

**SEMIPARAMETRIC AND PARAMETRIC MODELLING
OF *VIBRIO* SPECIES ABUNDANCE IN A BIOFLOC
SHRIMP PRODUCTION SYSTEM**

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ABSTRACT

Vibrio species that cause white spot disease and vibriosis are known to be influenced by environmental factors. In this study, the changes in the abundance of presumptive *Vibrio* species from a biofloc shrimp production system with respect to physicochemical and biological parameters were evaluated. Parametric and nonparametric modelling techniques were used to identify and predict changes in *Vibrio* abundance in relation to alkalinity, ammonia, dissolved oxygen, nitrite, pH, salinity, temperature, transparency, and phytoplankton and zooplankton densities. Abundance was found to be highly correlated with alkalinity, pH, and phytoplankton density as revealed by both parametric and semiparametric models. Generalized additive model (GAM, a semiparametric model) is the best model based on Akaike's Information Criterion (AIC) values in which 41.2% of the variability in the dependent variable can be explained by the predictors compared to ordinary linear regression and negative binomial models (parametric models) with 16.04% and 14.5% respectively. Prediction on the abundance can help prevent bacterial diseases in shrimp as this will provide an insight to the farmer about when to and which water parameters or predictors can be controlled. Thus, it is important to consider the use of semiparametric modelling approach as a tool for fish health management and to prevent losses in aquaculture.

Keywords: *Vibrio*, biofloc, semiparametric model, parametric model, shrimp