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THE EFFECT OF OREGANO ESSENTIAL OIL ON GROWTH PERFORMANCE AND MORTALITY OF SHRIMP (*Liptopenaeus vannamei*) UNDER *vibrio parahaemolyticus* CHALLENGE

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SUMMARY

- *Vibrio sp.* infection is one of the most common challenges effecting *Litopenaeus vannamei* shrimp production globally, resulting in economic losses.
- Shrimp were challenged with *V. parahaemolyticus* after being supplemented with Orego-Stim Forte at varying inclusion rates.
- Significant improvement in shrimp survivability was recorded in shrimp fed Orego-Stim Forte at 3.5kg per tonne of feed, indicating suppression of bacterial infection.

INTRODUCTION

Litopenaeus vannamei is one of the most cultured species of penaeid shrimp and accounts for more than 95% of the total production. Among pathogenic bacteria, species belonging to the *Vibrio* genus are one of the most common and widespread disease-causing agents in aquaculture resulting in severe production and economic losses. Oregano essential oil (OEO) has been widely demonstrated to support the health and performance of food-producing animals. To investigate the effect of OEO in shrimp, a trial was performed at Nong Lam University in Vietnam under *Vibrio parahaemolyticus* challenge.

MATERIALS AND METHODS

Pathogen-free shrimp from post-larval stage were raised for 8 weeks in a recirculation system using two treatments (Control and OEO). Shrimp were fed 4 times daily at 5% of mean body weight and uneaten food was removed after 2 hours and dried then deducted from the total feed. Water temperature was 27 ± 1°C and salinity was 10 ± 5 g l^{-1}. Water changes and bio-filtration kept ammonia below 0.5mg l^{-1} and nitrite-N below 0.15 mg l^{-1}. Shrimp with initial weights of 1.5 ± 0.2 g were randomly assigned to 0.5m^3 tanks with four tanks per treatment. Basal diets are shown in (Table 1). Orego-Stim Forte (Anpario plc) was added to one treatment at 3.5kg/t. At 8 weeks, 20 shrimp per treatment were challenged with *Vibrio parahaemolyticus* at 10^5 CFU/ml (confirmed via spectrophotometry and serial plate counts) and mortality was assessed over 14 days. Data was statistically analysed in IBM SPSS 2.0 using one-way ANOVA with a Duncan posthoc.

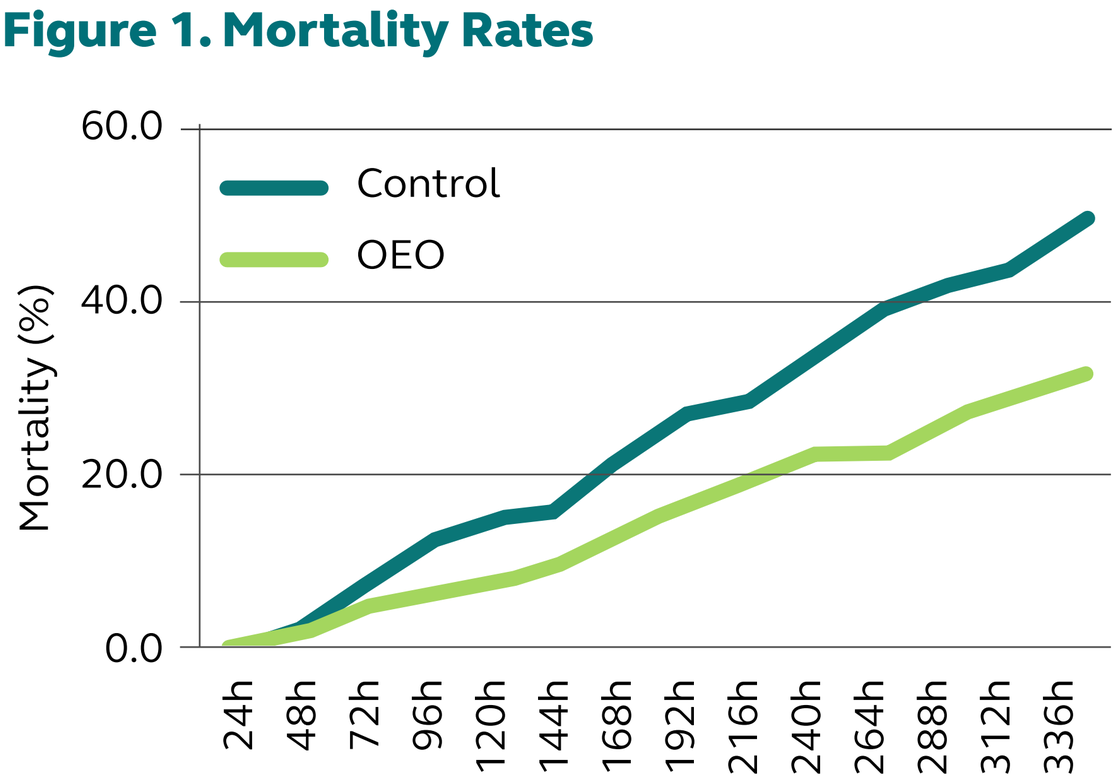
Table 1: Diet Formulation

Ingredient	Inclusion (%)
Fish meal 67%	11.195
Shrimp meal 33%	3.0
Poultry meal	10.0
Soybean meal 47%	30.0
Fermented SBM	8.0
Wheat Gluten	7.0
Wheat flour	27.0
Lecithin	2.255
Fish oil	1.0
Stay C	0.05
Premix	0.5

Table 2: Growth Performance

	Control	OEO
Initial BW(g/sh)	1.57 ± 0.02a	1.54 ± 0.03a
Final BW (g/sh)	15.1 ± 0.5a	15.7 ± 1.2a
Weight gain (g/sh)	13.5 ± 0.5a	14.1 ± 1.2a
SGR (%/d)	4.0 ± 0.1a	4.2 ± 0.1a
FCR	1.22 ± 0.13a	1.21 ± 0.07a
Feed Intake (g/sh/d)	0.28 ± 0.01a	0.27 ± 0.00a

Figure 1. Mortality Rates



CONCLUSION

There was no significant difference in growth performance between treatments (Table 2). However, following the bacterial challenge, there was a significant 17.5% reduction ($p<0.05$) in total mortality at the end of study (Figure 1.)

The dietary supplementation of OEO resulted in a substantial reduction in total mortality under *Vibrio parahaemolyticus* challenge. This suggests that OEO could be a useful tool for controling bacterial challenge in shrimp.