

RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE

**ruma**

**GUIDELINES**

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**Responsible use of  
antimicrobials  
in fish  
production**

Produced by the Fish Working Group  
of the  
**RUMA Alliance**

February 2004  
with minor updates July 2007

# RESPONSIBLE USE OF ANTIMICROBIALS IN FISH PRODUCTION

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## **Responsible use of Antimicrobials in Fish Production**

### **Introduction**

1. The Responsible Use of Medicines in Agriculture Alliance (RUMA) is a coalition of organisations including agricultural, veterinary, pharmaceutical, retail and consumer interests. This paper is one of a series of species-specific documents developed by RUMA. Broadly, the objectives of this paper are:
  - To review the use of antimicrobials in fish production, and to produce responsible use guidance for farmers.
  - To aim to establish and communicate practical strategies by which the need for use of antimicrobials might be reduced without adversely affecting either the welfare of farmed fish, or the viability of the industry.
2. This paper establishes a framework against which future activities may be evaluated. It also seeks to encourage the involvement of the different organisations and individuals that have a role in achieving these aims.
3. It includes guidelines designed to help farmers evaluate their husbandry procedures with respect to the well-being of their fish. Proper management yields benefits to both the fish and to the farmer.

### **Background to the use of antimicrobials in fish production**

1. Antimicrobials are vital medicines for the treatment of bacterial infections in fish. The emergence of antimicrobial resistance as a serious problem in human medicine has prompted concerns about the potential for crossover of resistant bacteria from livestock to the human population and the associated possibility of this impacting on the effectiveness of medical antimicrobial treatments.
2. All antimicrobials used in the EU have been authorised for their current uses on the basis that they are effective and safe to both man and animals including fish. This safety and efficacy is kept under review. Use for the purposes for which they are authorised should therefore pose little or no hazard to the environment, to those who administer them, to workers involved in the preparation of food or to consumers of food produced from treated animals. In the United Kingdom the Veterinary Medicines Directorate (VMD), acting for the Licensing Authority, a group of Ministers of the Crown, issues marketing authorisations for veterinary medicines. Marketing authorisations are only issued where scientific assessment of data supporting the application demonstrates that the product is of consistently acceptable quality and is safe and effective when used in accordance with the manufacturer's recommendations. The Veterinary Products Committee (VPC) advises the Licensing Authority on the safety, quality and efficacy of veterinary medicinal products. There is a chain of quality assurance from the pharmaceutical manufacturers, through wholesalers, veterinary surgeons and distributors. This

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dovetails with the farm assurance schemes which effectively ensure that medicines are used responsibly.

4. Antimicrobial resistance in bacteria is a natural phenomenon. It can exist in the absence of medication. Particular strains of bacteria are naturally resistant to certain antimicrobials. Most discussion of resistance focuses on 'acquired resistance' – that which occurs after exposure of the bacteria to the antimicrobial. This is an inherent risk associated with any use of antimicrobial medication in any species.
5. Bacteria that are initially sensitive to antimicrobials can potentially acquire resistance whenever antimicrobials are used in man or animals. The treatment of patients with resistant or multi-resistant bacteria is difficult, not always effective and very often expensive. The risk posed to human health by the use of antimicrobials in aquaculture should be realistically appraised.
  - Antimicrobial resistance is a global problem as the resistant bacteria travel with humans, food products and animals, and antimicrobials are used globally.
  - The increase in multi-resistant organisms in human medicine has placed greater significance on the remaining antimicrobials available for treatment. There is concern that animals carrying bacteria resistant to critically important antimicrobials may act as sources of resistance for bacteria in humans directly or indirectly.
  - There has been almost no quantitative analysis of the risk to man from antimicrobial resistance in food-borne bacteria or bacteria in the environment. The Advisory Committee on the Microbiological Safety of Food published its Report on Microbial Antibiotic Resistance in Relation to Food Safety in August 1999.
  - Some antimicrobial resistant bacteria reach man via meat. Some cause disease directly, others may transfer antimicrobial resistance to human pathogens.
  - The pathway for transfer of antimicrobial resistance by bacteria has only been clearly demonstrated for Salmonellae. Although Salmonellae have developed resistance to antimicrobials which are used for the prevention and treatment of disease in man and animals they do not occur in fish.
  - Proper cooking of meat results in the destruction of bacteria. This, in theory, would eliminate the risk of transferring resistance. Pasteurisation or irradiation would considerably reduce the risk of transfer. Good food hygiene, including preparation, handling and storage is extremely important because it minimises the potential for cross-contamination of food.

