

THE EFFECTS OF DIETARY SUPPLEMENTATION WITH SULFATED POLYSACCHARIDES FROM *Nannochloropsis oceanica* ON THE ANTIOXIDANT AND IMMUNE STATUS OF *Dicentrarchus labrax* INFECTED WITH *Photobacterium damsela* SUBSP. *piscicida*

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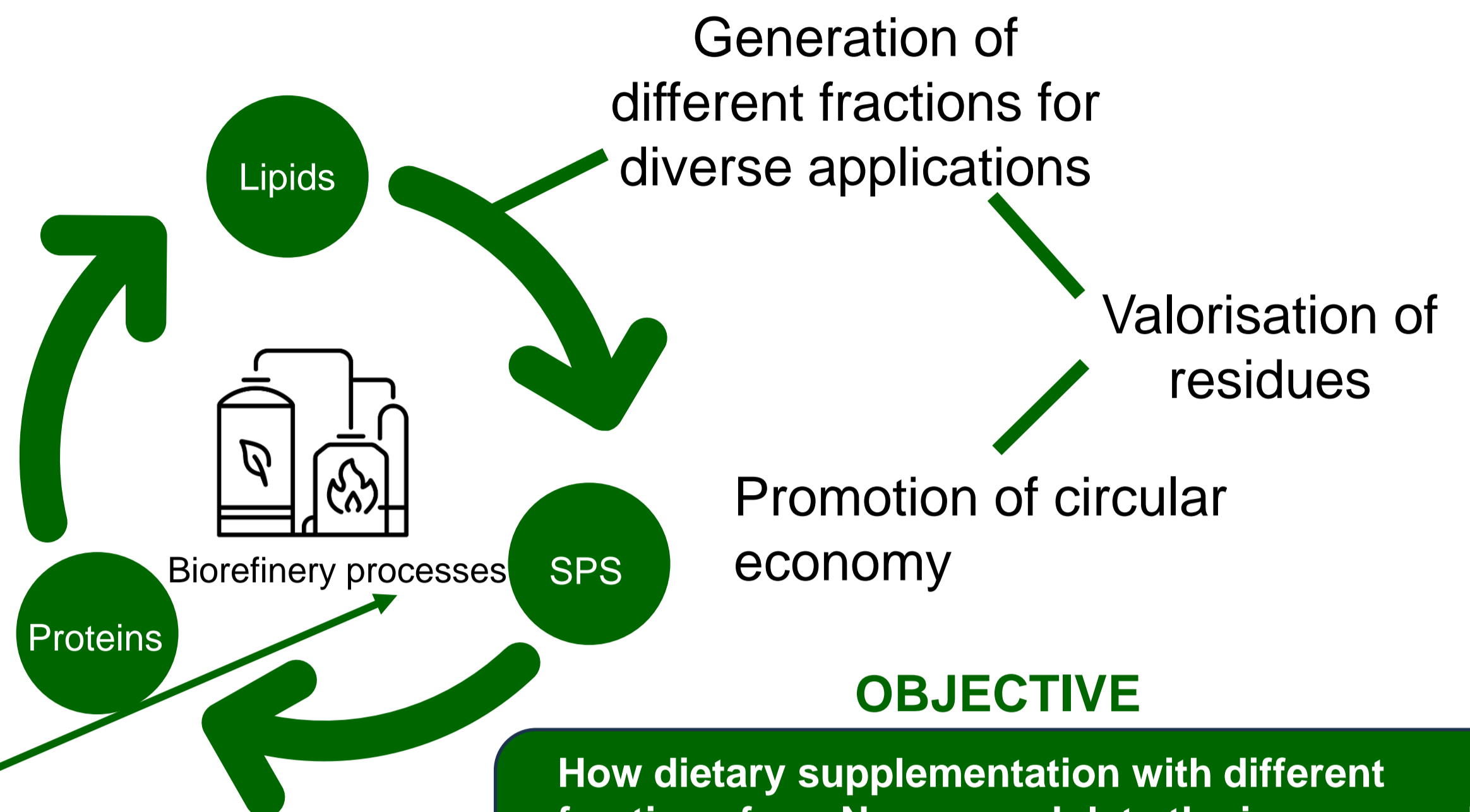
INTRODUCTION

Fish's natural defenses can be boosted through the immunostimulants and antioxidant supplements

Nannochloropsis oceanica (Nanno), a microalgae, has been suggested for this purpose for having sulphated polysaccharides (SPS)

SPS have antioxidant and immunostimulant properties, but its use in aquafeeds remain unexplored

How to use Nanno for aquafeed without competing with other industries?



