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Can the minerals calcium and sodium, chelated to propionic acid, influence the health and zootechnical parameters of native silver catfish *Rhamdia quelen*?

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Running title: Propionic acid supplementation for *Rhamdia quelen*

Abstract

Intensive aquaculture production requires new strategies to improve the performance and health parameters of farmed fish to avoid developing resistance in bacterial genes and to avoid environmental pollution. The aim of this study was to evaluate the effects of calcium and sodium as chelants to propionic acid on the growth performance and hemato-immunological parameters of native silver catfish *Rhamdia quelen* fed for 60 days with a supplemented diet, in addition to evaluating survival and immunological parameters after exposure to the pathogenic bacterium *Aeromonas hydrophila*. A total of 225 fish were divided into 15 tanks, with 15 fish per tank in five groups: control (not supplemented), Ca-propionate 0.25% ($Ca_{0.25\%}$), Ca-propionate 1% ($Ca_{1\%}$), Na-propionate 0.25% ($Na_{0.25\%}$), and Na-propionate 1% ($Na_{1\%}$), with three replicates for each group. Fish fed $Ca_{0.25\%}$ showed the best results in terms of weight gain (43.61 ± 4.89), biomass (779.06 ± 79.40), specific growth rate (3.00 ± 0.13) and survival after pathogen exposure. This group showed 54% more survival than the $Na_{1\%}$ group after 96 h of exposure. Fish fed $Na_{1\%}$ presented high leukocytosis (12.0 ± 4.20) and lymphocytosis (9.24 ± 2.57) in relation to those fed $Na_{0.25\%}$ and $Ca_{1\%}$ (before exposure). Total protein showed a significant decrease while lysozyme and agglutinating titer increased after exposure. These results suggest the Ca-propionate 0.25% as the best additive to be used in fish farming of native silver catfish.

KEY WORDS