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6. The ability to use antimicrobials provides us with an important tool to reduce disease and suffering in fish. However measures aimed at limiting the development of resistance are important for prolonging the useful life of all antimicrobials in fish medicine as well as human medicine. The effectiveness of measures and products needs to be monitored and those which are appropriate today may need to be adjusted in the future in the light of changing resistance patterns and scientific knowledge.
7. Resistance to antimicrobials is an international problem. Action by the EU on the basis of the precautionary principle cannot be enforced internationally. Imports of fish and aquaculture products from outside the EU may therefore come from fish or crustaceans which have been exposed to antimicrobials that were not authorised within the EU.
8. There is a joint responsibility between the veterinary surgeon and the farmer to ensure that antimicrobials are used correctly and for the right reasons. This is essential so that the consumer can be assured that antimicrobial residues will not appear in food, and that the correct use of antimicrobials in fish will not create resistance problems in the human or fish population. Although it is always necessary to assess the efficacy of any treatment to ensure there is a cost benefit, it is also important to take into consideration that treatment may also be justified in order to improve fish welfare.

### **Legal controls**

1. Animal medicines play an important role in the control and prevention of disease and animal suffering but have the potential to impact on animal and human health and the environment if not used properly. In the UK consumers have long enjoyed the benefits of rigorous systems designed to safeguard animal health and environmental safety and to protect them from potentially harmful residues of such medicines in their food. These include controls on the authorisation, distribution and administration of such medicines. Additionally, foods of animal origin are monitored for medicinal residues in accordance with legislation implementing EU directives.
2. The general public are not aware of the current controls on the distribution and use of veterinary medicinal products. Members of the RUMA Alliance consider the current controls to be effective safeguards. They would like to ensure that UK aquaculture is not blamed as the major cause of antimicrobial resistance is primarily related to use of antibiotics in human medicine. Antimicrobial resistance is also an issue that requires a consistent global approach because resistance cannot be confined within national geographic boundaries.

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3. The Veterinary Medicines Directorate (VMD), acting on behalf of Ministers, is responsible in the UK for the authorisation and control of the manufacture and marketing of animal medicines and for surveillance for residues of animal medicines in meat and other animal products.
4. All authorised animal medicines in the UK are assigned to one of the following legal distribution categories:
  - POM-V Prescription only medicine – veterinarian. A medicine, to be supplied only on veterinary prescription, which must be prescribed (either orally or in writing) by a veterinarian to animals under his care following a clinical assessment, and which may be supplied by a veterinarian or pharmacist in accordance with the prescription. (Formerly POM products and a few P products.)
  - POM-VPS Prescription-only medicine – veterinarian, pharmacist, Suitably Qualified Person. A medicine for food-producing animals (including horses), to be supplied only on veterinary prescription, which must be prescribed by a veterinarian, pharmacist or SQP (either orally or in writing) and which must be supplied by one of those groups of people in accordance with the prescription. (Formerly PML livestock products, MFSX products and a few P products.)
  - NFA-VPS Non-food animal medicine – veterinarian, pharmacist, [Suitably Qualified Person](#). A medicine for companion animals which must be supplied by a veterinarian, pharmacist or Suitably Qualified Person. (Formerly PML companion animal products and a few P products.)
  - AVM-GSL Authorised veterinary medicine – general sales list. This may be sold by anyone. (Formerly GSL.)

All antimicrobials are in the POM-V category.

### Codes of Practice

1. Ultimately it is the farmer who is responsible for ensuring that aquaculture medicines are used in a safe, responsible and effective way.
2. Those involved with fish farming recognise that antimicrobial resistance is an emerging threat to human health, are conscious of public attitudes and appreciates the need for responsible and careful use of antimicrobials. The industry needs effective antimicrobials to treat animal disease and prevent suffering. The widespread acceptance of quality assurance schemes illustrates the commitment of the industry to food safety.
3. An important example of this commitment is UFAS (the UKASTA Feed Assurance Scheme), which is owned by AIC (Agricultural Industries Confederation), with Guidelines for the Implementation of the Code of Practice. The purpose of this Code is to give a set of principles for the production of safe

