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# Mexican institute studies dried artemia biomass as feed for postlarval shrimp

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## Research carried out at Centro Interdisciplinario de Ciencias Marinas Instituto Politécnico Nacional

For more than 30 years, the use of artemia nauplii as live food during the mysis and postlarval development stages of penaeid shrimp has been a common practice in hatcheries. However, from hatchery operators' perspective, artemia nauplii are costly and time-consuming. Dried artemia biomass and other crustacean meals could be cost-efficient alternatives for shrimp hatcheries as the only feed used to rear shrimp postlarvae (PL).

All test feeds were milled to a similar size before feeding.

# Background

Live artemia have been used in a limited manner as a food supplement in the nursery culture of black tiger shrimp (*Penaeus monodon)*. Dhert et al. (1993) demonstrated that in addition to its nutritional advantages, the use of live artemia biomass for feeding postlarval shrimp also resulted in improved economics, as the costs for cysts and weaning diets could be reduced. Chen and Lin (1992) reported that growth of *P. monodon* PL was significantly greater when fed live artemia biomass than when fed frozen biomass.

Unfortunately, live or frozen artemia is often difficult to procure, and only in some areas can it be collected close enough to shrimp hatcheries. Whenever there is a need to freeze the collected biomass and transport it, costs increases considerably.

Artemia biomass has been recently used commercially for the production of artemia flakes as feed for postlarval shrimp, but the flaking process requires costly special equipment (Wouters 2002). In addition to salt production, sun drying thin layers of artemia biomass could offer solar salt pond owners an additional source of income.

# Feed study

With support from Instituto Politécnico Nacional, a recent study by the authors at Centro Interdisciplinario de Ciencias Marinas Instituto Politécnico Nacional (Interdisciplinary Center for Marine Sciences – National Polytechnic Institute) in La Paz, Mexico, determined under laboratory conditions the suitability of dried artemia biomass as feed for postlarval *Penaeus vannamei*. It compared the artemia to four commercial feeds and three crustacean meals (krill, freeze-dried krill, and red crab). The artemia biomass was dried at 70 degrees-C for 24 hours, milled, and stored at 5 degrees-C.

Shrimp $PL_{1-6}$ stocked at 2 to 4 per liter were reared at 28 degrees C in 16, 100-liter aerated tanks where dissolved oxygen was maintained above 5 milligrams per liter. The various PL groups were fed *ad libitum* 5 times per day with artemia, commercial feed, or crustacean meal. Feeds were milled and sieved to a particle size of 100- to 150- m before feeding.

# Results

Proximate analysis of the feeds showed considerable differences. All samples contained about 60 percent crude protein, with the exception of the red crab meal (39.6 percent). However, the lipid contents of the dried artemia biomass (4.9 percent) and red crab meal (2.8 percent) were much lower than the 11 to 17 percent lipid content for the other feeds. Ash content ranged 11 to 20 percent, with the exception of 37 percent ash for the red crab meal. Fiber content was negative in artemia and two of the commercial feeds, whereas a high concentration was found in the krill (3 percent) and red crab (9 percent) meals.

The different feeds used affected the growth and survival rate of the shrimp PLs, which showed marked differences after 23 to 29 days of rearing. The survival rate of PLs fed artemia biomass was always higher than those of animals fed the commercial feeds and crustacean meals. Also, the mean size of PLs fed artemia was larger than that of animals fed the other feeds, except for one of the commercial feeds, where no statistical differences with artemia were determined.

Artemia-fed animals were heavier than PLs fed the commercial feeds and crustacean meals, but one commercial feed produced animals significantly heavier than those fed artemia. The nutritional value of dried artemia biomass was comparable to that of one of the commercial feeds.

Meals from krill, freeze-dried krill, and red crab should be incorporated into a balanced feed to obtain a product of higher nutritional value, in contrast to dried artemia biomass, which can be used directly as a feed for PL shrimp.

# Conclusion

Preliminary study results demonstrated the potential of dried artemia biomass as a feed for rearing postlarval shrimp. Dried artemia could be an effective alternative to commercial products, especially in areas where salt beds with endemic populations of artemia are found.

*Note: Cited references are available from the authors.*

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