Effects of including shrimp protein hydrolysate in practical diets on the growth and survival of redclaw crayfish hatchlings *Cerax quadricarinatus* (Von Martens, 1868)

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**Abstract**

An experiment was carried out to analyse the effects of substituting fish-meal (FM) with soya bean meal and shrimp protein hydrolysate (SPH) on the percent survival, growth rate, feed efficiency and molt frequency of redclaw crayfish hatchlings, *Cerax quadricarinatus*. The experiment was performed in a closed recirculating-water system over a 56-day period. Five diets were tested: a control diet (SPH0) comprising 100% FM without SPH, and four diets with 2.5%, 5.0%, 10.0% and 15.0% SPH substitution (diets SPH2.5, SPH5, SPH10 and SPH15 respectively). Analysis of water quality indicated that it was adequate to maintain a good growth and survival of hatchlings. The results showed that 100% survival was obtained for hatchlings fed with SPH5, SPH10 and SPH15 diets. Higher mean values of final weight were obtained for the SPH5 diet. The highest weight gain was observed in SPH2.5 and SPH5 diets. Hatchlings showed similar specific growth rates for all diets. The efficiency rate of the SPH15 diet was lower compared to the other diets. Overall, individual feed consumption was higher in hatchlings fed diets of SPH5 and SPH15. It is recommended that 5.0% of SPH could be included in diets of hatching redclaw crayfish to improve their growth efficiency.

**Keywords:** protein hydrolysate, bioindicators, feed efficiency, PER

**Introduction**

The Mexican shrimp industry produces around 130 000 metric tons of marine shrimp per year, and generates between 30 000 and 39 000 metric tons of waste in the form of shrimp heads, which represent approximately 30% of body weight (CONAPESCA 2009). This waste is deposited in open-landfills, causing large amounts of contamination (Shirai & Hall 1996). Fish processing by-products are frequently used in the production of fish-meal (FM) and oils by the aquaculture feed industry. There have been increasing interests in protein hydrolysates (PH), because these compounds contribute towards improving feed palatability. In addition, PH is used as feed attractants and feed binders, as well as to stimulate the non-specific immune defense system. Furthermore, PH