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- animal feedingstuffs including the sourcing and evaluation of feed materials as well as manufacturing, storage, loading, transport and delivery of the feedingstuffs themselves. Special attention is also paid within the Code to the production of medicated and zootechnical feedingstuffs and to the need for competent and trained personnel. A fundamental feature of the Code is the requirement for application of HACCP (Hazard Analysis Critical Control Points) principles within the manufacturing process; in addition to adequate documentation. Accreditation to this Code can only be given after passing an independent audit. Farmers utilising medicated or zootechnical feedingstuffs should ensure that the feedingstuffs have been produced in accordance with the requirements of this or similar schemes.
4. Fish farmers and their veterinary surgeons aim to ensure that fish are kept in the best state of health and welfare. This must be viewed against a backdrop of a sound commercial base and the economics of the business but never compromised by it. Antimicrobial use on all fish farms is under the supervision of the veterinary surgeon. It is a legal requirement for farmers to keep a record of the administration of medicines, including in-feed medication, which must be available for inspection. Farm Assurance Schemes audit compliance with the legislation. Farmers and veterinary surgeons have a shared responsibility to ensure that medicines are used responsibly.

### Research Requirements

1. There is concern that there is no serious commitment, for example, by European politicians, that decisions taken on the basis of the precautionary principle will be re-evaluated if new relevant scientific evidence becomes available. This could place the UK industry at a competitive disadvantage and would not necessarily resolve any safety concerns for consumers (as imported product not subject to the same restrictions would substitute for UK product). Action should not be taken unilaterally by the UK: it should be agreed at European level as a minimum, but that could result in conflict with the World Trade Organisation (WTO).
2. All reasonable precautions that could help reduce the threat posed by antimicrobial resistance would be welcomed by the industry. Objective scientific tests and standards for monitoring antimicrobial resistance should be developed. Blanket bans on categories or uses of antimicrobials would tend to suggest that scientific evidence was being ignored.
3. Future action should be based on acquiring and using scientific evidence. At present there is a lack of scientific evidence and research is urgently required in a number of key areas including:
  - How resistant organisms arise and spread within and between species.
  - The extent of transmission of antimicrobial resistance from fish to man especially in food.

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- Programmes to manage antimicrobial resistance on farms.
- The use of vaccines and other therapies or treatments as alternatives to antimicrobials.
- Analysis of the effects of vaccine on antimicrobial useage.
- The effects of the use of disinfectants on antimicrobial resistance.
- Management systems and their effect on transmission and susceptibility to disease.
- Risk assessment to identify areas where antimicrobials or other use of medicines may be a risk to humans or the environment.

### **Future action**

Fish farmers are committed to ensuring the safety of fish for consumers.

- Risk assessment, based on current knowledge of antimicrobial resistance should be evaluated to see if it could be of value as a basis for future action and any data or other requirements to increase the precision of risk assessment identified.
- Fish farmers support the development of objective scientific tests and standards for monitoring antimicrobial resistance.
- Fish farmers support the current EU initiative to establish the prevalence of antimicrobial resistance.
- The problem also affects the rest of agriculture and a consensus should be reached across the whole industry which regains and maintains consumer confidence, avoids restrictive legislation yet ensures that the industry remains competitive and safe.
- The Government should be encouraged to pursue action at European and world level – antimicrobial resistance is an international problem and actions in the UK could be undone by misuse of antimicrobials elsewhere. Standards must be applied uniformly throughout the EU and the rest of the world.
- The Government should remain aware of the need for a stable regulatory environment so that safe and effective products continue to be available to safeguard animal and fish health and welfare.
- The establishment of a committee with overall responsibility for the use of antimicrobials as recommended by the Swann Committee Report in 1969 is long overdue. The House of Lords Select Committee of Science and Technology in 1998 reinforced that this recommendation should be carried forward. The Specialist Advisory Committee on Antimicrobial Resistance (SACAR) was set up in 2001 to fulfil the recommendation for England and Wales.



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### **Antimicrobials in Fish Farming**

