

BUTYRATE AND PROPIONATE IMPROVE THE GROWTH PERFORMANCE OF WHITELEG SHRIMP

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Organic salts can improve the animal performance, increasing the efficiency of nutrient utilization and modifying the intestinal microbiota. This study was aimed to evaluate the effects of sodium butyrate and sodium propionate dietary inclusions at different levels in the growth performance of whiteleg shrimp (*Litopenaeus vannamei*).

Seven diets were evaluated: a control diet (without supplementation) and three diets from each sodium salt, propionate and butyrate, in concentrations of 0.5%, 1%, and 2%. We used 21 fiberglass tanks of 12.5 m² (6.000 L) with constant aeration and heaters of 3.000 W controlled by a thermostat (29 ± 0.4 °C). Each tank were stocked with 150 shrimps (2.53 ± 0.03 g). The water exchange rate was 50% per day. After 47 days, the shrimp performance was evaluated (final weight, weekly weight gain, yield, feed efficiency, and survival).

Temperature, dissolved oxygen, salinity, pH, total ammonia nitrogen, and nitrite nitrogen had low variation during cultivation, with average values of 28.8 °C (27.5 °C–29.4 °C); 4.9 mg.L⁻¹ (4.4–5.8 mg.L⁻¹); 35 ppt (34–37 ppt); 7.9 (7.6–8.1); 0.6 mg N-NH₄.L⁻¹ (0.1–1.4 mg N-NH₄.L⁻¹), 0.1 mg N-NO₂.L⁻¹ (0.0–0.3 mg N-NO₂.L⁻¹), respectively. The shrimps fed with diets supplemented with propionate and butyrate, in all concentrations used in the present research (0.5%, 1%, and 2%), experienced an increase in their final weight and weekly weight gain. The feed efficiency and survival of shrimps fed with the diet containing 2% butyrate and the yield of the supplemented with 2% propionate, 0.5% and 2% butyrate also showed higher values than the shrimps fed the control diet.

Table 3 – Growth performance of *Litopenaeus vannamei* (Boone, 1931) cultured in indoor clear water system with dietary supplementation of sodium propionate and sodium butyrate, in three different concentrations (0.5%, 1% and 2%).

Treatments	Final weight (g)	Weekly weight gain (g)	Yield (kg.ha ⁻¹)	Feed efficiency	Survival (%)
Control	9.32±0.90 ^a	0.94±0.06 ^a	992±89 ^b	0.53±0.03 ^b	88.7±0.6 ^b
Propionate 0.5%	10.20±0.25 ^b	1.14±0.04 ^b	1113±7 ^{ab}	0.59±0.04 ^{ab}	91.0±2.0 ^{ab}
Propionate 1%	10.16±0.13 ^b	1.14±0.02 ^b	1085±28 ^{ab}	0.52±0.03 ^b	89.0±2.0 ^{ab}
Propionate 2%	10.35±0.06 ^b	1.17±0.01 ^b	1143±24 ^a	0.55±0.01 ^{ab}	92.3±1.2 ^{ab}
Butyrate 0.5%	10.60±0.15 ^b	1.20±0.02 ^b	1176±5 ^a	0.59±0.01 ^{ab}	92.3±1.5 ^{ab}
Butyrate 1%	10.25±0.08 ^b	1.15±0.01 ^b	1100±0 ^{ab}	0.55±0.01 ^{ab}	89.3±0.6 ^{ab}
Butyrate 2%	10.82±0.53 ^b	1.24±0.08 ^b	1237±23 ^a	0.61±0.01 ^a	93.0±1.4 ^a
P-value	0.0021	0.0008	0.0109	0.0222	0.0126

Data expressed as mean ± standard deviation. Means within columns followed by different letters are different by SNK's test (p<0.05).