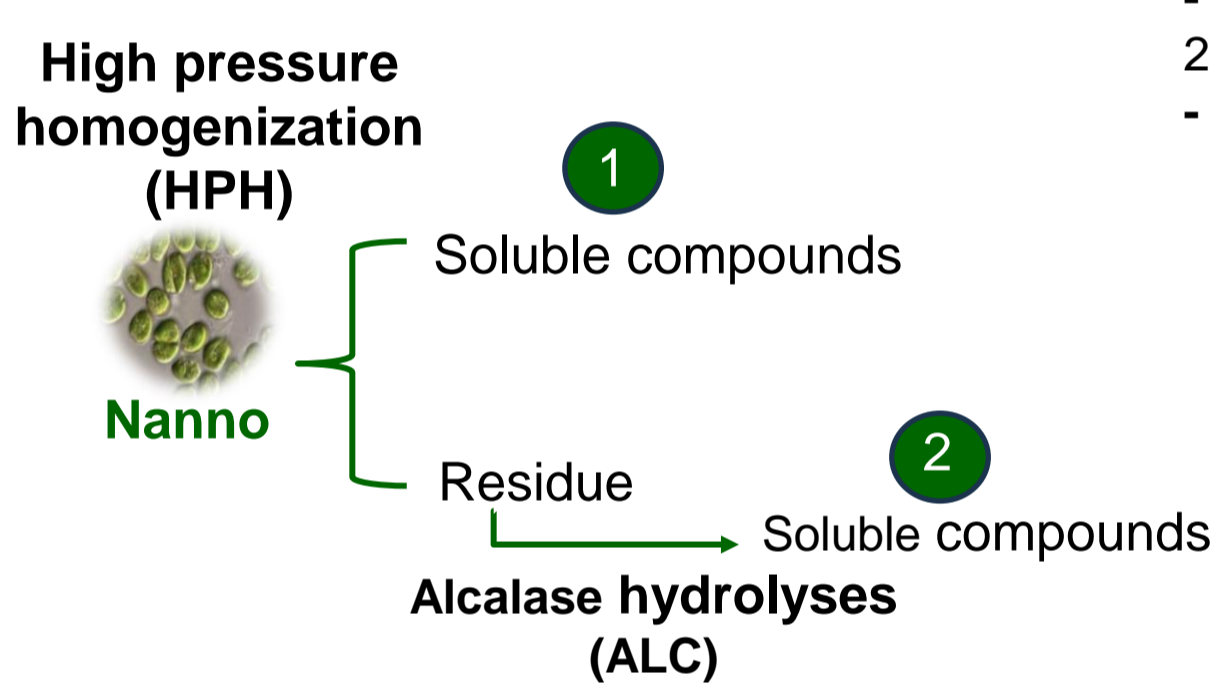
OBJECTIVE

How dietary supplementation with different fractions from Nanno modulate the immune and oxidative responses of fish subjected to an acute infection?