#### **Treatment and prevention of disease**

1. Microbial diseases cause mortalities, pain, distress and economic loss. Authorised therapeutic antimicrobials can reduce this suffering and distress in infected fish. Since fish should not be allowed to suffer, the alternative is to kill them. The removal of antimicrobials from fish medicine would cause great welfare problems.
2. The antimicrobials that are authorised for use in fish in the UK are detailed in the Veterinary Data Sheet Compendium published by NOAH, and in the Handbook of Medicinal Feed Additives published by HGM publications. Withdrawal periods for veterinary medicines are set to ensure that any residue which may remain after treatment is harmless. Information on withdrawal periods is contained in the NOAH Compendium, also available online at [www.noahcompendium.co.uk](http://www.noahcompendium.co.uk).
3. Initially aquaculture in the UK used antimicrobials to combat a range of bacterial diseases including furunculosis and vibriosis, as well as secondary bacterial infections subsequent to physical damage which, for example, ectoparasite infestation with salmon lice might cause. However improved husbandry combined with the widespread use of efficient vaccines has significantly reduced the use of antimicrobials in aquaculture to a very small proportion of what was used previously.
4. The usual route of administration of antimicrobials to farmed fish is oral, via medicated feed. Inevitably some of the medicated feed will not be consumed, and will fall to the bottom of the tank or pond or through the bottom of the netpen. In addition, some of the antibacterial material will be excreted by the fish, and some will leach from the medicated feed pellets. The characteristics of the particular fish farm site will determine the fate of the uneaten medicated feed or excreted antimicrobial. Marine cage sites with fast currents and large tidal movements will provide greater dispersal of both solid, particulate and dissolved matter than would sites with poor water exchange. In addition, uneaten food and faeces may be consumed by fish and invertebrates in the vicinity of the farm. (Niels Svennevig, Helge Reinertsen & Michael New (1999) *Sustainable Aquaculture Food for the Future?*)
5. There has been some concern regarding the potential impact of antimicrobials in the aquatic environment, both marine and fresh water, and the wider theoretical risks associated with the development of antimicrobial resistance by fish pathogens and environmental bacteria. Since bacterial pathogens of fish only grow at the temperature of their surrounding aquatic environment, very few of the bacterial pathogens of farmed fish in a temperate climate such as the UK are capable of infecting humans, so the risk of human disease being caused by antibiotic resistant fish pathogens is very low.

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6. Transferable resistance (to *Escherichia coli*) has been reported in *Vibrio* and *Pseudomonas* isolates from sediments beneath marine cage sites in Norway (Sandaa & Enger, 1994). Transfer of multiple drug resistance plasmids between *Aeromonas salmonicida*, *E. coli* and *V. cholerae* under simulated natural conditions has also been demonstrated (Kruse & Sørum, 1994). In the latter studies resistance plasmid transfer was seen with or without antimicrobial compounds being present. The extent to which any increased frequency of resistance in sediment beneath fish farms is contributed to by strains with transferable resistance genes has not been determined. (Niels Svennevig, Helge Reinertsen & Michael New (1999) Sustainable Aquaculture *Food for the Future?*)
7. One major way in which fresh water aquaculture differs from marine aquaculture in relationship to the development of antibiotic resistance is that there is a potentially different and additional relationship to the human consumer. This is because, in many places the primary source of drinking water is by the abstraction of river water, thereby producing an alternate route by which antibiotic resistant bacteria may conceivably contact the human consumer. The possibility that antibiotic resistant bacteria deriving from fish farm use of antimicrobial agents might reach the human consumer through the drinking water chain appears to be extremely remote in developed countries. The factors that need to be taken into consideration include very high dilutions, the fact that most fish pathogens present in temperate waters are not capable of infecting humans, the fact that antimicrobials such as oxytetracycline are readily complexed by calcium and magnesium ions readily available in the aquatic environment, the multiplicity of other anthropogenic sources of antibiotics in ordinary river water including the presence of effluents derived from human usage from sewage farms. (Niels Svennevig, Helge Reinertsen & Michael New (1999) Sustainable Aquaculture *Food for the Future?*)
8. Antimicrobials do not appear to have ever been used as growth promoters in fish farming.

## Responsible use of Antimicrobials in Aquaculture Production

### Responsible Use – Veterinary Surgeons

1. The Royal College of Veterinary Surgeons Guide to Professional Conduct makes specific and detailed reference to the use of pharmaceutical products. In 1998 the British Veterinary Association published their Code of Practice on Medicines. The challenge to the veterinary profession is to ensure that these codes of practice are effective and properly implemented.
2. Antimicrobials may only be prescribed and used under the direction of a veterinary surgeon when:
  - a. the veterinarian has been given the responsibility for the health of the fish in question by the owner or the owner's agent.
  - b. the care of the fish by the veterinarian is real and not merely nominal.

