

Aquaculture & Biotechnology

Fish fit for a king

Kingfish research and development has paid off at Bream Bay, with a five-fold increase in larval survival rates and production of juvenile fish. Breakthroughs were achieved in early feeding and husbandry, enabling us to supply 210 000 high quality fingerlings to customers in the Marlborough Sounds and Northland. These achievements put New Zealand on track for commercial marine finfish production, thanks in part to funding from the Foundation for Science, Research & Technology.

Chinook salmon smolt from our Silverstream Hatchery also made a splash. Using selected broodstock from Sanford Limited, we've increased salmon growth rates by 30%, and reduced the proportion of females that mature (and therefore stop growing) as two-year olds from about 16% to 3%. This has enabled us to improve the quality of juvenile salmon supplied to clients around the South Island.



More value from kina

NIWA's collaboration with Kiwi firm Sea Urchin New Zealand (SUNZ) has led to improvements in the quantity and quality of kina (sea urchin) roe, giving fishers a better income from the same number of animals.

Roe yields in wild-caught kina have been consistently doubled by feeding them a protein-rich diet developed by NIWA from fishing byproduct. The kina are held in either land-based tanks or sea-cages for 10–12 weeks and are fed on kelp (their natural food) for the last 5–7 weeks to improve taste.

Commercial-scale sea trials in the Marlborough Sounds showed that the switch from land-based to sea-based operations hugely reduced infrastructure costs, and reduced labour and feeding costs by about 80%.

Roe taste has also been greatly improved. 'All the product was taste tested by our regular clients, who came back with positive feedback ... a great success in itself,' says Peter Herbert, managing director of SUNZ.

The recent trials were co-funded by SUNZ and the Technology for Business Growth scheme.



Healthy skin from fish waste

Our biotechnology team continues to make good progress with identifying biologically active compounds from seafood processing byproduct and bycatch. *Whatukura a Takaroa: Nutraceuticals from Seafood* is a five-year Foundation for Research, Science & Technology-funded project with Ngāi Tahu Seafood Ltd to develop high-value products from fish species or parts of fish that are normally discarded or turned into fishmeal.

We have so far tested more than 2700 samples from 130 different fish species, and have discovered some form of bioactivity in 146 of those samples. Among the low-value fish species identified by Ngāi Tahu Seafood as targets for adding value, we found 43 bioactive extracts that stimulated skin cell growth and/or had UV-protective or antioxidant properties.

The UV-protectants look promising for developing a product that actually penetrates into cells to work at a biological level, rather than acting as a screen on the skin's surface.



TerraMarine identifies natural gout relief

A joint initiative between NIWA, Crop & Food Research, and the Malaghan Institute of Medical Research has identified two promising anti-inflammatory compounds from native marine organisms.

The three institutes formed TerraMarine Pharmaceuticals in 2002 to discover and rapidly commercialise new non-steroidal anti-inflammatory drugs from native plants and marine life. NIWA has been collecting, identifying, and screening a wide range of marine organisms, from pelagic fish to deepsea bacteria. The group patented their first anti-inflammatory compound in September 2005. Tests show it reduces gout-induced inflammation in tissue cultures and in mice. A second compound is undergoing further development before a patent application is lodged.

These discoveries indicate what a tremendous resource New Zealand's unique marine and terrestrial biota is for treating the growing number of people suffering from inflammatory diseases, including approximately 1 in 20 New Zealanders who suffer from gout.