

EXPRESSION OF DIGESTIVE ENZYME PRECURSORS UNDER DIFFERENT FEEDING CONDITIONS IN *Sparus aurata* LARVAE



Sánchez-Amaya, M.I., Yúfera, M. & Martínez-Rodríguez G.



Instituto de Ciencias Marinas de Andalucía. CSIC, Campus Universitario Río San Pedro, s/n 11510. Puerto Real, Cádiz (Spain)

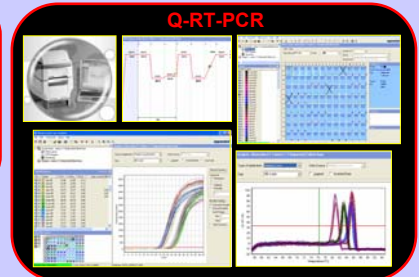
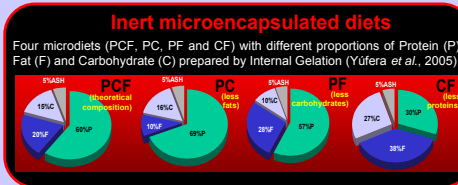
INTRODUCTION

- ✓ Digestive enzymes expression \rightarrow Useful tool for nutritional condition and adaptation of the organism to dietary change.
- ✓ Aim \rightarrow To study the expression onset and ontogeny of α -amylase (Amy), bile activated lipase (BAL) and trypsinogen (Tryp) in gilthead seabream *Sparus aurata* in order to better understand the sequence of events occurring during the alkaline digestion in larval development and to gain insights into the digestive physiology from hatching stage onwards.

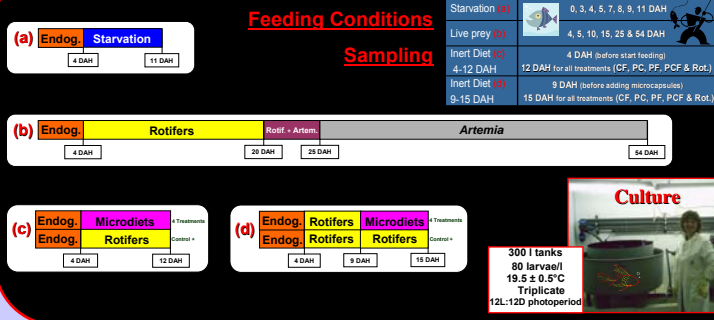
MATERIAL AND METHODS

Full length cDNA from Amy, BAL and Tryp have been cloned after screening a digestive tissue library in *Sparus aurata* larvae and were totally sequenced

Expression was analyzed by *in situ* hybridization (ISH) and Q-RT-PCR under different feeding conditions (starvation, live prey and 4 inert microdiets) during the first weeks of larval development

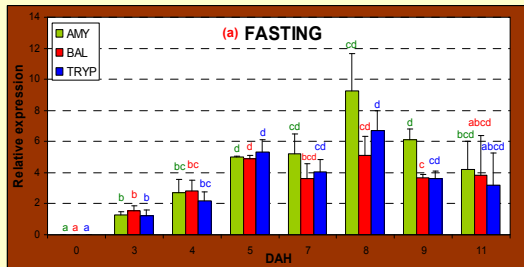


Four Experimental designs

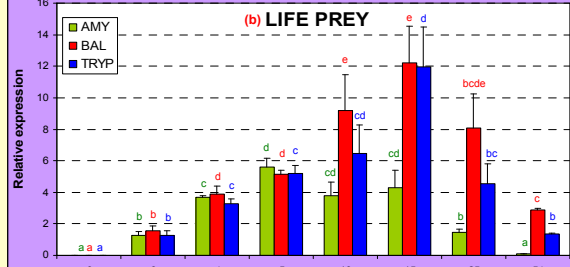


RESULTS & DISCUSSION

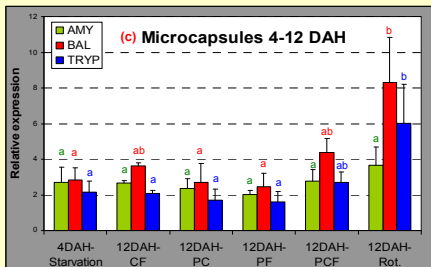
Amy, BAL and Tryp transcripts were localized specifically by ISH in the exocrine pancreas and the signal started to detect with very low intensity from hatching, when it started to increase



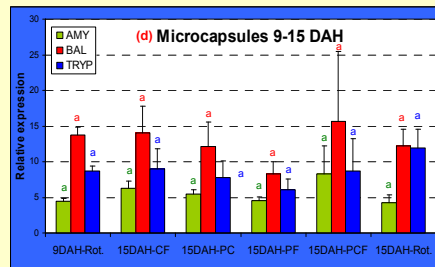
(a) Expression increased from 0 to 8 DAH, and decreased until 11 DAH, just before 100% mortality. This is in agreement with the irreversible starvation moment at 7-8 DAH (Yúfera et al., 1993)



(b) Expression of BAL and Tryp increased till 15 DAH, and decreased afterwards. Expression for α -amylase increased till day 5 and was almost negligible at 54 DAH



(c) Gene expression profiles at 12 DAH were very similar in all treatments and to 4 DAH, but not to 12 DAH larvae fed on rotifers (control +), which exhibited higher expression



(d) Gene expression profiles and levels at 9 and 15 DAH were very similar in all treatments (inert diets or live prey) without significant differences between them

CONCLUSIONS

BAL, α -amylase and trypsinogen, involved in the digestion of lipids, carbohydrates and proteins, were present in *S. aurata* larvae before the onset of exogenous feeding. Moreover, patterns of expression were different between fed and fasted larvae, as well as between both microdiets time-courses, indicating the importance of macronutrients composition and quality and set-point in the beginning of the digestive system development.

ACKNOWLEDGMENTS

- Ministry of Science and Innovation, Spain (National Plan Projects AGL2004-06669-C02-01, AGL2007-64450-C02-01/ACU & Aquagenomics Consolider-28502).
- Mrs. Sánchez-Amaya was supported by a predoctoral FPI fellowship (BES-2005-11031).
- This study benefits from participation in LARVANET COST action FA0801.

REFERENCES

- Yúfera, M., Fernández-Díaz, C. & Pascual, E. 2005. Food microparticles for larval fish prepared by internal gelation. *Aquaculture* 248: 253-262.
- Yúfera, M., Pascual, E., Polo, A. & Sarasquete, M.C. 1993. Effect of starvation on the feeding ability of gilthead seabream (*Sparus aurata* L.) larvae at first feeding. *Journal of the Experimental Marine Biology and Ecology* 169: 259-272.