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Improvement of reproductive indices, lysozyme activity, and disease resistance in live-bearing ornamental fish, *Poecilia latipinna* using *Artemia* supplementation with treated yeast cell, *Saccharomyces cerevisiae*

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Abstract

In the present study, the effects of *Artemia* supplemented with 2-β-mercapto-ethanol (β-ME) treated yeast cell, *Saccharomyces cerevisiae*, on growth and reproductive performance, lysozyme activity, and disease resistance to *Aeromonas hydrophila* of freshwater ornamental species, *Poecilia latipinna*, were investigated. Within 60 days, molly fish were fed with three treatments including commercial food (T1), un-supplemented *Artemia* (T2), and *Artemia* supplemented with β-ME-treated yeast cell (at concentration of 4×10^7 CFU/L of water) (T3). After the feeding period, the fish were exposed to 100 μl of a suspension (1.1×10^7 cells/ml) of *A. hydrophila* (BCCM5/LMG3279) and the cumulative mortality rates were recorded for 12 days. No significant difference was found between survival rate and growth performance of *P. latipinna* except for weight gain that was higher in fish fed through *Artemia* supplemented with β-ME-treated yeast cell compared to control group. Fecundity rate was significantly improved in fish fed using T3 with the maximum amount of 49.5 ± 2.29 per female ($p < 0.05$). Besides, lysozyme activity was significantly increased in group 3 ($p < 0.05$). Moreover, lowest fish mortality was significantly observed in this treatment ($p < 0.05$). In addition, the number of colonies formed by yeast cell in T3 (634×10^3 CFU/g intestine) showed significant difference with other treatments ($p < 0.05$). In sum, *Artemia* enriched with β-ME-treated yeast improved reproductive indices, immune responses, and resistance against *A. hydrophila* of *P. latipinna*.

KEYWORDS

Artemia, disease resistance, *Poecilia latipinna*, reproduction, *Saccharomyces cerevisiae*, β-ME-treated yeast

1 | INTRODUCTION

Reproduction and cultivation of ornamental fish is one of the most important and profitable part of aquatic activities (Hajibeglou & Sudagar, 2010). Considering the high value of the ornamental fish, it is essential to examine different aspects of these broodstock fish including growth, survival, and resistance to diseases in order to avoid relying on animals in the wild. In 2014, the average annual export of ornamental fish in the world was about $362 million and 0.3% of the world's total fish trade (FAO, 2014). In these fish, optimal reproduction performance is important for mass production of larvae. Improving the nutrition of broodstock has shown to be effective in enhancing the quality of gametes as well as the production of

