Effect of Enriched *Artemia parthenogenetica* with Probiotic (*Bacillus spp.*) on Growth, Survival, Fecal Production and Nitrogenous Excretion in Rainbow Trout (*Oncorhynchus mykiss*) Larvae

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bacteria per liter (CFU l^{-1}) were provided by Protexin Co. and the colony forming unit (CFU) of probiotic Bacilli were tested by microbial culture in Tryptic Soy Agar (TSA) [13].

Artemia parthenogenetica removal and bioencapsulation

The *Artemia parthenogenetica* had been collected from the Lake Maharloo. The *Artemia parthenogenetica* were bioencapsulated in three doses of bacterial suspensions for 10 h at 29 ± 1ºC, in glass con with 1 liter of seawater (30 gl^{-1} salinity) at a density of 2.0 g l^{-1} with constant illumination and oxygenated through by setting air pump [14]. The bioencapsulated *nauplii* were used as a vector to carry probiotic bacillus to digestive system of *Oncorhynchus mykiss* larvae. The *Artemia parthenogenetica* at a density of 2 g live *Artemia* $litter^{-1}$ was held in a broth suspension with *Bacillus licheniformis, B. subtilis, B. polymixa, B. laterosporus* and *B. circulans* at densities of 1×10^8, 2×10^8 and 3×10^8 bacteria per liter for 10 hours.

Experimental design

This experiment was conducted in a completely randomized design with four treatments (three probiotic levels and a control), and three replicates per treatment for a total of twelve fiberglass tanks (each with a capacity of 10 liters). Larvae of *Oncorhynchus mykiss* (initial weight: 176 mg) were obtained from Hatchery of Zamiry center, Golestan, Iran. The density of fish larvae in per tank were 40 fish. Rainbow Trout larvae in control and experimental treatments were fed 30 percent of their body weight for 4 times a day (6.00, 12.00, 18.00 and 22.00).The control treatment was fed unbioencapsulated *Artemia parthenogenetica*. Water quality parameters of input water to rearing system were monitored each week throughout the experimental. The water temperature was 14 to 16°C, pH was 7.85 ± 0.26 and water oxygen level was maintained above 7.65 ± 0.55 mg l^{-1} during the experiment an electrical air pump.

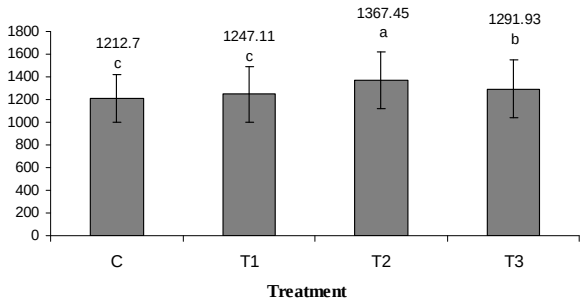
Feces were collected twice a day by pipetting, oven dried at 70°C, weighed, at the beginning and end of which period, water was sampled, and ammonia and urea contents in each tank were

Nitrogenous excretion and fecal production

Ammonia excretion, Urea excretion and fecal production decreased in experimental treatments when larvae were fed by bioencapsulated *Artemia parthenogenetica* (Table 5). The higher rate of Nitrogenous excretion and fecal production were observed in control treatment ($p<0.05$). One-way ANOVA showed that ammonia excretion, Urea excretion and fecal production was affected significantly by probiotic *bacillus* and least rate observed in 2×10^8 treatment (ammonia excretion: 51.32, $p<0.05$; Urea excretion: 12.83, $p<0.05$; fecal production: 2.23, $p<0.05$).

Final weight, Survival, Specific growth rate and feed conversion efficiency

Final weight, Survival, Specific Growth Rate in Wet Weight (SGRw), Dry Weight (SGRd), Protein (SGRp) and Energy (SGRe) of larvae Rainbow Trout increased in experimental treatments (Figure 1, 2 and Table 4). ANOVA showed that Final weight, Survival, Specific growth rate was affected significantly by probiotic bacillus and higher rate observed in 2×10^8 and 3×10^8 (CFU l^{-1}) treatment (SGRw: 6.35, $p<0.05$; SGRd: 7.57, $p<0.05$; SGRp: 6.95, $p<0.05$; SGRe: 6.23, $p<0.05$).



[5]FCEw=100×(final body weight

inherent variation associated with using wild undomesticated gene stock in research. However, results suggest a positive correlation between NEM supplementation and lipid concentration of the carcass.

Ammonia excretion, urea excretion and fecal production decreased in experimental treatments when larvae were fed by bioencapsulated *Artemia parthenogenetica*. Faramarzi [38] showed that ammonia and urea excretion were decreased in experimental treatments by inclusion

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