

Salmon eile

Government, IFA and multinational fish-farmers deny reality that typical farmed smoked salmon contained 10 unsafe chemical residues



by Tony Lowes

Asksed if the limitations on chemical residues in farmed salmon set by our government and its agencies are adequate to protect health, Dr David Carpenter, Director, Institute for Health and the Environment at the University at Albany in the US, wrote in a personal communication to the Boycott Farmed Salmon Campaign that, “In my judgment many of them are not”.

Malachite is probably the most toxic of the ten chemicals. For more than ten years it has been

known to cause carcinogenesis, mutagenesis, chromosomal fractures, teratogenicity and respiratory toxicity in some mammals including organ damage and mutagenic, carcinogenic and developmental abnormalities.

All ten chemicals are recorded at levels below the Minimum Residue Level SET by the Marine Institute and so are listed in the Annual ‘Chemical Residues in Irish Farmed Finfish’ Report as “compliant”.

Introduction

Last year the scalps of super-chef Darina Allen and super-foodie Sally McKenna were quietly obtained for the ‘Boycott Farmed Salmon’ Christmas campaign – in delightfully different ways. The campaign quoted Slow Food International’s opposition to farmed salmon, specifically its ‘Not On My Plate’ listing of farmed salmon. Ballymaloe Cookery School’s Allen was President of Slow Food in Ireland and McKenna was involved in setting up a watered-down Slow Food ‘Snail’ marketing logo. After the campaign implied hypocrisy, Allen, a friend of Agriculture Minister Simon Coveney, somehow felt she should “step back’ from her role as President of Slow Food Ireland. McKenna’s Snail has vanished without a trail. However, both of the Irish food celebs continue to promote Irish ‘organic’ smoked salmon and its artisan producers, even if it suggests a double standard. Their lack of support for the boycott is not unexpected.

On the other end of the political rainbow, the campaign found an ally in the surprising form of Eamon DeValera’s grandson, Eamon O’Cuív, TD, the long-standing FF Galway Deputy – popular supporter of all things rural.

O’Cuív told the Oireachtas Agriculture Food and Fisheries Committee hearings in early December that he “will

not touch farmed salmon because it is a totally unnatural product”, referring specifically to the use of chemicals. A story filed by Connacht Tribune reporter, Dara Bradley, accurately described the campaign’s highlighting of O’Cuív’s comments. BUT a banner-headlined feature on the front page: ‘TD wants farmed salmon boycott’. Toxicity-friendly phones in the west rang off their hooks before the ink was dry and an apology to the TD followed the next week. The canny O’Cuív felt he had been used by everyone. This time he was right.

The row was triggered by the publication by Boycott Farmed Salmon of a pre-slaughter chemical-residue test of typical ‘organic’ farmed salmon which listed ten chemicals. The ten chemicals include pesticides, food preservatives, dyes, and antibiotics. All of them are recorded at levels below the Minimum Residue Level allowable set by the Marine Institute and so are listed in the Annual ‘Chemical Residues in Irish Farmed Finfish’ Report as “compliant”.

Both the company involved, Marine Harvest, a Norwegian multinational that controls 80% of Irish farmed-salmon production and the IFA have issued denials. The comments tell an extraordinary tale and I include them serially after the relevant chemical summary.

THE 9 CHEMICALS

1 Emamectin benzoate

Top of the list because of the Irish connection must come the pesticide Emamectin benzoate, orally administered in fish food under veterinary prescription. It is sold under the trade name 'Slice' to paralyse the nervous system of the ectoparasite sea lice, a relative of the common head lice.

Long-standing concerns over this chemical have led to the banning from the food chain in the UK of horses treated with this product.

This biocide has been the mainstay against sea lice since salmon farms began. Sea lice are now the major biological problem facing the industry worldwide, according to Marine Harvest CEO Alf-Helge Aarskog, describing them as the "industry's biggest challenge" when publishing the industry's Q3 2015 Report.

The lice not only damage fish, leading to secondary infections and high mortality, but have a free-swimming stage in which they have been shown to infect wild salmon, reducing dramatically the numbers which would otherwise return to their spawning ground.

However, a 2015 peer-reviewed scientific study shows that salmon lice have mutated, wherever they are found, across the globe in eleven years to resist this pesticide. It classifies the chemical as a 'mutagen'. As resistance was first reported from Ireland in 2005, the author of the study, Professor Kevin Glovers, says that "It is not unthinkable that the origin of the observed genetic changes was in Ireland". Get out the green jersey.

MARINE HARVEST POSITION There is absolutely no scientific evidence whatsoever to support a claim that this product has led to lice 'mutating'.