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3. Although circumstances will vary enormously the veterinary surgeon must at least: (a) either seen the fish for the purposes of diagnosis or prescription; or (b) visited the farm or other premises where the fish are kept sufficiently often and recently enough to have acquired from personal knowledge and inspection an accurate and up-to-date picture of the current health status on that farm sufficient to enable him or her to make a diagnosis and prescribe for the fish in question.
4. In all uses of antimicrobials the best available information should be used to determine treatment, the most prudent regimes and doses. The veterinary surgeon should perform all relevant diagnostic procedures including laboratory investigations as well as farm visits where necessary. The aim is to provide optimal efficacy with minimal risk of developing resistance. The veterinary surgeon will be the normal source of such information for the farmer.
5. All available practice or farm health office information should be consolidated such that this information should
  - Allow monitoring of the level of medication used
  - Contain a list of those medicines supplied to each farm site
  - Contain a list of medicine withdrawal periods and a system for allowing information to be updated
  - Keep a record of bacterial sensitivities
  - Note any comments concerning the response of medication under these circumstances.
6. Any suspicion of adverse reactions or evidence of bacterial resistance should be thoroughly investigated with the support of in-vitro bacterial sensitivity testing and the medication changed appropriate to these findings. Suspected adverse reactions, including lack of efficacy, should be reported to the Veterinary Medicines Directorate through the Suspected Adverse Reactions Surveillance Scheme (SARSS).

### **Responsible Use – Feed Manufacturers**

The protection of human and animal health must always be a prime consideration in the manufacture and distribution of animal feedingstuffs. Feed mills must have a comprehensive and documented system for the production of safe animal feedingstuffs with the requirements of UFAS (the UKASTA Feed Assurance Scheme), which is owned by AIC (Agricultural Industries Confederation) or a proven equivalent. These requirements include a rigorous Hazard Analysis Critical Control Points (HACCP) procedure and adherence to the DEFRA/DARD Codes of Practice for the control of Salmonella.

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### a. **feed materials**

Feed materials should be sourced with a view to minimising contamination with zoonotic pathogens. The origin, transport, storage, processing and handling of feed material must be considered. Store hygiene is particularly important and should be verified by annual inspection or membership of a recognised Assurance Scheme. Source assurance is an impending requirement for 2004. This will allow complete product and claim traceability to be demonstrated. In some sectors these are demanding requirements which will need additional resource.

- b. Although feed materials are processed prior to arrival at the feed mill, some will be unprocessed and come direct from farm or intermediate storage. Feed materials may be processed to improve the nutritional quality of the material or to reduce undesirable bacteria, such as salmonella. Any material known to be contaminated with salmonella should be put through a heat or chemical treatment to destroy the micro-organisms before the material is used for animal feedingstuffs.

### c. **finished feed**

Finished feed may undergo a final decontamination either through a high temperature process. Where they are applied, the principle of separation of treated from untreated feed materials must be applied in order to ensure no possible re-infection. This can be obtained by limiting personnel access, filtering air to coolers and generally ensuring that finished products are kept well clear of incoming feed material and any air which might contain dust from these materials. Cooling equipment is especially important given the range of temperatures which exist within them (some of which may allow bacterial or mould growth) and their high demand for air.

### d. **transport and delivery**

Feed materials or compound feedingstuffs may be readily contaminated if placed in contaminated vehicles. Vehicles used for carrying feed materials and finished feedingstuffs must comply with the AIC Code of Practice for Road Haulage and the UFAS or proven equivalent. Particular attention must be paid to vehicle hygiene and cleanliness, correct loading, avoidance of contamination and cross-contamination and delivery to correct farm facilities so that the feedingstuff is received by the correct livestock.

### e. **Vehicles**

Vehicles may be contaminated from the general environment (e.g. road spray), farm environment (when loading or unloading), or from the transport of raw materials (“backloading”). These risks need to be evaluated for the specific feed production system, and they need to be managed with a balanced approach to vehicle dedication, maintenance and cleaning. Where possible, feed should be transferred to bins on site without vehicles having to go within the biosecure area.

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### **Responsible Use – Fish farmers**

Fish farmers have a responsibility to safeguard the health of the fish on their farm. Where appropriate farmers may ask their veterinary surgeon to help them discharge this responsibility. Farmers and fish keepers can play a major role in ensuring the responsible use of medicines on fish farms by following the guidelines below. Similar guidelines form part of all farm assurance schemes.