MATERIAL AND METHODS

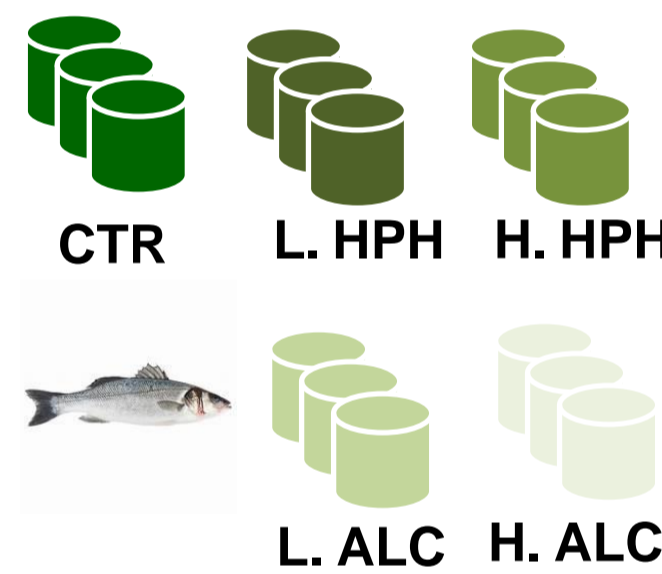
Biorefinery process



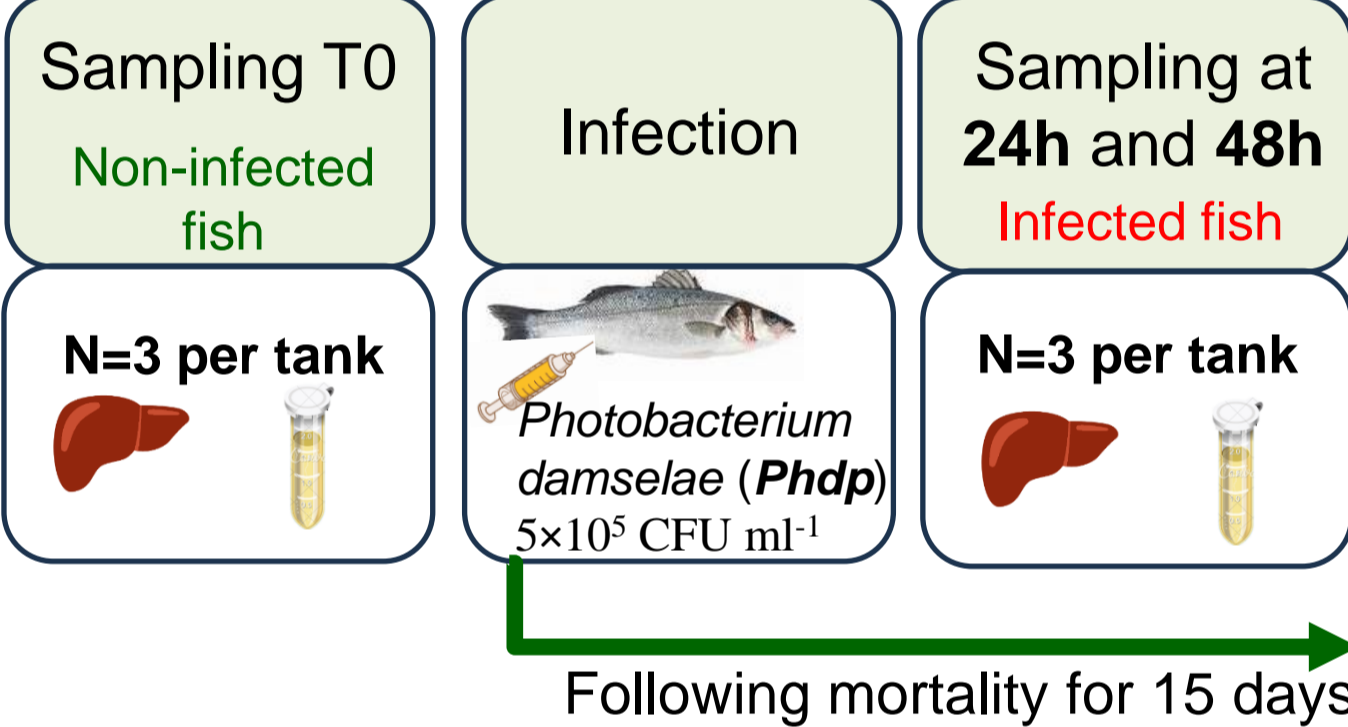
Feeding Trial

- 16 days of feeding until satiation
2 times a day

- Inclusion levels: Low (L.); High (H.)

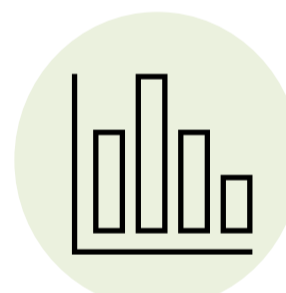


Infection Trial



Parameters

- Oxidative stress**
- ✓ Catalase (Cat)
 - ✓ Glutathione peroxidase (GPx)
 - ✓ Glutathione reductase (GR)
 - ✓ Reduced/oxidized glutathione ratio (GSH/GSSG ratio)
- Immune parameters**
- ✓ Lysozyme
 - ✓ Peroxidase
 - ✓ Protease
 - ✓ Antiprotease