IRISH FARMERS ASSOCIATION POSITION Emamectin benzoate is an anti-sea-lice product which is authorised and has a permitted residue limit authorised by the EU and national authorities.

MARINE INSTITUTE POSITION The residue testing data referred to derive from private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Marine Harvest offers no reason for ignoring Glovers' 2014 research published in October 2014 in *BMC Genomics* 2014. It was actually the first time that science had managed to simultaneously document that a mutation that arose in just one animal in the marine environment had spread to the whole population, and documented how long this process took (11 years).



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1.1 Details of companies used to transport fish to and from this site:

NAME*	ADDRESS	TYPE OF TRANSPORTATION*
THE GRIP TANNERY	MH OMMAD	WELL BOAT
GALWAY	DONAGAL	TANK
O'SULLIVAN	GALWAY	TANK
O.S. WELLS ADAT	NEWMAN, BEANS, LA SAN	WELLS BOAT

For those vehicles owned by the company being inspected, are the Transport Records in order?
 YES NO OTHER (please specify below)

Marine Institute's Inspector's record of 20 June 2012

This document is the Marine Institute's Inspector's record of 20 June 2012 of chemical residues testing undertaken by Marine Harvest on 3 September 2011 on a fully grown salmon about to be marketed. The product is certified organic under a 2009 EU Regulation supervised by the Minister for Agriculture, the competent authority for the sector, through the 'The Standards for Organic Food and Farming in Ireland'.

The document was provided by the Marine Institute to the Information Commissioner after a 2012 failure by the Department of Agriculture, Fisheries and Food to provide any records relating to chemical use on fish farms led to an appeal. The Marine Institute initially informed the Information Commissioner that they "held no relevant documents", a statement which the Information Commissioner wrote "does not make any sense considering their legal obligations".

In July 2014, the Department notified the Information Commissioner that it had "identified a number of records relevant which had been overlooked earlier". The Information Commissioner's ruling states: "No explanation has been offered by the Department as to why these reports were not identified as relevant in response to the original or internal review

requests, or indeed when my Office queried the issue in 2014", concluding "the Department's handling of the request falling short of what might reasonably be expected".

Three pre-slaughter Residue Testing Inspection Reports were included in the ten Inspection Reports released. Marine Harvest and the IFA have denied that some of the chemicals listed are present (even though some of them are on the company's list as approved for use on organic salmon). The IFA accused the Boycott Farmed Salmon campaign of an attempt "to ruin hundreds of jobs on Irish farms, processing plants, smokeries and shops in Ireland in the run up to Christmas each year".

When asked about the results, The Department of Agriculture consulted the Marine Institute, its scientific advisor, which informed it that as the test results were undertaken for a private company, it would not be appropriate for it to comment – in spite of the fact that the record was created as part of the Marine Institute's statutory regulatory role, by its own Inspector.

The Minister for Health, who controls the Food and Safety Authority, referred the matter back to the Minister for Agriculture.

THE 9 CHEMICALS

Continued

2 Deltamethrin

A pesticide used to create a bath to treat the same ectoparasite as Emamectin. The Product Data sheet issued by the manufacturer states: "This pesticide is toxic to fish and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark".

Management of farmed salmon requires transfer by suction in pipes from the cages to 'well boats' filled with treated water which is discharged directly into the bay after use. Now used in combination with Emamectin as sea-lice resistance increases. (See #1)

The Aquaculture Stewardship Council [ASC] certification approval report on Marine Harvest's salmon farm at Deenish, County Kerry, dated 05 March 2015, states that: "Lice levels on this site never reached the trigger levels for treatments". This trigger level which requires mandatory treatment is based on an egg-bearing female's winter-limit of two sea lice per fish. The ASC-required 'Dashboard' for this farm (covering the last two months) shows Almost five per fish in the first week of December 2015 – but only one of these was an egg-bearing female. Thus the trigger level was not exceeded – and no treatment was required under the state's protocol, though the number of lice indicates an infestation of at least 170,000 lice per cage.

The record shows that the company appears itself to treat these infestations with pesticides, given that in this December 2015 example, the number of lice fell from 4.9 to 0.35 by the following week when - without intervention - they would be expected to increase. Yet the organic standards state that for farmed salmon "The use of parasite treatments, not including compulsory control schemes operated by the Competent Authority, shall be limited to twice per year or once per year where the production cycle is less than 18 months". These records show that Marine Harvest uses sea-lice treatments as a prophylactic, greatly increasing damage to the environment and also the resistance of the sea lice.

IFA POSITION The fish did not contain any Deltamethrin

MARINE HARVEST POSITION Deltamethrin was not detected at all.

