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for Presentation of

MODULATING GUT MICROBIOTA OF Artemia urmiana BY ADMINISTRATION OF DIFFERENT LEVELS OF Bacilluss subtilis AND Bacillus licheniformis

Roy Palmer

Co-Chairman, Asian-Pacific Aquaculture 2011

MODULATING GUT MICROBIOTA OF *Artemia urmiana* BY ADMINISTRATION OF DIFFERENT LEVELS OF *Bacillus subtilis* AND *Bacillus licheniformis*

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Considering the beneficial effects of probiotic bacteria on growth and health of the host, these microorganisms are considered as important tools to increase the production and to reduce losses in aquaculture. Artemia as one of the important live food in larviculture has a significant role in the transmission of pathogens to aquaculture systems.

This study was conducted in order to evaluate the effects of dietary inclusion of *Bacillus subtilis* and *Bacillus licheniformis* on gut microbiota (total count, *Bacillus* count and *Vibrio* count) of *Artemia urmiana*. In this experiment four different levels of probiotics 10^2 (T_1), 10^4 (T_2), 10^6 (T_3) colony per gram of Artemia food (CFU) and control treatment (without probiotics) were applied through using a completely randomized design (four treatments with three replicates). The experiment started from the first day of the exogenous feeding and continued until the day 15. In order to assess the ability of the probiotics to adhere on the gut mucosa, probiotics were eliminated from the diets from the day 15 to 20. Samplings were performed on days 1, 5, 10, 15 and 20 of the experiment.

Results showed that the gut was sterile before starting the exogenous feeding. There were not significant differences in terms of gut total bacteria count between the treatments and control. However, the total *Bacillus* count (Fig. 1) significantly increased in the experiments with treatments ($P<0.05$) and the highest was observed in T_3 ($23\times10^4\pm2.65$). Also, the ratio of *Vibrio* to total bacteria count (Fig. 2) was significantly lower than the control treatment (0.75 ± 0.33) ($P<0.05$). Five days after the cessation of the probiotic consumption (day 20) total *Bacillus* count, were decreased ($P<0.05$) in treatments (Fig. 3). According to the results *B. subtilis and B. licheniformis* can balance the gut microbiota of *A. urmiana*, increase food efficiency and improve the growth. In addition, the probiotic used in this experiment made a loose adhesion to the gastrointestinal mucosa. The study determined that the 10^6 CFU was most effective in modulating the gut microbiota.

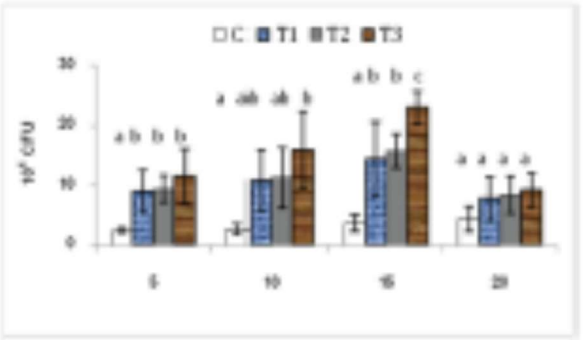

Fig 1 - Total *Bacillus* count (Mean ± SD) during the experiment (n=3).

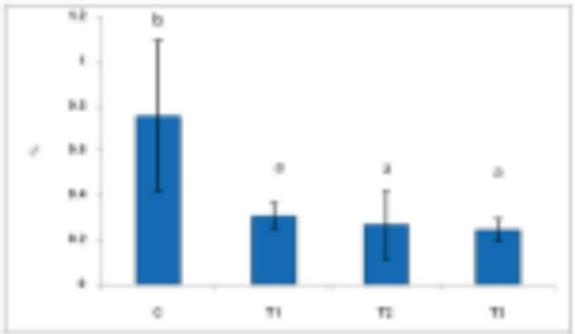

Fig 2 - The ratio (Mean ± SD) between total *Vibrio* and totall count (n=3).

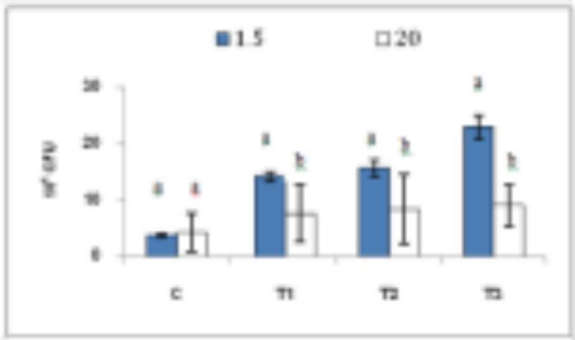

Fig 3 – Comparison *Bacillus* counts (Mean ± SD) between day 15 and 20 (n=3).