SLICE (EMAMECTIN BENZOATE)

Association of Aquaculture Veterinarians of British Columbia
December 14, 2004

SLICE (emamectin benzoate) is a therapeutant manufactured by Schering-Plough for the control of sea lice in farmed salmon. The product was submitted for approval in both the US and Canada in 1999. Both countries have very strict drug approval processes, and both Health Canada's Veterinary Drug Directorate (VDD) and the US Food and Drug Administration's Center for Veterinary Medicine are still reviewing the submission. In the interim the product is being used by veterinary prescription in both countries under strictly controlled situations.

In Canada the review of a new veterinary drug must undergo rigorous scrutiny and fully satisfy all scientific requirements under the Regulations to the *Food and Drugs Act*.[i] If a submission is accepted and the product is approved, the manufacturer receives a Notice of Compliance from Health Canada specifying the terms and conditions under which the drug can be sold and used. The drug must bear a Drug Identification Number (DIN) on its label.

In Canada, Emergency Drug Releases (EDR's)[ii] may be issued by Health Canada's Veterinary Drugs Directorate to permit the manufacturer of a new drug to sell a limited quantity of the new drug to a veterinary practitioner. Adequate evidence is required that the drug poses no known health risk to the animals to be treated or to consumers. The veterinarian must make a detailed submission, and after treatment report to the manufacturer and to the VDD on the results of the use of the new drug, including efficacy and information respecting any adverse reactions encountered. The report must account for all quantities of the drug received.

For SLICE administered under an EDR, the Veterinary Drugs Directorate set an administrative Maximum Residue Limit (MRL) of 50 ppb (parts per billion) and a withdrawal time of 25 days, i.e., the number of days between harvest and the last day the drug was administered. SLICE is registered in several countries. In Europe, the UK and Chile there is a 0 day withdrawal time and a tolerance of 100 ppb (allowable level of drug in harvested fish tissue). These numbers are derived from risk assessments based on amounts of fish consumed and knowledge of toxicology testing for emamectin benzoate.[iii] In Norway the withdrawal time is 175 degree-days (e.g., 17.5 days at a water temperature of 10 degrees Centigrade)[iv].

Emamectin is approved for use in Japan and in the US on vegetable crops. In the US, SLICE is also permitted to be used in food fish in Maine under an INAD (Investigational New Animal Drug) process. This requires a veterinary prescription and is monitored by the US Department of Agriculture (USDA). The drug has a 60-day administrative withdrawal period.

US regulations, based on US Environmental Protection Agency (EPA) assessments,[v] allow for use of emamectin benzoate on leafy vegetables, turnip greens, cottonseed, fruiting vegetables and products such as tomato paste. Tolerance for combined residues of emamectin and its metabolites range from .02 ppm (20 ppb) to .10 ppm (100 ppb).

Regulations also establish tolerances for "indirect or inadvertent combined residues of emamectin" in food animals that may consume these vegetables. These range from .002 ppm (2 ppb) in meat of cattle, goats, hogs and horses to .02 ppm (20 ppb) in liver tissues of cattle, goats, hogs, horses and sheep.

These tolerances are based on average consumption rates for each product and toxicological assessments of emamectin. "Based on these risk assessments, EPA concludes that there is a reasonable certainty that no harm will result to the general population…from aggregate exposure to emamectin residues. " [vi] In the same regulations, emamectin is classified as a "not likely" human carcinogen.

Preliminary information from the British Columbia Ministry of Agriculture, Food and Fisheries indicates that the amount of product administered to farmed fish in British Columbia in 2003 was approximately 0.08 gm/ tonne of fish produced.[vii] Not all farm salmon sites were treated and, of those that were, only two sites were treated more than one time during the year[viii].

In Canada, food safety testing is the responsibility of the Canadian Food Inspection Agency (CFIA). CFIA may target their testing or do generic testing for all products used in finfish. When EDR's are approved, Health Canada notifies the CFIA regionally, and prescribing veterinarians are required to contact CFIA prior to the harvest of any populations treated with SLICE. Regulation in British Columbia also requires each lot of finfish sent to a processing plant to be accompanied by detailed documentation for all therapeutants used.

CFIA has tested approximately 100 samples per year Canada-wide for emamectin benzoate in the last two to three years. A large proportion of these samples were negative for emamectin benzoate, and of those that were positive, all were below Health Canada's limits. As a result CFIA did not have to take any regulatory action during that time[ix].

In summary, the use of SLICE in Canada follows the strict regulatory controls established for the use of drugs in food producing animals. Withdrawal times in both Canada and the US are stricter than in countries where the drug has already been approved. In the last two to three years testing of harvested fish shows that there has been no finding of emamectin benzoate residues above limits set by Health Canada.

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[i] http://www.hc-sc.gc.ca/vetdrugs-medsvet/approval_e.html
[ii] http://www.hc-sc.gc.ca/vetdrugs-medsvet/edr_e.html
[iii] http://www.emea.eu.int/pdfs/vet/mrls/086303en.pdf
[iv] Schering Plough Animal Health
[v] US CFR (Consolidated Federal Register) Vol 68 No. 131 (1999)
[vi] US CFR (Consolidated Federal Register) Vol 68 No. 131 (1999)
[vii] http://www.agf.gov.bc.ca/fisheries/health/Product_use_bar.pdf
[viii] BC Fish Health Database
[ix] Canadian Food Inspection Agency