RESULTS

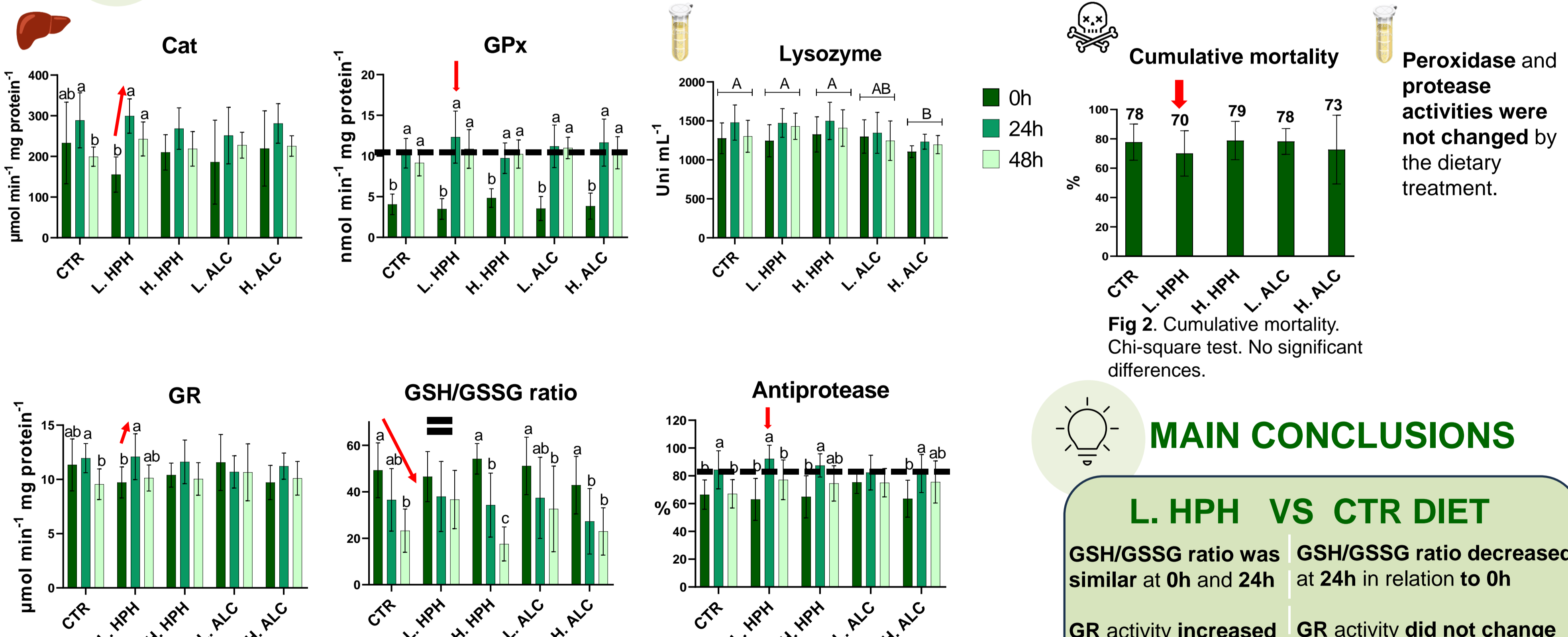


Fig 1. Oxidative stress (Cat, GPx, GR and GSH/GSSG ratio) and immune parameters (Lysozyme and Antiprotease). Tukey post hoc test. Different lowercase letters indicate significant dietary differences between times within the same dietary treatment, while uppercase letters indicate differences between dietary treatments at the same time.

Fig 2. Cumulative mortality. Chi-square test. No significant differences.

MAIN CONCLUSIONS

L. HPH VS CTR DIET

- GSH/GSSG ratio was similar at 0h and 24h
- GSH/GSSG ratio decreased at 24h in relation to 0h
- GR activity increased between 0h and 24h
- GR activity did not change between 0h and 24h

TAKE HOME MESSAGE

The hepatic antioxidant response suggested that L. HPH enhanced the redox homeostasis of European seabass infected with *Phdp* by increasing the activity of antioxidant enzymes.

FURTHER WORK

Further studies using gene expression analysis on the head-kidney are needed to provide a more detailed understanding of the potential of Nanno soluble extract to enhance the immune response of European seabass.