

Effects of omnivorous fish feed on enzymatic activity and metabolic profile of South American crustaceans: potential organic extractive species of fish farming

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INTRODUCTION

- One way to develop more sustainable aquaculture systems is through species diversification and optimization of the feed input, such as that obtained by integrated multitrophic aquaculture (IMTA) (Chopin *et al.* 2008; Knowler *et al.* 2020).
- *Macrobrachium borellii* (Palaemonidae) and *Aegla uruguayana* (Aeglidae) are freshwater crustaceans native to South America that have many useful features to be implemented in an IMTA system.

OBJECTIVE:

We analyze the effect of a commercial feed formulated for omnivorous fishes on growth, digestive enzyme activity, and metabolic profile of two decapod crustaceans species

...in order to collect information on the nutritional requirements of this species

MATERIAL AND METHODS

- ✓ **Organisms collection:** 45 adults of each species were captured in the wild, weighed, measured and placed in glass aquariums (60x35x35 cm) (density: 62.5 individuals/m²), with artificial refuges and stones, individual aeration system and the same amount of water.

- ✓ **Experiment:** 3 aquariums (replicates) for species; duration: 40 days. When it finished, crustaceans were weighed, measured and sacrificed.

- ✓ **Feed:** crustaceans were fed twice a day ad libitum with omnivorous fish feed (PA-27, Garay-SRL, Argentina).

- ✓ **Hepatopancreas and muscle tissues** were extracted and immediately ultrafrozen for posterior analyses of digestive enzymes and metabolic profile.

HEPATOPANCREAS

MUSCLE

Enzyme activities:

- Lipase
- Total proteinase
- Amylase

Metabolites:

- Glycogen
- Triglycerides
- Protein

Enzymatic activities as well as metabolites of hepatopancreas and muscle were determined by established protocols.

- ✓ **Growth increments** of organisms were calculated.

- ✓ **Data analysis:** comparison of enzymatic activity and metabolic profile between both species → F test to compare variances (p<0.05). Normality of dataset → Shapiro-Wilk test

RESULTS and DISCUSSION

Metabolic profile

Enzymatic activities

- *A. uruguayana* registered higher growth (21.13±6.18%) than *M. borellii* (-7.05±11.51%).

- Amounts of glycogen recorded in hepatopancreas of aeglids were significantly higher than those of prawns → energy available to be mobilized quickly to supply energetics demands in locomotion, sudden changes in environmental parameters or short-term starvation events (Sánchez-Paz *et al.* 2007).

- Aeglids presented lipase activity standing out significantly + higher amount of triglycerides in hepatopancreas → lipid stores are being metabolized perhaps for hormone synthesis (Kumar *et al.* 2018).

- Aeglids had better performance than prawns in terms of growth and energy reserves. This result leads to consider *A. uruguayana* as a potential species for IMTA with omnivorous fishes.