- a. Regard therapeutic antimicrobial products as complementary to good management, vaccination and general site and farm hygiene.
- b. A site and farm health plan should be drawn up that outlines routine preventative treatments (for example vaccination, fungus control, salmon lice control etc.). Delay in initiating therapy causes welfare problems and may ultimately lead to increased medicine usage.
- c. Initiate treatment with an antimicrobial medicine, all of which are subject to a veterinary prescription, only with formal veterinary approval.
- d. In the case of in-feed medication this will be provided by a Medicated Feedingstuff (MFS) Prescription.
- e. Ensure that accurate information is given to the attending veterinary surgeon in order that the correct dosage can be calculated for the fish concerned, and ensure that clear instructions for medication, dosage and administration are obtained and passed on where necessary to the staff responsible.
- f. Always complete the course of treatment at the correct dosage. Ensure that the dosage is dispensed in an effective manner by careful administration, and that the feeding method is correct.
- g. Ensure the end of medication is accurately determined by cleaning the feed bin or hopper as appropriate.
- h. Ensure that the appropriate withdrawal period is complied with prior to slaughter of the treated fish for human consumption. In general the withdrawal time is specified on the Medicated Feedingstuff Prescription or as set by the veterinary surgeon.
- i. Maintain a fish medicines record book on farm together with copies of relevant regulations and Codes of Practice.
- j. Accurately record the identity of the fish medicated, the batch number, amount and expiry of the medicine used, the withdrawal period required and the date the medication was completed.
- k. For all medicines used, appropriate information should be kept on file – for example, product data sheets, package inserts or safety data sheets as available.

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1. Report to the veterinary surgeon, the supplier, or direct to the Veterinary Medicines Directorate any suspected adverse reaction to a medicine in either the treated fish or farm staff having contact with the medicine. A record of the adverse reaction should also be kept on the farm: either a copy of the VMD adverse reaction form or a note in the medicine record book.
- m. Co-operate with Farm Assurance schemes which monitor antimicrobial usage, medication documentation and withdrawal period compliance. However, such schemes should not constrain the attending veterinary surgeon or farmer from preventing suffering of fish stocks.
- n. With your veterinary surgeon monitor antimicrobial usage taking account of the potency of various products.
- o. Ensure that different medicines are only given at the same time with the specific approval of the veterinary surgeon to prevent the possibility of adverse reactions.

### **Responsible Use – Farm Assurance Schemes**

1. Farm assurance schemes have a very important role to play in promoting the responsible use of antimicrobials on fish farms. Credible farm assurance schemes with a credible inspectorate are essential if the industry is to reassure consumers. Farm assurance scheme assessments and audit trails should be consistent.
2. Farm assurance schemes often require farmers to nominate a veterinary surgeon or veterinary practice. Veterinary surgeons prescribing medicines are in a position to certify compliance with standards of the farm assurance scheme in relation to antimicrobial usage providing the fish were actually under his care and he was aware of all products used on the farm. Keeping records of medicine use is already a legal requirement on all farms in the UK. The Veterinary Medicines Directorate Code of Practice On The responsible Use Of Animal Medicines on the Farm should be adopted by the industry as a minimum standard.
3. Veterinary surgeons should play an important role in assurance schemes while recognising the expertise of the farmer in managing his own fish stock. A Farm Health Plan should be developed with the assistance of a nominated veterinary surgeon where necessary. Regular and frequent review of this Health Plan is recommended. It is recognised that the frequency of the review will vary according to the situation and the requirements of the particular farm assurance scheme.

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### **Farm Guidelines**

There should be written instructions on each farm or farm site outlining the farmer's obligations in law concerning his use of medications including antimicrobials. It should cover:

- Storage
- Administration techniques
- Recording
- Withdrawal periods.

Part of the instruction should be specific to the farm or to the site including:

- The correct dosage and duration of medication
- The correct indication for use
- The correct procedures for ensuring adequate withdrawal periods.

All of which is to ensure the accuracy of medication of fish at the anticipated site of infection.

### ***Integration with Farm Health Programme***

These written instructions should be in conjunction and co-ordination with a written Farm Health Programme tailored to meet the needs of the farm and emphasising those areas of management that are likely to reduce the requirement to use medication.

### ***Review***

There should be a written procedure for a regular periodic review of the medication prescribed to provide the opportunity to reassess the efficacy of treatment (treatment = medication + management). Alterations can then be made in the treatment regime as appropriate.

Appendix A

**Practical strategies for reducing the need to use antimicrobials on fish farms**

**A.1 Introduction**

- a. These guidelines are designed to help farmers evaluate their husbandry procedures with respect to the well-being of their fish. Proper management yields benefits to both the fish and to the farmer.
- b. For a specific disease to occur, certain combinations of factors involving the fish, the environment, and the disease agent must be present. Proper manipulation of nutrition, husbandry practices and the environment will help to prevent disease. There are at least two reasons to give fish proper care. One is an ethical concern for their well-being. Another is production efficiency. Management practices that incorporate good care are usually also the most effective from a production standpoint.
- c. If certain management practices conflict with the well-being of the fish, it will be to the producer's long-term advantage to adopt practices that put fish welfare ahead of short-term cost savings.
- d. Veterinary surgeons ensure that fish diseases are properly diagnosed and help to design preventative programmes. Farmers should therefore consult their veterinary surgeons when they require a diagnosis of disease in their fish, or when they need to design or modify a disease prevention programme.