MARINE INSTITUTE POSITION The residue testing data referred to are on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Delatmethrine is approved for use on organic fish on Marine Harvest's Medicine Positive List.

3 Tricaine mesilate [MS222]

Tricaine mesilate is an anaesthetic used under veterinary prescription to anaesthetise fish for handling during the suction transferring to well boats for pesticide bath treatment or other procedures. It is reported as present on the premises of every operation inspected in the ten files released, with one reporting it was kept in the glove-compartment of a van. In fact, Marine Harvest's storage of MS222 in Castletownbere, County Cork, was found by one Inspector to be inadequate and the company was required to install locks on the office storage cupboard (which it subsequently did). Given its wide usage and essentially benevolent purpose (in the circumstances) it is inexplicable why its presence is denied. It is sold in aquarium shops for the painless euthanasia of fish.

IFA POSITION The fish did not contain any MS222.

MARINE HARVEST POSITION MS222 was not detected at all.

MARINE INSTITUTE POSITION The residue-testing data referred to are on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Marine Harvest's Medicine Positive List lists Tricaine mesilate [MS222] as permitted for organic fish and it is present (below the MRL) on all three reports on residue tests provided to the Information Commissioner by the Marine Institute.

4 Oxytetracycline

This antibiotic is used in human medicine. It is used (under prescription) by salmon farms to treat furunculosis, first confirmed in Ireland in 1985 and now considered endemic. The disease results in gross boils, and is transmitted through the water column, direct contact, and vectors such as birds or sea lice. It is also used to treat secondary infections caused by the increasingly frequent jelly fish attacks and sea lice infestations.

The World Health Organisation (WHO) classified Oxytetracycline in 2009 as "Critically Important Antimicrobials for Human Medicine". These are defined a "used as sole therapy or one of few alternatives to treat serious human disease" including in this case Lyme disease, brucellosis, and pneumonia. WHO is seeking to restrict the use of this antibiotic on animals "in order to preserve their effectiveness in human medicine".

McDonalds USA announced in March 2015 that it will no longer source food from suppliers who use human antibiotics on their animals, stating that, "Our vision for antimicrobial stewardship is preserving antimicrobial effectiveness in the future through ethical practices today".

IFA POSITION The fish did not contain any Oxytetracycline.

MARINE HARVEST POSITION Oxytetracycline was not detected at all.

MARINE INSTITUTE POSITION The residue testing data referred to is on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Oxytetracycline is permitted for use on organic fish according to Marine Harvest's 'Medicine Positive List'.

5 Ethoxyquin &

6 Ethoxyquin DMK

Ethoxyquin is an anti-oxidant added to the increasingly lengthy animal food chain to prevent spontaneous combustion because refrigeration is "prohibitively expensive" for animal feed transport. Ethoxyquin is 'authorised', but only in the animal food chain. Crossover to the human food chain is an increasing concern. In 2015 the Australian Therapeutic Goods Administration detected the presence of ethoxyquin in multiple krill-oil products, augmenting concerns that there may have been contamination of other Omega 3 fish products.

A worldwide consumer-driven trend to eliminate a variety of artificial preservatives, flavours and colours, such as Ethoxyquin, from our foods has led to companies like Nestlé USA, Hershey's, MARS and General Mills eliminating or committing to eliminate many chemicals - and specifically Ethoxyquin.

Recent reconsideration by the European Food Safety Authority [EFSA] of ethoxyquin MRL, published on 18 November 2015, states: "Considering the data gaps in the available studies, no safe dietary level for fish, including salmonids, can be derived". This finding does not appear to have been addressed in Ireland yet.

IFA POSITION BHA and Ethoxyquin are permitted antioxidants found in fishmeal and fish oil (feed ingredients) necessary for the prevention of spontaneous combustion in fishmeal and oils transported by sea. These were permitted antioxidants in 2011 and again at barely detectable levels.

MARINE HARVEST POSITION BHA and Ethoxyquin/Ethoxyquin Dimer are simply antioxidants found in fishmeal and fish oil (feed ingredients). These were reported at barely detectable levels.

MARINE INSTITUTE POSITION The residue testing data referred to are on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Ethoxyquin is 'permitted' for use only in animal feed ingredients and should not be present in the human food chain.

7 BHA (butylated hydroxyanisole)

Anti-oxidants like Ethoxyquin, BHA and BHT are, however, permitted in food products to extend shelf life, in spite of the fact that the US National Institutes of Health reported that BHA is “reasonably anticipated to be a human carcinogen” based on evidence of carcinogenicity in experimental animals – such as rats. Critics point out that it does this exclusively in the forestomach, an organ that humans don't have.

