

# Smell-free boost from fish waste

Kypros Kotzikas believes good money can be made from fish offal, writes TIM CRONSHAW.

For years, United Fisheries owner Kypros Kotzikas thought about how to make better use of the remains of fish after they are filleted.

Commonly, the carcasses with their skin, scales, and oils were sold to another company to be made into fish meal as feed for aquaculture, pig and poultry industries.

Over the course of a year his processing business produces 15 tonnes a day of offal for little, if any, return.

The Greece-born Kiwi was left with a sense that he was wasting a product rich in nutrients, vitamins and other goodies.

Frustratingly, he never found the time to take it further as the pressures of work and running a big business at United Fisheries took priority.

Kotzikas, 67, moved into retirement seven years ago as his children took larger roles in the processing and export business.

Retirement “isn’t in his dictionary”, but it gave him time to assemble a small team and put more resources in finding ways of adding value to a by-product.

Three years and \$2.6 million later, a new processing plant, capable of producing 30 tonnes of liquid fish products, is at the rear of his distinctive fisheries plant – resplendent in Greek architecture with its high columns at the entrance.

This is expected to be running commercially for a new liquid fish fertiliser and fish silage range by today and eventually for a bone supplement.

And so BioMarinus was born.

Kotzikas believes that down the track there is just as much money to be made from byproducts as the premium fillets coming off the red cod, groper, gurnard and other fish now.

“Over the last 50 years of my business career I have seen a lot of cities, fish factories and fishermen wharfs. The knowledge I have

got from that and talking to different production managers around the world and the requests we get for byproducts from mainly Korea and Japan I knew that there was a lot of money being lost with offal being turned into fish meal.”

The position of his first factory at Sydenham and the existing site at Sockburn prevented him from running his own fish-meal plant because of the strong odours generated during processing.

So he was left with the only alternative of selling on the material, yet it rankled knowing he could do better if something better could be created.

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Kotzikas was aware of companies processing the offal into fertiliser and tried unsuccessfully to buy the technology.

“I am pleased I didn’t (buy the technology) because we have found a better method. One day I was having a coffee with Joe Cave and the conversation came up about fish and liquid fertiliser. I explained I was looking at it and he told me not to worry as he would teach me how to make it. That’s how the whole thing started from that conversation.”

Cave was co-owner, with Paul Lewis, of Bio-Mer, a biotechnology extraction company manufacturing nutritional supplements, and they combined with Smitha James to devise a way to break down the fish. United Fisheries originally employed James, a biotechnician, three years ago to work in food technology, but she was quickly seconded to lead Kotzikas’ pet project.

The decision was made to use enzymes to break down the material into liquid. The enzymes are extracted from natural products such as plants and are introduced to fish proteins which disintegrate, bar the large bones, after 12 to 15 hours.

The beauty of this hydrolysis is that it’s odour-free.

After the best enzyme was

identified, a pilot processing plant was developed over the last two years to perfect the product.

Part of the small team was Tom Harris, from Bio Sea, who makes fish fertiliser and helped formulate the recipe for the fertiliser.

Kotzikas says the result is the best liquid fish fertiliser in the world.

“We have had to overcome the three problems of removing the smell, making the particles smaller than 200 microns to enable the product to go through irrigation or contractor sprayers and emulsifying the waste so the water, oils and solids bind together. In the early days we managed to block two or three farmers’ sprayers. Lucky enough, they were mates, but

they gave us back information and we learned if we wanted to sell the fertiliser it had to go through the sprayers without blocking.”

Preliminary trials run independently by Land Research Services have confirmed the dry matter in dairy pastures increases by 5 per cent with fish fertiliser from BioMarinus – named by his wife Mary.

Pasture growth was measured on trials sites on two Canterbury dairy farms during August to December last year for sites containing only liquid fertiliser, combinations with nitrogen and urea and contrasted with effluent and urea applications with no liquid-fish fertiliser.

James says plant production will get better

each year because the biology of the soil will improve as moisture is retained.

“The soil will get healthier and the production of grass will improve by applying organic or biofertilisers to enhance the growth and multiply the biology under the soil.”

She says the fish fertiliser is the best available of its kind because of the enzymatic hydrolysis. “By doing it with the enzymes we retain all the nutrients of the fish and no oil or water or solids are taken out.”

Offal from the fish processing plant is put into a digester silo and fish proteins are hydrolysed into small peptides and amino acids with the help of the enzymes.

A low temperature is

fertilisers.

The results favoured the fish fertiliser trial for grape bunch weights, harvest yields and brix levels, and McKean Estates have committed to using the liquid fertiliser vineyards in both regions.

Research by James found the processed fish frames also gave good health benefits as a fish silage for animals.

Still to be completely tested is her findings from overseas research papers that methane emissions can be reduced from ruminants such as cows by 40 per cent.

Lincoln University senior lecturer Jim Gibbs was brought in to check out this research. Fish oil in the silage was fed to dairy cows – and the results, he says, demonstrated a significant and sustained reduction in methane production particularly after the feeding period.

He has found early results suggest fish silage is a genuine possibility for adding to the diet of livestock and it appears to have a role in production, animal health and reducing ruminant methane emissions.

Preliminary trials also show fish silage is accepted by livestock and high intakes are possible either alone or with other supplements, and internal parasite egg counts were reduced in calves fed with fish silage and barley pellets. Milk fat was also higher in cows fed fish oil with their grazing diet than if they fed on pasture alone.

The early results will be explored more closely over the next two years of the three-year project funded by \$1.6 million from joint venture research company Seafood Innovation and matched by an equal amount by United Fisheries.

Kotzikas plans to create soon a product from fish bones as a calcium supplement for human and animal consumption.

The larger bones form 7 per cent to 12 per cent of a fish frame. He initially thought this would become a problem of the fish waste process until learning the bone market is a \$6 billion industry internationally.

Kotzikas says New Zealand needs to combine biological products into everyday production if it’s to retain its “green, clean and crystal-clear waters” image.

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Smitha James  
Biotechnician

