

**EFFECTS OF SODIUM IODIDE-ENRICHED BRINE SHRIMP  
(*Artemia salina*) ON THE GROWTH, SURVIVAL AND  
METAMORPHOSIS OF RABBITFISH (*Siganus guttatus*) BLOCH  
LARVAE**

**MA. IRENE CABIGONA CABANILLA-LEGASPI**

**A Master's Thesis Presented  
to the Graduate Faculty of the  
Institute of Aquaculture  
College of Fisheries and Ocean Sciences  
University of the Philippines Visayas**

**In Partial Fulfillment of the Requirements  
for the Degree of  
Master of Science in Fisheries  
Major in Aquaculture**

**JUNE 2018**

## ABSTRACT

Metamorphosis is considered the most crucial stage in larval fish development that dictates the overall larval fish survival and production output in a hatchery system. This physiological process is modulated by thyroid hormones produced from the thyroid gland the biosynthesis of which is dependent on the supply and availability of the mineral iodine. The present study evaluated the supplementation of iodine to rabbitfish (*Siganus guttatus*) larvae to determine the influence of this mineral on thyroid hormone levels, metamorphosis, growth performance, stress tolerance and survival.

To efficiently deliver iodine to the larvae, the enrichment protocol was optimized by exposing the *Artemia* to increasing concentrations of this mineral (0.05 g L<sup>-1</sup>, 0.1 g L<sup>-1</sup>, 0.2 g L<sup>-1</sup>, 0.4 g L<sup>-1</sup> and 0.8 g L<sup>-1</sup>). The best iodine enrichment treatment was selected (0.8 g NaI L<sup>-1</sup>) and used to evaluate the influence of this mineral on larval development, growth, metamorphosis, stress tolerance and survival. Results suggest that growth of rabbitfish in terms of body weight was higher in the treated group (0.20±0.01g) as compared to the control group (0.14±0.01g). This significant growth response is associated with accelerated period of metamorphosis by 11.2 days and a lower muscle fiber count in the treated group (0.003±0.005 μm<sup>2</sup><sup>-1</sup>). Higher levels of triiodothyronine (T<sub>3</sub>) and thyroxine (T<sub>4</sub>) were also observed in the group receiving the iodine-enriched *Artemia* that coincides with the larvae's accelerated period to metamorphose. T<sub>3</sub> in the treated group (15.31±1.22 ng g<sup>-1</sup>) is higher compared with the control (8.67±1.5 ng g<sup>-1</sup>) and T<sub>4</sub> in the treated group (459.25±136.9 ng g<sup>-1</sup>) is also higher compared with the control group (170.86±92.55ng g<sup>-1</sup>) at 27 days after hatching which coincides with the onset of metamorphosis leading to early metamorphosis of larvae in the treated group. In addition, the present results showed that the larvae in treated group were significantly tolerant to stress, quantified as the cumulative stress index (15.33±2.40 CSI) indicating the positive response of the larvae to the dietary iodine enrichment.

In summary, sodium iodide-enriched live food (*Artemia*) accelerated rabbitfish larvae metamorphosis, improved growth and stress tolerance in rabbitfish larvae. The results of this study can be used as a model iodine enrichment protocol to improve the hatchery output of other high-valued marine fish species in culture.

Keywords: brine shrimp, enrichment, growth, metamorphosis, rabbitfish, sodium iodide