**A.2 Disease prevention**

The best way to prevent disease is to prevent it from entering the farm. It is important to develop a preventative medicine programme and consulting with those who have additional expertise and experience in the use of medicines to prevent disease, for example, a veterinary surgeon, may assist this.

**Biosecurity**

- a. Biosecurity is a management strategy designed to minimise the potential for introducing disease-causing organisms onto the farm. People, fish, animals or wildlife may transport diseases from outside the site.
- b. Ideally no visitors and vehicles from outside the premises should be allowed on the site but, where this is unavoidable, they should be cleaned and disinfected before entry. Keep disinfectants available for those who must come on to the site.



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### A.3 Routine health procedures

- a. Attention must be given to good management/husbandry as part of disease control
- b. A programme should be prepared for routine treatments to control external parasites and gill problems
- c. Water quality should be maintained at the optimum for the species kept.

### A.4 Vaccination

- a. Vaccination forms a major part in disease control for certain major aquaculture species, and the use of vaccines improves health and welfare and can reduce production losses associated with a range of diseases, as well as increase profitability.
- b. Vaccines must be stored and administered according to label directions if they are to be effective. In most cases vaccines will need to be stored in a refrigerator. Refrigerator temperatures should be monitored.
- c. Vaccination teams must observe good hygiene practice between farm sites and between farms.
- d. Vaccination methods must be arranged to minimise handling stress to the fish, in terms of transporting fish to the vaccinating tables, handling during the anaesthetisation and vaccination procedures and during the return to the holding tanks to minimise scale damage.
- e. Many fish vaccines contain mineral oil as adjuvants to improve the efficacy of such products. This can have implications for operator hazard. Even if small amounts have been injected, accidental injection with this product can cause intense swelling, which may, for example, result in ischaemic necrosis and even the loss of a digit. Expert, PROMPT, surgical attention is required and may necessitate early incision and irrigation of the injected area, especially where there is involvement of finger pulp or tendon.
- f. Vaccination needles should be changed frequently to avoid damage to the fish and the passage of contamination from fish to fish.
- g. Once vaccine containers have been broached, they must be used within the stated 'in use shelf life' which is provided on the SPC (Summary of Product Characteristics) and product literature. This may be less than a day's vaccination session. Once this is exceeded the remains should be discarded according to the manufacturers' instructions.

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### A.5 Cleaning and disinfection

- a. Cleaning and disinfection are the most basic and the most important of all the disease control measures. Prompt and proper removal of wastes, and cleaning and disinfection of equipment is central to disease control. Effective disinfection requires cleanliness first because the disinfectants have little or no action on dirty surfaces. Organic material inactivates chemical disinfectants. Also organic material provides protection for disease organisms and the chemical solution is unable to penetrate and reach them.
- b. Cold temperatures can reduce the effectiveness of most disinfectants. Note that the chemical agents commonly used may require several minutes contact time with the disease producing agents to be effective.
- c. Care should be taken to ensure that the chosen disinfectant is compatible with the aquatic environment – this may be especially important on marine sites. Care should also be taken in the disposal of chemical after use.

### A.6 Disease diagnosis and treatment

- a. In spite of good preventative medicine and proper care, fish may still become sick or may receive injuries. Accurate diagnosis allows selection of the proper treatment and helps in deciding what management steps, if any are needed to prevent the spread of the disease around the site.
- b. Wherever possible, precise diagnosis of the cause of mortalities should be attempted. This allows for a more rational choice of treatment. When the presence of a specific pathogen has been established in the laboratory, antimicrobial sensitivity testing should be conducted to aid in the selection of the appropriate antimicrobial. If necessary, contact names and telephone numbers of veterinary surgeons and Fish Health laboratories should be kept in a handy location.
- c. When fish require treatment, it should be administered promptly. When using medicines, it is essential to read and follow the label instructions. A record of the product used, dose and duration of treatment and period of withdrawal should be kept. A record of medicine usage is a legal requirement, but it also can be useful in developing and documenting a site or farm health plan.
- d. Medicines must be used in fish only when absolutely necessary and, where relevant, on the advice of a veterinary surgeon. Only medicines authorised for use in fish should be used and only as recommended by the manufacturer unless under the specific direction of a veterinary surgeon. Simple rules should be followed:-
  - Label instructions must always be read and followed completely regarding dose, frequency and timing of use, and withdrawal periods before slaughter.

