

## Effect of zinc-enriched *Dunaliella salina* on growth, survival and reproduction performance of *Artemia parthenogenetica* around the Urmia Lake

Shahin Nahali<sup>1</sup>, Nasrollah Ahmadifard<sup>1\*</sup>, Naser Agh<sup>2</sup>, Naser Samadi<sup>3</sup>

<sup>1</sup>Department of fisheries, Faculty of Natural Resources, Urmia University, P.O. Box: 46414-356, Urmia, Iran.

<sup>2</sup>Department of Artemia, Artemia and Aquaculture Institute, Urmia University, Urmia, Iran.

<sup>3</sup>Department of Analytical, Physics and Applied Chemistry, Faculty of Chemistry, Urmia University, Urmia, Iran.

\*Corresponding author: n.ahmadifard@urmia.ac.ir

Received: 2018/2/22

Accepted: 2018/5/17

### Abstract

In the present study, the effect of enriched *Dunaliella salina* with zinc in 4 concentrations (0, 0.8, 1.6 and 3.2 mg L<sup>-1</sup>) was investigated on the growth, survival, and reproduction of *Artemia parthenogenetica*. Based on the results, on days 11, 17 and 21, the treatment of 3.2 mg L<sup>-1</sup> and 0.8 mg L<sup>-1</sup> had respectively the highest (7.07, 8.86 and 9.05 mm) and lowest (5.48, 7.06 and 7.25 mm) total length growth. In addition, survival rate decreased with increasing zinc content in the enrichment treatments and on days 11, 17 and 21. The lowest and highest survival rate was observed in the treatment of 3.2 and 0.8 mg L<sup>-1</sup>, respectively. To determine the reproductive efficiency of *A. parthenogenetica*, the number of nauplii, cysts produced per female, encysted embryos percentage and the reproductive period of each female were investigated. The highest reproductive period (13.6 days) and nauplii production (43.64 nauplii) were significantly observed in treatment 3.2 mg L<sup>-1</sup> ( $P>0.05$ ). Based on the results, the highest and lowest encysted embryos percentage in *A. parthenogenetica* were observed in treatment 0.8 and 3.2 mg L<sup>-1</sup>, respectively. The results also showed that *D. salina* are well-enriched with mineral zinc and there was a significant increase in the total length growth. However, with increasing levels of enrichment, there was no increase in survival rates and all reproductive performance.

**Keywords:** Algae, Zinc mineral, Reproduction, Growth.