



The use of squid viscera protein in feeds for postlarvae shrimp

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Key words: squid, shrimp, feed

Introduction. The jumbo squid (*Dosidicus gigas*) is an abundant and underutilized marine resource in the California Gulf. Waste materials from squid processing as viscera, have the potential to be used as valuable protein sources for feeds if they are processed correctly. The aim of the present work was to evaluate the nutritional value of protein concentrates derived from jumbo squid viscera.

Methods. Shrimp, *Penaeus vannamei*, postlarvae were fed either with dried squid viscera or protein hydrolyzates. Experimental feeds contained 5% or 15% squid protein replacement. In vitro digestion, amino acid and chemical composition of the feed were used to evaluate the protein value of the squid viscera. Shrimp larvae growth parameters were analyzed. Shrimp digestive gland was used as proteinase source for the pH-stat method to evaluate the degree of hydrolysis, DH (1, 2).

Results. The degree of hydrolysis evaluated the extent of protein hydrolysis; according to this parameter, control feed had the highest digestibility. There were no differences among the equivalent hydrolyzates and viscera feeds in terms of digestibility, except from feeds dried at 70°C and 5% of protein replacement (Fig. 1).

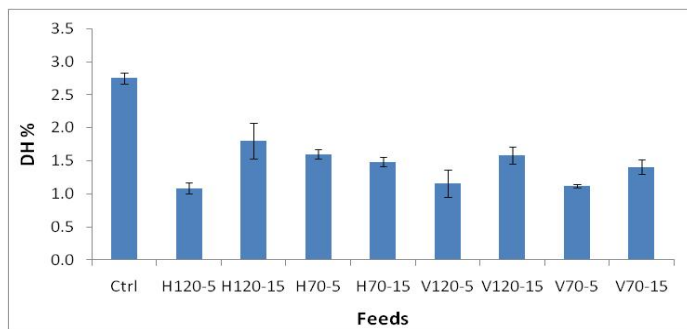


Fig. 1. In vitro digestibility of protein ingredient of experimental feeds. H120/70, hydrolyzed squid viscera dried at 120 or 70 °C; V120/70, squid viscera dried at 120 or 70 °C. Number post-fix (5/15) is the percent of substituted protein in the feeds. DH, degree of hydrolysis. Ctrl, control was fish meal Royal™ feed (Bernaqua. Olen, Belgium).

Digestibility of the proteins used in experimental feeds showed that soybean flour had the lowest degree of hydrolysis (Fig. 2). Also it is noticed that the squid protein either hydrolyzed or raw and dried at 120°C had the same digestibility as control feed.

No significant differences were observed in the analyzed variables for shrimp larvae among treatments: Gained

biomass, survival, Food Conversion Ratio and, Protein Efficiency Ratio.

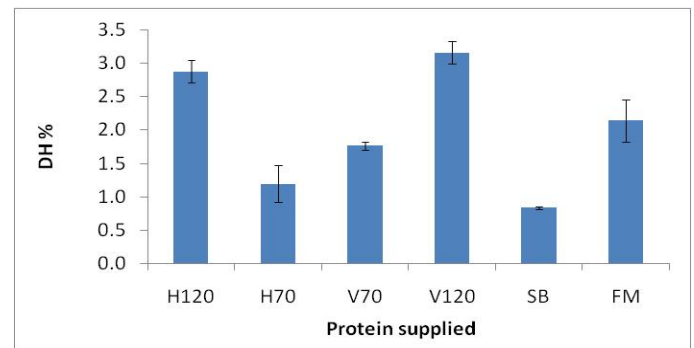


Fig 2. In vitro digestibility of protein ingredient of experimental feeds. H120/70, hydrolyzed squid viscera dried at 120 or 70°C; V120/70, squid viscera dried at 120 or 70°C; SB, soybean flour; FM, fish meal; DH, degree of hydrolysis.

Conclusions. Variables evaluated showed no statistical differences among treatments, which suggest that the raw squid viscera or hydrolyzates can be used in shrimp postlarvae feeds in combination with other less expensive protein ingredients (as the soybean meal) to yield the same postlarvae performance that fed with the commercial feed.

The squid raw viscera or hydrolyzates are a source of protein that can be used directly as a dry meal to complement the protein in feeds. There was no difference if the ingredient was 120°C or 70°C dried

Similar growth in all experimental trial suggests that even digestibility and amino acid content were not optimal; squid viscera could have other properties that support shrimp larvae development.

Acknowledgements.

Dosidicus, LLC, Washington for supporting the research.

References.

1. Ezquerria M, García-Carreño F, Haard N (1997). Aquaculture. 157: 251-262.
2. Córdova-Murueta JH, García-Carreño F (2002). Aquaculture. 210:210:71-384.