Controversy surrounds the use of BHA and BHT, with some proponents suggesting the same antioxidant effects that BHA has on fats (scavenging free radicals) can also neutralise the threat of other carcinogens.

Vitamin E - tocopherols - are a natural alternative and are likely to be the preservative used in food, particularly those labelled ‘organic’, marketed in health-food shops.

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MARINE INSTITUTE POSITION The residue testing data referred to are on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Ethoxyquin is permitted only as an additive to animal feed and should not ‘cross-over’ into the human food chain. The ‘Organic Farming and Food Standards in Ireland’ list for approved use only permit “Natural antioxidant substances” with the “use restricted to feed for aquaculture”. Ethoxyquin is not a natural antioxidant substance.

8 BHT Butylated hydroxytoluene

The chemical cousin to BHA, BHT is another anti-oxidant. See above.

IFA POSITION The fish did not contain any BHT.

MARINE HARVEST POSITION The results in question show that BHT was not detected at all.

MARINE INSTITUTE POSITION The residue testing data referred to is on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT The “barely detectable levels” Marine Harvest admits for BHA are <0.3 ug/kg. BHT is recorded as <0.4 ug/kg. It is utterly illogical for Marine Harvest to characterise a <0.3 result as a “barely detectable level” while claiming that a <0.4 reading for BHT shows that BHT was “not detected at all”.

9 Malachite green & leuco malachite green dyes

Salmon are pink for the same reason flamingos are pink: their diets are heavy in krill and shrimp. Denied their natural diet of krill and shrimp, farmed salmon's flesh is grey and unappetising. The deepest orange is associated with wild Alaskan salmon whose diet in the Baltic Sea is predominantly krill, whereas North Atlantic salmon are a pink so distinct that Crayola have named a colour after it – “salmon pink”.

Dyes have been a subject of controversy since King Edward I issued the first food-adulteration regulation in 1300 banning ground bones used for whitening flour. Malachite is also used as a local antiseptic and was widely used by the fish breeding industry to control the fungus *Saprolegnia*, a water mould that kills the eggs and young fry.

Traces of malachite green which the Marine Institute's 2011 Residues Reports state is “illegal” are, consequently, inexplicable. The 2008 EU Regulations give a “Reproductive Toxicity Warning: Suspected of damaging fertility or the unborn child”, with a further Warning that it is “very toxic to aquatic life”, and an “acute hazard with long-lasting effects”.

The Marine Institute's last report of this chemical (above the MRL) was in 2006, leading the 2014 Chemical Residues Reports to claim that “Recent results suggest that as a result of increased industry awareness that it is an unauthorised substance, supported by monitoring and enforcement, the use of malachite green has ceased”.

In fact concern over dyes in salmon are indirectly acknowledged by the Marine Institute's upgrading in September 2014 to enable a new validated analytical method “to expand testing to cover a broader suite of dyes”. The MRL for malachite was lowered from 1.0 to 0.5 ug/kg at the same time.

After a 2003 lawsuit in the United States, all farmed salmon that is dyed was required to state on the packaging that it contains “added colouring”. This has since been tightened to require the identification of the dye in question, albeit through a complex code system.

There is no regulation in Ireland requiring organic salmon to declare if dyes have been used in their production, or what those dyes are.

IFA POSITION The fish did not contain any Malachite Green.

MARINE HARVEST POSITION The results in question show that Malachite Green and Leuco Malachite was not detected at all.

MARINE INSTITUTE POSITION The residue testing data referred to are on foot of private testing carried out by the industry and the Institute is therefore unable to comment on the specifics of the results.

FACT Once again, the readings for malachite - <0.5 ug/kg – which was “not detected at all” are higher than the readings for BHA - <0.3 ug/kg – which Marine Harvest admits indicates BHA is “present”. Malachite is probably the most toxic of the ten chemicals. For more than ten years it has been known to cause carcinogenesis, mutagenesis, chromosomal fractures, teratogenicity and respiratory toxicity in some mammals, including organ damage, mutagenic, carcinogenic and developmental abnormalities.

The ‘Organic Farming and Food Standards in Ireland’ are silent on the use of dyes in organic foods.

Glovers was the corresponding author: he is principal scientist and research group leader for the population genetics group at Institute of Marine Research, Norway and a professor at the Sea lice Research Centre at the University of Bergen. The publication lists nine co-authors from three academic institutions in Norway and has never been challenged.

Marine Harvest's ‘Medicine Positive list’, which lists chemicals approved for use by the company, including those permitted in their organic certified salmon production, states that no withdrawal period is required, in spite of the fact that this pesticide is banned in Canada, and a 60-day withdrawal period is required in the USA, to protect public health.