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The protein requirement of juvenile silver trevally (*Pseudocaranx georgianus*) to optimise growth in hatchery environments.

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Abstract

Aquaculture is a growing primary industry in New Zealand. Currently the industry is comprised of three main species: Greenshell™ mussels, Pacific oyster, and King Salmon. The introduction of a white fleshed fish presents obvious commercial opportunity and production gains for New Zealand aquaculture. Silver trevally provides this opportunity and has the potential to further develop the industry. When developing a new species for aquaculture an understanding of their nutritional requirements at the different life stages is required. This thesis investigates the protein requirement of juvenile silver trevally.

Silver trevally (67.5 ± 12.0 g) were randomly assigned to 12 tanks, 15 fish per tank. Four iso-energetic diets ranging in crude protein (CP) content from 30 to 60% CP were fed, in triplicates, for 12 weeks. Growth, including specific growth rate (SGR), did not significantly differ between diets. Feed efficiency was lowest in fish fed the 40% CP diet compared with the other three diets. Protein retention was highest in fish fed the lowest protein diet. Condition indices in silver trevally were unaffected by the protein content of the diet. Overall, this experiment was inconclusive on the ideal protein level in the diet.

A palatability trial was carried out to determine if feed intake varied among diets. For comparison a commercial pellet from Ridley's (50% CP) and a gel diet (20.4% CP) used by Plant & Food Research was also included in this trial. Twenty-four fish from the growth trial were allocated to two tanks for the palatability trial. Four behavioural responses were observed: the food item was ignored; fish approached the food but did not ingest; the fish took the food into their mouths before spitting it out; and the food was ingested. The 60% CP experimental diet, a commercial pellet, and a gel diet had significantly higher rates of intake than the other diets, with the 30% CP diet having the lowest rate of complete ingestion. The 60% CP and gel diet had the lowest rate of food being ignored. The most palatable diets were the 60% CP diet and the gel diet.

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Abbreviations

ADC – apparent digestibility coefficient

ADG – average daily gain

BSA – Bovine serum albumin

CF – condition factor

CL – crude lipid

CP – crude protein

DHA – docosahexaenoic acid

DM – dry matter

EPA – eicosapentaenoic acid

FCR – feed conversion ratio

FD – freeze dried

FE – feed efficiency ratio

GE – gross energy

Hb - haemoglobin

HSI – hepatosomatic index

n-3 HUFA – n-3 highly unsaturated fatty acids

Ind – indicator

IPF – intraperitoneal fat

LGR – length growth rate

PER – protein efficiency ratio

PFR – Plant & Food Research

PR – protein retention

PUFA – polyunsaturated fatty acids

SGR – specific growth rate

VSI – viscerosomatic index