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Adaptive Response and Performance of Whiteleg Shrimp (*Litopenaeus vannamei*) in Freshwater Culture Media Using Biofloc Technology: A Solution for Limited Land and Water Aquaculture

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BACKGROUND

Whiteleg shrimp (*Litopenaeus vannamei*) has high economic value and can tolerate a wide range of salinity making it suitable for inland aquaculture. Biofloc technology is potentially applied in low-salinity freshwater systems, but its effect on adaptation and performance still needs further evaluation



OBJECTIVES

To evaluate the adaptation response and performance of whiteleg shrimp reared in freshwater with low salinity using biofloc technology

METHODOLOGY

Experimental Design



Three treatments with three replicates

Rearing Conditions

- Salinity : 5.1 – 5.7 ‰
- Temperature : 27.0 – 30.0 °C
- DO : 7.1 – 8.3 mg/L
- pH : 7.0 – 8.2

Aerated pond system with biofloc management (*Bacillus* and Mix)

Observed Parameters

- Water quality
- Floc volume and TSS
- Adaptation response and molting
- Growth, survival, and feed conversion ratio (FCR)

Data Analysis

- Water quality and floc development: descriptive analysis
- Growth, survival, and FCR: one-way ANOVA ($\alpha = 0.05$) based on experimental units

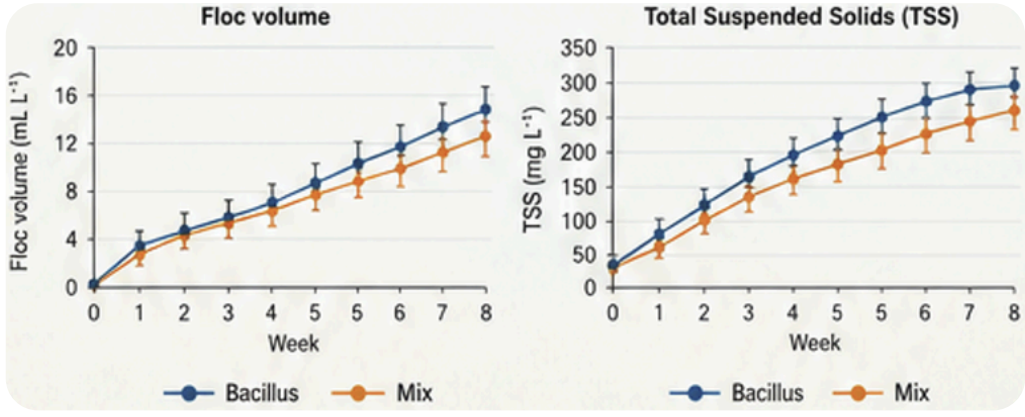
RESULT

Water Quality

- Salinity 5.1 – 5.7 ‰
- Temperature 27.0 – 30.0 °C
- DO 7.1 – 8.3 mg/L
- pH 7.0 – 8.2

Water quality remained relatively stable throughout the rearing period.

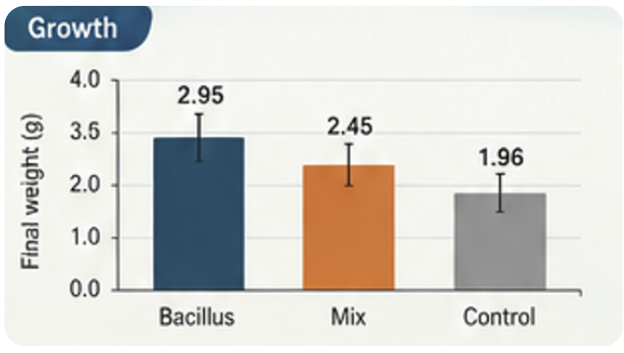
Floc Development



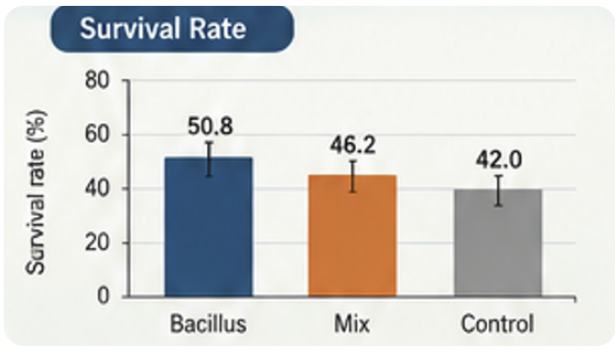


Biofloc formed in Bacillus and Mix treatments

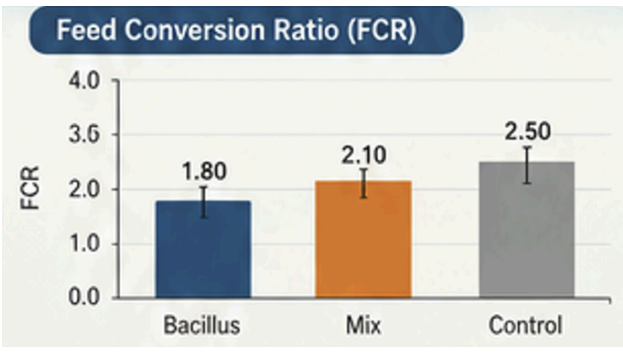
Growth



Survival Rate



Feed Conversion Ratio (FCR)

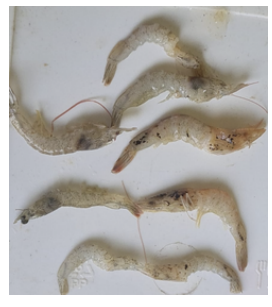


Although numerical differences were observed among treatments, no significant differences were deteceted for all analysis

Adaptation Response and Molting

- Shrimp with a larger initial size showed better survival in low-salinity media.
- Molting occurred throughout the rearing period.
- Initial size was not an experimental factor and thus no statistical conclusion can be made.





Key Findings

- Biofloc was formed and developed in *Bacillus* and Mix treatments, as indicated by increased floc volume and TSS.
- No significant differences in growth, survival, or FCR among treatments.
- Floc characteristics were not directly associated with shrimp performance.

CONCLUSION

Whiteleg shrimp (*Litopenaeus vannamei*) has high economic value and can tolerate a wide range of salinity making it suitable for inland aquaculture. Biofloc technology is potentially applied in low-salinity freshwater systems, but its effect on adaptation and performance still needs further evaluation

ACKNOWLEDGEMENT

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