Introduction

The common snook (*Centropomus undecimalis*) is a species with important value in Mexico (commercial) and the United States (recreational); however, fry production is still a bottleneck due to the need of live foods, which are neither necessary nor adequate. To understand the digestive physiology of fish during early ontogeny, our objective was to evaluate the changes in digestive enzymes using biochemical and electrophoretic techniques during the larviculture of *C. undecimalis*.

Results

Trypsin, chymotrypsin, Leucine-aminopeptidase, carboxypeptidase A, amylase, and phosphatases were detected from yolk absorption (2 days after hatching, dah) onwards, increasing their activities between 12 and 25 dah. Pepsin was first detected from 25 dah, and increase rapidly from 34 onwards (Figs. 1-2). The alkaline protease zymogram showed two bands, the first (26.1-26.4 kDa) at 25 dah onwards, and the second (51.6 kDa) at 36 dah. The acid protease zymogram showed two bands (0.32 kDa) at 25 dah onwards, and the second (51.6 kDa) at 36 dah. Enzyme activities measured were the total alkaline proteases, acid proteases, chymotrypsin, trypsin, leucine aminopeptidase, carboxypeptidase A, α-amylase, lipase, acid and alkaline phosphatases. Alkaline protease isoforms were revealed using SDS-PAGE and acid protease isoforms were revealed using PAGE. Each isoform MW were calculated with Quality One V 4.6.5 software. A Kruskal-Wallis test was used to compare the enzyme activity between ages for each activity. A nonparametric Nemenyi test was used when significant differences were detected.

Materials and method

Embryos were obtained from an induced spawning of broodstock maintained in 13-m³ circular tanks. Larvae were fed using the microalgae *Nannochloropsis* sp and S-type rotifers *Brachionus rotundiformis* (R) from mouth opening until 10 dah. Rotifers were mixed with newly hatched *Artemia nauplii* (AN) until day 24 after hatching. Finally, from day 25 to 36 dah lipid-enriched (SELCO) *Artemia meta-nauplii* (EAMN) were supplied to the larvae. Several numbers of larvae were collected at 0, 1, 3, 5, 7, 12, 25, 34, and 36 dah. Enzyme activities measured were the total alkaline proteases, acid proteases, chymotrypsin, trypsin, leucine aminopeptidase, carboxypeptidase A, α-amylase, lipase, acid and alkaline phosphatases. Alkaline protease isoforms were revealed using SDS-PAGE and acid protease isoforms were revealed using PAGE. Each isoform MW were calculated with Quality One V 4.6.5 software. A Kruskal-Wallis test was used to compare the enzyme activity between ages for each activity. A nonparametric Nemenyi test was used when significant differences were detected.

Discussion and conclusions

Our results agree with those obtained for other species where the changes in activities are related with morphophysiologcal changes in the larva gut; when this organ differentiates to hind, mid and fore-gut, the maturation of microvilli in the enterocytes, as well as in live or artificial food changes during larval growth (Moyano et al., 1996; Zambonino-Infante and Cahu, 2007). *C. undecimalis* larvae have the classic digestive enzyme development as other marine fish. We propose the weaning for this species from 34 dah onwards.

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