Hindawi
Aquaculture Nutrition
Volume 2023, Article ID 7343070, 10 pages
https://doi.org/10.1155/2023/7343070

Research Article

Effect of HUFA in Enriched *Artemia* on Growth Performance, Biochemical and Fatty Acid Content, and Hepatopancreatic Features of *Penaeus vannamei* Postlarvae from a Commercial Shrimp Hatchery in Santa Elena, Ecuador

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Received 18 January 2023; Revised 15 February 2023; Accepted 4 March 2023; Published 28 March 2023

Academic Editor: Liqiao Chen

A 12-day experiment was conducted to investigate the effects of *Artemia* enrichment with two experimental microalgal emulsions (formulated with selected fatty acid contents) on *Penaeus vannamei* postlarvae. For this purpose, 405,000 postlarvae (stage 1) were obtained from a commercial hatchery in Santa Elena, Ecuador, and distributed into nine fiberglass tanks. Postlarvae were fed for 12 days with three experimental diets (three tanks per treatment): treatment A (*Artemia* enriched with experimental microalgal emulsion A and dry diet), treatment B (*Artemia* enriched with experimental microalgal emulsion B and dry diet) and nonenriched *Artemia* (*Artemia* without enrichment and dry diet). At the end of the experiment, length (mm), coefficient of variation of population sizes, number of postlarvae in a gram of weight (PL-gram), biochemical composition, fatty acid profile, hepatopancreas perimeter, and histopathological hepatopancreas status of *P. vannamei* postlarvae (stage 12) were analyzed. To evaluate the status of the hepatopancreas, a categorization range (1–5) was created with different histological parameters such as number of B cells, vesicles around them, healthy tubules, and degradation tissues. Growth traits did not present differences between treatments; total length was 10.17 mm, 10.83 mm, and 10.27 mm for treatment A, treatment B, and nonenriched treatment, respectively, and PL-gram was 141.00, 162.00, and 142.33 for treatment A, treatment B, and nonenriched treatment, respectively. Biochemical composition of postlarvae (lipids, ash, and protein content) did not present differences between the three treatments. Significant differences were observed in the content of three essential fatty acids (DHA, DPA, and ARA) in *Penaeus vannamei* postlarvae fed with *Artemia* enriched with experimental emulsions. Thus, DHA content was significantly superior in animals fed with *Artemia* enriched with treatments A and B ($9.80 \pm 0.71\%$ and $9.75 \pm 0.44\%$, respectively) than in animals fed with unenriched *Artemia* (5.78 ± 0.68) ($P < 0.05$). Concerning arachidonic acid (ARA), treatments A and B showed $3.31 \pm 0.20\%$ and $3.19 \pm 0.09\%$, respectively, higher than postlarvae fed with unenriched *Artemia*, $2.73 \pm 0.04\%$ ($P < 0.05$). Regarding DPA content, treatments A and B reported higher values of MA and MB ($0.81 \pm 0.06\%$ and 0.86 ± 0.08 %, respectively), than unenriched *Artemia* ($0.43 \pm 0.02\%$) ($P < 0.05$). Interestingly, the increase in DHA, DPA, and ARA contents in postlarvae coincided with the increase in hepatopancreas perimeter. In addition, a large number of B cells, a large number of healthy tubules, increased dilatation of the central tube, and a lower percentage of deteriorated tissue were observed in the hepatopancreas when postlarvae were fed with enriched *Artemia*.

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