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NTU team develops fish feed that shields young seabass from disease

It might look like ordinary fish grub, but this bright yellow speck protects the juvenile Asian seabass from a pathogen that afflicts it.

The *Streptococcus iniae* (*S. iniae*) bacterium causes major disease among tropical fish, especially those in intensive aquaculture. Infected fish are often afflicted with meningitis, blood poisoning, skin lesions and bulging eyes.

To protect juvenile Asian sea-

bass from infection, scientists from Nanyang Technological University (NTU) in the past year concocted a novel blend of probiotics and nutrients, and mixed them in fish feed.

The supplements are covered with an edible coating that protects the probiotics from acid in the fish gut that can destroy them fast.

Inside a 2mm-wide food pellet, the capsule of probiotics and nutrient is between one and 10 microns in size. That is thinner than a strand of hair, which is about 70 microns thick.

For the fish to gain immunity against the pathogen, the medicinal probiotics and nutrients must

travel farther down its gastrointestinal tract unscathed to be successfully utilised.

At the destination, enzymes will break down the fish feed and coating to release the probiotics and nutrients where they are most effective.

“Our hypothesis is that if we feed this feed to fingerlings (young fish), their survivability will improve, and because they are much more disease-resistant, they grow faster as well,” said Professor Joachim Loo from NTU’s School of Materials Science and Engineering, who led the team of five in the project.

His hunch proved to be correct when he tested the feed at a local



This fish feed created by Nanyang Technological University researchers contains a blend of probiotics and nutrients that can kill a bacterium that causes major disease among tropical fish. PHOTO: NTU SINGAPORE

farm between August and September.

Some fish in the farm were afflicted with a mild infection. A few days after the seabass were fed the special grub, most of them were cleared of the infection.

Juvenile seabass that were given the yellow pellets also grew larger than those on a normal diet, said Prof Loo. But this finding will need further validation, he added.

Rearing meaty, healthy and disease-resistant fish in a cost-efficient manner is a key aim of aquaculture players here, as food security rests on their shoulders.

Prof Loo does his part by creating value-added fish feed. Food for fish accounts for between 50

per cent and 70 per cent of a farm’s production cost.

The project was funded in 2021 by the Singapore Food Story R&D (research and development) Programme under the Singapore Food Agency.

The nutrient used in the feed comes from a traditional ingredient of some cuisines here that has anti-inflammatory and anti-infective properties. Prof Loo did not reveal the nutrient since the technology is proprietary.

The team hunted for the most suitable probiotic by screening 22 different strains from yogurt, fermented food and drinks, and other sources.

Together, the ideal probiotic

and nutrient mix, at specific concentrations, was more effective in vanquishing *S. iniae*, said Prof Loo.

Prof Loo now wants to examine whether mature seabass can return to a normal diet once they have become immune to *S. iniae* thanks to the special feed.

This will also reduce cost for farmers, as there would be no need to keep using the special feed – which is expected to be pricier than normal feed – for the seabass' whole lifespan.

To test this theory, the NTU team will conduct trials at urban farm and nursery Opal Resources in 2023.

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