

# EFFECTS OF GAMMARID AND POLYCHATE MEAL AS ATTRACTANT IN PLANT-BASED DIETS ON GROWTH AND HEALTH STATUS OF WHITE LEG SHRIMP *LITOPENAEUS VANNAMEI*

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## Introduction

Shrimp research has recently focused on the development of practical feeds that use plant proteins as substitutes for animal protein sources (Amaya et al., 2007; Sabry-Neto et al. 2017; Guo et al., 2019). According to Davis et al. (2004) and personal communication with shrimp industry partners (Euroshrimp: The Shrimp Network), the use of a purely plant protein feed may be limited by a variety of factors. These include amino acid profile, lower mineral content, low/limiting poly-unsaturated fatty acid content, the presence of antinutritional factors and lower palatability (Amaya et al., 2007). Feed attractants are being considered as a means of improving diet palatability and intake of feed in shrimp fed high percentages of plant material (Browdy et al., 2006). The efficacy of krill meal as attractant has been already proven in shrimp diets however, much research is needed for alternatives and sustainably produced attractants. In this study, we investigated the potential of meal from gammarids and polychaetes, low trophic organisms and can be bred from agricultural by-products and processing residues, as attractants in plant-based diets for white leg shrimp (Malzahn, A.M. et al., 2023; Ribes-Navarro et al., 2022). A controlled feeding experiment was conducted to evaluate the effects of the inclusion of the gammarids, *Gammarus locusta*, *Gammarus pulex* the polychaete *Nereis virens*, and Krill *Euphausia superba* as attractants in white leg shrimp diet. Growth performance, feed intake, survival rate, health and immune responses were evaluated.

## Material and Methods

A one-month controlled feeding experiment with Whiteleg shrimp (*L. vannamei*) was conducted with 40 shrimps per tank in quadruplicate. Shrimp with an initial weight of  $0.39 \pm 0.02$  gr were hand-fed four times daily according to the recommended feed rate, expressed as percent of body weight per day (Wyk et al., 1999) in a recirculation aquaculture system (RAS).

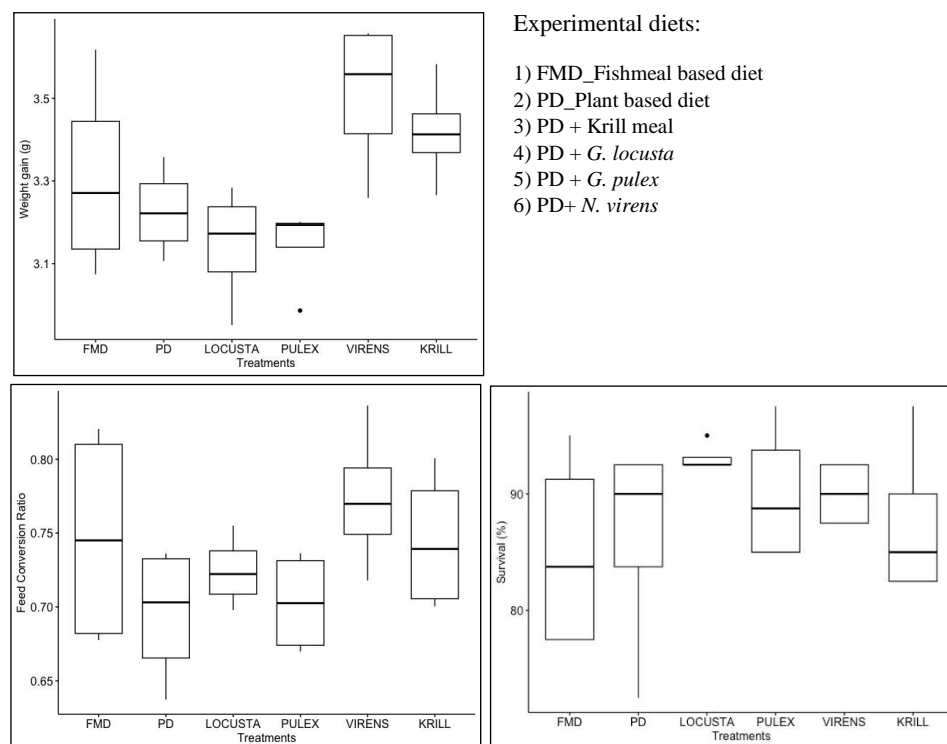
Six experimental diets were formulated: a commercial feed (FMD) as positive control with 10-20 % fishmeal content; a negative control (PD) containing no ingredients from marine sources and consisting of 100 % vegetable proteins and no added attractant. In addition, four test diets were produced from PD and with the addition of the 2% attractant (krill meal, gammarid meal (*G. locusta* and *G. pulex*) and polychaete meal (*N. virens*)).

Growth performance, survival rate, feed intake were monitored. At the end of the experiment haemolymph and hepatopancreas samples were taken to determine metabolic parameters (glucose, acylglycerides and total haemolymph protein), immunological capacity (phenoloxidase activity), stress resistance (antioxidant capacity) and nutritional value (fatty acid profile).

## Results and Discussion

Preliminary results showed that shrimp fed the *N. virens* diet showed significantly higher weight gain than both gammarid diets. No significant differences were observed between

the other diets. Moreover, survival rate did not significantly differ between treatments (Figure. 1). To date, no conclusions are possible since the full data set is not yet available.



**Figure 1.** Weight gain, feed conversion ratio and survival rate of whiteleg shrimp fed the experimental diets.

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