## RESPONSIBLE USE OF ANTIMICROBIALS IN FISH PRODUCTION

- Treat all fish at the dosage and for the duration recommended.
- All medicines should be stored according to the manufacturer's instructions. Those medicines requiring refrigeration should be identified and kept in an efficient working fridge. Temperatures within the fridge should be monitored.
- Details of purchase, use and disposal of unused medicines should be kept.
- When in doubt, seek professional advice.
- Do not use any product for which clear instructions are not available.

### **A.7 Lice control**

- a. Current best Industry practice suggests keeping only one generation of salmon on a sea site, and possibly within a whole loch system, at any time. This system leads to first and second production years and facilitates the fallowing of sites after the completion of the two-year production cycle.
- b. Local management practices and environmental conditions on individual farms combined with historical observations of levels and timings of sea lice infestation will all play a part in drawing up optimal treatment programmes.

### **A.8 Withdrawal periods.**

- a. The withdrawal period for a medicine is the minimum time required between the last treatment and the harvesting of flesh for human consumption. Withdrawal periods are only established after considerable research and are set for the purpose of ensuring consumer safety. The withdrawal period is the time between the last dose given to the fish and the time when the level of residues in the tissues is lower than or equal to the Maximum Residue Limit (MRL). The Maximum Residue Limit is the maximum concentration of residue resulting from administration of a veterinary medicinal product which is legally permitted in the Community.
- b. The National Office of Animal Health (NOAH) includes in its Compendium of Data Sheets for Veterinary Products a table showing Withdrawal Periods for Animal Medicines. This is also online at [www.noahcompendium.co.uk](http://www.noahcompendium.co.uk). The Marketing Authorisation/Product Licence holder must always be the absolute reference point for any information on a specific product.
- c. Authorised products have stated withdrawal periods. Where products are used outside the data sheet recommendations then the veterinary surgeon must set a withdrawal period not less than the minimum of 500 degree days. (As fish are poikilotherms and metabolism varies with temperature, withdrawal periods are set in "degree days". Degree days are calculated by multiplying the water

## RESPONSIBLE USE OF ANTIMICROBIALS IN FISH PRODUCTION

temperature in degrees centigrade by the number of days following cessation of treatment e.g. 500 degree days would represent a withdrawal of 50 days at 10°C or 100 days at 5°C.)

### **Summary**

There should be consultation with a veterinary surgeon for help with disease prevention, control, diagnosis and treatment. A farm health plan should be developed; including vaccinations and where appropriate, parasite control, and reviewed and this must be updated often. Basic disease prevention and control methods should be used to the greatest degree possible.

The Responsible Use of Medicines in Agriculture Alliance (RUMA) was established in November 1997 to promote the highest standards of food safety, animal health and animal welfare in British livestock farming.

A unique initiative involving organisations representing every stage of the food chain, RUMA aims to promote a co-ordinated and integrated approach to best practice in the use of animal medicines.

RUMA membership spans the food chain and includes organisations representing interests in agriculture, veterinary practice, the pharmaceutical industry, farm assurance, training, retailers, consumers and animal welfare interests.

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**RUMA is made up of the following organisations:**

*Agricultural Industries Confederation (AIC)*  
*Animal Health Distributors Association (AHDA)*  
*Animal Medicines Training Regulatory Authority (AMTRA)*  
*Assured Food Standards (AFS)*  
*British Poultry Council (BPC)*  
*British Retail Consortium (BRC)*  
*British Veterinary Association (BVA)*  
*Dairy UK*  
*Linking Environment and Farming (LEAF)*  
*Meat and Livestock Commission (MLC)*  
*National Beef Association (NBA)*  
*National Consumer Council (NCC)*  
*National Farmers Union (NFU)*  
*National Office of Animal Health (NOAH)*  
*National Pig Association (NPA)*  
*National Proficiency Test Council (NPTC)*  
*National Sheep Association (NSA)*  
*The Royal Association of British Dairy Farmers (RABDF)*  
*Royal Pharmaceutical Society of Great Britain (RPSGB)*  
*Royal Society for the Prevention of Cruelty to Animals (RSPCA)*

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