

GROWTH PERFORMANCE OF *Litopenaeus vannamei* FED PRACTICAL DIETS WITH DIFFERENT LEVELS OF CRUDE PROTEIN IN A BIOFLOC SYSTEM

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The protein is the most important macronutrient, not only to its high demand, but also to its high cost. *Litopenaeus vannamei* requires 30-44 % crude protein (CP) in its diet, depending on its stage of life. The objective of this study was to evaluate four different diets with 24.3, 30.3, 32.9 and 36.7 % CP levels on the growth performance of Pacific white shrimp (*Litopenaeus vannamei*) in a biofloc system.

The diets were prepared with the same ingredients, maintaining the ratio of fishmeal to soybean meal at 1.8 to 1.9. The fat content was also kept constant using a marine source (derived from flour and fish oil). The 12 experimental units (800 L) were distributed among the four treatments (24.3, 30.3, 32.9 and 36.7 % CP) in a completely randomized design, in triplicate. Each tank was stocked with 200 shrimp (average 5.3 g), maintaining an initial density of 250 shrimp.m⁻³. The temperature water was maintaining at 29 ± 0.5°C with constant aeration. Daily, the water parameters were checked. The shrimp were fed four times per day (8:00 am, 11:00 am, 2:00 pm and 5:00 pm) with a checking program to confirm the consumption.

No significant differences on the water quality parameters were observed among the treatments. The temperature (27.9 to 30.2°C), pH (7.48 to 8.56), dissolved oxygen (4.7 to 6.3 mg.L⁻¹), salinity (20 to 21 ‰), orthophosphate (3.36 to 4.91 mg.L⁻¹), ammonia (0.05 to 0.31 mg.L⁻¹), nitrite (0.05 to 0.31 mg.L⁻¹) and nitrate (7.4 to 79.9 mg.L⁻¹) were also suitable for the cultivation of *L. vannamei*.

After 49 days, the shrimp fed with a diet containing 24.3 % CP exhibited a lower weight gain, weekly growth, consumption and productivity compared with the shrimp in the other treatments. The highest intake was observed in the shrimp fed with diets containing 32.9 and 36.7 % CP (Table 1). No significant differences were detected in the apparent feed efficiency and survival.

The *L. vannamei* cultured in biofloc systems required at least 30.0 % protein per kg of feed.

TABLE 1. Growth performance (mean ± standard deviation) of *L. vannamei* fed with different levels of crude protein (CP) in biofloc system.

CP (%)	24.3	30.3	32.9	36.7
Survival (%)	84.4±4.8	84.1±8.4	82.2±4.3	84.5±5.4
FE	0.6±0.1	0.61±0.2	0.71±0.3	0.71±0.2
WGA (g)	5.9±0.5 ^a	7.8±0.7 ^b	9.0±0.6 ^b	9.2±1.1 ^b
WG (g.week ⁻¹)	1.2±0.1 ^a	1.6±0.1 ^b	1.8±0.1 ^b	1.8±0.2 ^b
PRO (kg.m ⁻³)	2.4±0.1 ^a	2.9±0.1 ^b	3.0±0.3 ^b	3.2±0.3 ^b
CON (kg)	1.9±0.0 ^a	2.2±0.1 ^b	2.4±0.0 ^c	2.5±0.2 ^c

*Feed efficiency (FE), Weight Gain (WGA); Weekly Growth (WG); Productivity (PRO); Consumption (CON); Different letters indicate significant differences (p < 0.05) between treatments using one way ANOVA, and SNK for mean separation.