



Aquaculture nutrition

Global demand for high-value food products from the sea is growing at a rapid and sustained rate. This increasing demand will be met, almost entirely, through aquaculture. New Zealand is privileged to have the natural, financial, regulatory and human resources to capitalise on the opportunity through sustainable production of premium aquaculture products for a discerning global marketplace.

NIWA's National Centre for Aquaculture is responding to the opportunity and helping to ensure New Zealand's aquaculture industry meets its \$1 billion target by 2025. We bring together world-class research facilities – including the Bream Bay Aquaculture Park – and the country's largest team of aquaculture specialists to support the aquaculture industry with unique science that underpins current and developing operations and innovation.

One of our core areas of research and consultancy services is **aquaculture nutrition**.

The economics of fed aquaculture are dominated by the cost of feed and its biological and environmental performance in the production system. For many new and emerging aquaculture species, optimal nutritional requirements are unknown. Even for established species, access to alternative raw materials offers opportunities to improve product quality, reduce environmental footprints and lower feed costs.

These are key areas of focus for the National Centre for Aquaculture.

Our capability – systems

Our nutrition capability is based on the wide range of high-quality facilities located at our Bream Bay Aquaculture Park in Northland.

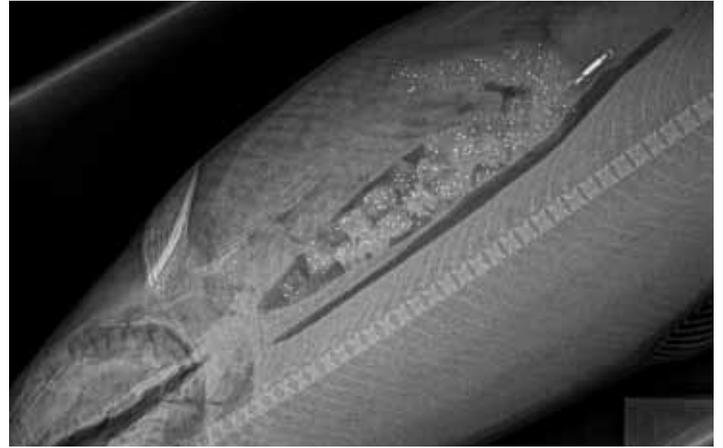
System 1: Dedicated larval trials unit comprising twelve, 600 litre, round tanks with black internal side walls and contrasting flat, white bases.

System 2: Production feed trials unit containing forty-two, 1500 litre, round tanks divided across three rooms (18, 12 and 12 tanks respectively), each under full photo-thermal control.

System 3: Metabolic chamber that combines capabilities to measure respiration and excretion of animals under controlled environmental conditions (i.e., temperature, salinity, oxygen, carbon dioxide, pH, diet, feed rates, dissolved substances, enforced exercise) as well as the quantity and quality of discharge through the use of particle sizing and capture.



X-ray imaging equipment set-up.



X-ray image of ballotini beads in eaten feed.

Our capability – analytical

Gas chromatography mass spectrometry

(GC-MS): dedicated apparatus to provide detailed fatty acid composition of materials, combining the features of gas-liquid chromatography and mass spectrometry.

Near infrared: This analytical capability enables us to analyse large numbers of samples to determine their proximate composition (protein, lipid, moisture), for quick turnaround of basic nutritional information.

Quantitative determination of feed

consumption: Using our portable x-ray camera and recognition software we are able to accurately determine the actual amount of feed consumed, with little disturbance of the fish. This method, using sophisticated counting software, visualises and quantifies x-ray opaque ballotini balls (0.5mm and 1mm) contained within test feeds at known inclusion rates.

Inductively coupled plasma mass

spectrometry (ICP-MS): Using this technique we can analyse feeds and faecal samples to estimate apparent digestibility using Ytterbium as the marker of choice.

Find out more

Visit the NIWA aquaculture website:
www.niwa.co.nz/our-science/aquaculture

Contact

Dr Michael Bruce

Programme Leader
Bream Bay Aquaculture Park
Email: aquabiotech@niwa.co.nz