

Vaccinating salmon: reducing antibiotics in fish farming



Farmed salmon is a key part of Scotland's world-renowned food industry, accounting for around 40% by value of Scottish food exports and contributing £2bn annually to the UK economy. It represents a huge Scottish success story, an outstanding example of a 'good food', both in terms of its exceptional nutritional value and its standards of production.

Formerly, salmon was a delicacy only a privileged few could enjoy. With the advent of fish farming, salmon and its nutritional benefits became available worldwide at more affordable prices. In the 1980s, both fresh- and sea-water salmon farming saw significant growth.

Fish veterinarian Ronnie Soutar, formerly director of veterinary services at University of Edinburgh and now Head of Fish Health at Aqualife Services Ltd, explains that with the huge opportunities came some serious problems. The main issue back then was that thousands of farmed salmon became infected with *Furunculosis*, a bacterial fish disease carried by wild salmon.

"There were no vaccines that worked well against *Furunculosis*, and there was concern whether it would be possible to produce one that was sufficiently effective," explains Ronnie.

"This led to fairly widescale use of antibiotics in the 80s to control the inevitable bacterial infection the fish would develop. At the time it was best practice – the best advice offered by Government specialists and fish vets to ensure fish welfare was maintained and the quality of the end product could be ensured."

However, the only way in which fish farmers could treat stock affected by *Furunculosis* was to mix antibiotics into fish feed and that is hard to get right.

“It’s really difficult to ensure each fish receives the correct dose of antibiotic via medicated feed. Appetite varies between individuals, especially when they are suffering from a bacterial infection. Suboptimal dosing with antibiotics—in farming or for human medical treatment— can speed up the development of antibiotic resistance, which is when bacteria change and become resistant to the antibiotics used to treat infections they cause.”

In the 1990s, concern was growing about the use of antibiotics – including the potential to impact the natural environments in which the fish were being reared. This is when the Scottish Salmon Producers Organisation collaborated with what was then the Government Scottish Office to work out a way to develop an effective vaccine against *Furunculosis* in farmed salmon.

As well as protecting against the disease, it was imperative the vaccine would have no impact on the quality of the salmon product or any effect on humans.

Dr John Webster, technical director at the Scottish Salmon Producers' Organisation, explains that the process of developing a vaccine took a number of years. In that time, not only did the vaccine have to be refined and developed to be commercial viable, but administration of the vaccine needed to be perfected.

“Many people don’t think it’s possible to inject a fish, but it is,” he says. “The vaccine is injected into the abdomen of salmon during their fresh-water phase using an automated process.

“Now, almost 20 years since the first vaccines were made commercially available, all Scottish salmon are vaccinated and we have virtually eliminated the use of antibiotics to treat *Furunculosis*. Controlling it in the farmed fish has also helped reduce the disease reservoir in wild fish.”

Today, Scotland produces salmon with a farmgate value of around £650m annually. It is estimated that the industry indirectly supports around 8,000 jobs in Scotland, with a significant number of these in the remote northern and western regions where it operates. Furthermore, salmon producers are at the heart of their local areas, reporting a spend of £448 million on suppliers and services and capital investment of £63.1 million.

However, John Webster says a single strategy is not enough – diseases and health challenges are constantly changing, and veterinary science needs to stay one step ahead.

“Our challenge now is not so much the potential for bacterial infection in the salmon but sea lice. To overcome this, we are utilising lumpfish and wrasse which act as cleaner fish for the salmon, swimming alongside them and eating the parasites. However, the cleaner fish can get their own bacterial challenges so we are working on new vaccinations to ensure they can stay healthy and keep the salmon healthy in turn.

“Overall we’re in good shape, having reduced sales of antibiotics into the fish sector from 1.7 tonnes of active ingredient in 2014, to less than one tonne in 2015. Can we go lower? We will try, but we must also strike that difficult balance with upholding animal welfare, which we’re committed to getting right.”