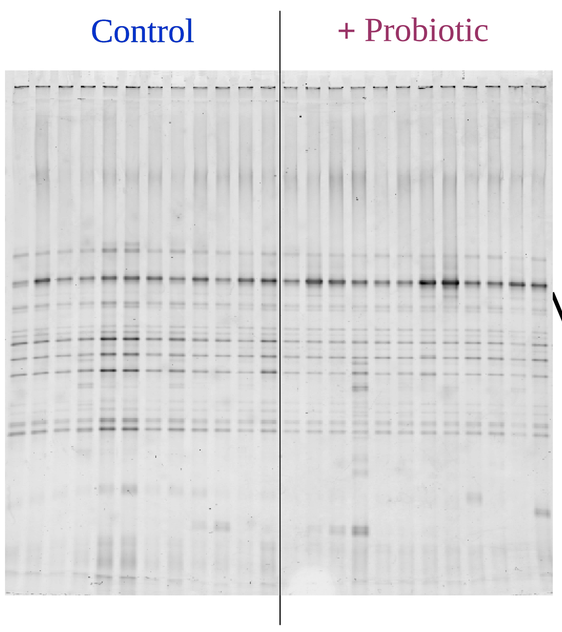
## Results



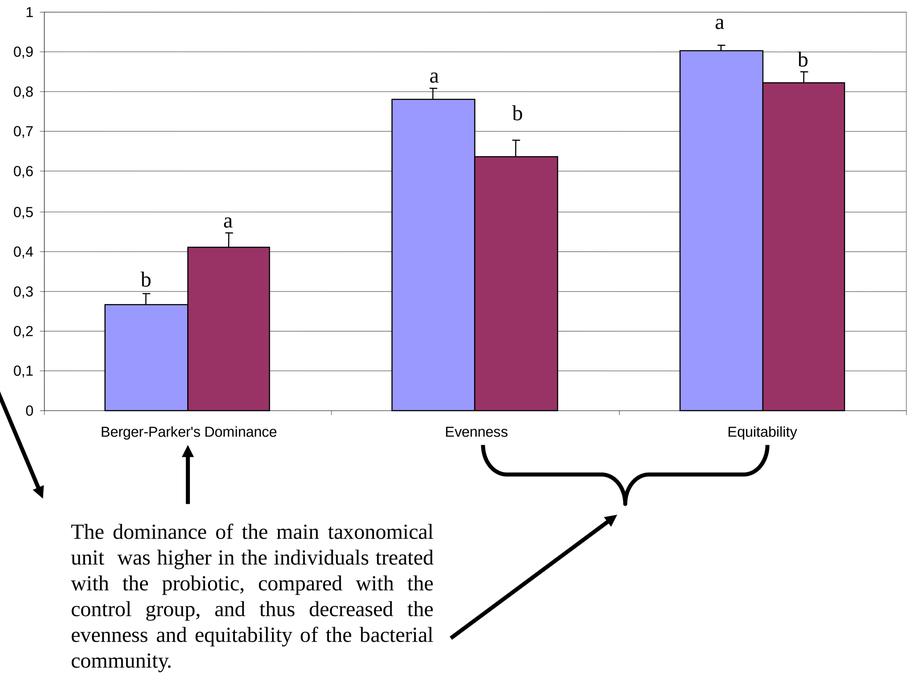

Expression levels of marker genes:

- A Oxidative status (CAT: catalase, GPX: glutathione peroxidase)
- B Inflammation (IL-1: interleukin-1β)

The larvae of the control group had a higher expression level of GPX and IL-1, compared with the probiotic-treated group.




DGGE profiles of the microbiota associated with individual larvae




The dominance of the main taxonomical unit was higher in the individuals treated with the probiotic, compared with the control group, and thus decreased the evenness and equitability of the bacterial community.

Growth was not significantly affected by the probiotic treatment. At 15dph, the expression levels of two genes indicated a better oxidative and inflammatory status of the larvae treated with the probiotic. At the same time, the probiotic increased the relative abundance of the dominant bacterium associated with the larvae.

## Conlusion

The probiotic treatment significantly affected larval microbiota and the anti-inflammatory/antioxidative status of tuna larvae. Further experiments are worth pursuing to elaborate a way of administration that can improve growth and survival of the larvae.

## Acknowledgments

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