

Improving Biosecurity through Prudent and Responsible Use of Veterinary Medicines¹ in Aquatic Food Production²

Rama Gardens Hotel, Bangkok, 15 to 18 December 2009

The international situation regarding aquaculture and the use of veterinary medicines have changed dramatically during the past few decades. Trade globalization of aquatic animal products and the rise in prominence of aquaculture as a primary supplier of the world's aquatic food supply have been associated with the culture of new aquatic species, the movement of aquatic organisms to new countries and continents and a general trend towards intensification of production methods and the industrialization of the sector. While sector globalization has created new market opportunities for farmed aquatic animals, it has simultaneously facilitated the spread of their pathogens and diseases. These trends have all lead towards increased reliance on veterinary medicines to ensure successful production through prevention and treatment of disease outbreaks due to pathogens, assuring healthy stocks and maximizing production. Diseases are a primary constraint to the culture of many aquatic species. Although the capability to manage aquaculture health issues has increased tremendously in the last 30 years, the rapid development of the aquaculture sector continues to generate new challenges. This is particularly apparent with increased interest in species diversification and new grow-out techniques. In addition to the obvious effects of large-scale aquaculture losses on rural communities, diseases (particularly those causing mass mortalities) also cause considerable impacts on investor confidence.

Use of veterinary medicines in aquaculture

As in the commercial livestock and poultry production sectors, prudent and responsible use of veterinary medicines allows the development of intensive, industrial-scale food production systems that support increased food outputs for society and the most financial gains for investors while increasing production efficiency by minimizing the resources (land, water, feeds, etc.) required to produce a unit of aquatic food. The use of veterinary medicines is essential to modern agricultural production (including aquaculture), through improved on-farm biosecurity and husbandry (e.g. via the use of vaccines and disinfectants) and for the prevention and treatment of both chronic diseases that lead to decreased production (through reduced growth, food conversion rates (FCRs) and survival) and the treatment of epizootic disease outbreaks that have potential to cause mass mortalities, failure of individual aquaculture enterprises and the occasional collapse of entire industries.

As the understanding of their role in aquaculture health management and biosecurity has improved, the use of veterinary medicines has been taken up progressively by the industry.

Currently, there is a general perception that veterinary medicines (and in particular, antibiotics) have not always been used in a responsible manner. The misuse of veterinary medicines can have potential negative implications for the environment and human food safety, and could impact free trade. A number of veterinary medicinal products used in aquaculture have been shown to have potential harmful effects on human health (e.g. chloramphenicol, malachite green, florfenicals), leading to bans on their use, thus reducing the already limited arsenal of drugs that are available for disease treatment. During the last few years, detection of the antimicrobial chloramphenicol in internationally-traded shrimp has caused much concern resulting to a slowdown of imports, causing economic losses among producers and their governments. As a consequence, governments have introduced changes or tightened national regulations on the use of antibiotics in order to comply with food safety export requirements.

The lack of approved drugs for certain aquaculture species and diseases and the significant variations in regulatory frameworks and enforcement in different countries have the potential to seriously impede the continued growth of the sector. When regulatory processes for aquatic veterinary medicines are not well developed, the concern is likely higher.

The limitation of chemotherapy is also increasingly recognized. In some cases, rather than providing a solution, chemotherapy may complicate health management by triggering toxicity, resistance, residues and occasionally, public health and environmental consequences. In addition to unpredicted side effects on the environment, the efficacy of some veterinary medicines under the conditions found in some aquatic environments is uncertain, both with respect to meeting treatment goals and with regard to the potential environmental and socio-economic costs of untargeted effects. Other environmental/ecological issues relating to the use and misuse of veterinary medicines into the aquatic environment include that of leaching from unconsumed feeds, intentional/unintentional release of effluent waters from aquaculture facilities and presence of residues in faecal materials. Other examples of impacts pertains to the accumulation of residues in sediments



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Fish vaccination

and impacts of drugs and chemicals on natural biota. These areas are generally poorly studied thus causing important concerns.

Another important issue concerns disease diagnosis. Rapid and accurate diagnosis of pathogens or an outbreak prior to initiating treatment is necessary. For antimicrobials in particular, promotion of susceptibility testing to ensure that the antibiotic applied will be effective against the strain of pathogen causing the disease outbreak.

The above perceptions and concerns often cast aquaculture in a negative light and have implications for its continued expansion of the sector and its role in addressing the increasing need for food fish protein for an expanding global population. However, without the use of veterinary medicines, aquaculture food production would be impaired.

Prudent and responsible use of veterinary medicines

In general, it can be stated that the global trend is toward more stringent and uniform standards and a more prudent and responsible use of veterinary medicines by the aquaculture sector.

Improved technology has also significantly increased the capacity to detect trace amounts of residue of banned or restricted substances, leading to ever decreasing detection levels. Consumer awareness and concern over the possible health and environmental hazards posed by the use and misuse of veterinary medicines in aquaculture has also grown. The result of these trends has been more stringent testing and inspection standards by importing countries and difficulties in some developing countries meeting importing country requirements (leading to occasional product bans

and also, due to lack of capacity, to some developing countries having different standards for aquaculture products directed to export and domestic markets).

The maturation of some aquaculture sectors, such as the salmon industry in Norway and yellowtail culture in Japan has shown the great potential that preventative methods (vaccines and improved husbandry) have towards reducing the aquaculture sector's reliance on veterinary medicines to achieve improved production and profitability. Additionally, aquatic animal health professionals are increasingly aware of the need to use veterinary medicines responsibly and to not prescribe antibiotics essential to human medicine for use in aquaculture species.

While governments have a key role to play in promoting the sustainability of aquaculture production and protecting public health, ensuring the judicious use of veterinary medicines does not rest with them alone, but is a shared responsibility of all stakeholders involved in sector development, including aquaculture producers, aquatic animal health professionals/practitioners, feed, drug and chemical manufacturers and sales persons, and the general public.

There is a current opinion that advocates further restrictions on the use of antimicrobials in food animal production and even promotes a complete ban on the use of certain veterinary medicines in aquaculture. However, as the World Health Organization (WHO) has stated: "*Antimicrobials are vital medicines for the treatment of bacterial infections in both human and animals*". Animal rearing, just as with "human rearing" needs the availability of effective antimicrobials to increase population survival rates, reduce sequelae from infections, and improve food conversion rates and growth. ■

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Rather than further restrictions, more judicious use of veterinary medicines by aquaculturists, better enforcement of current regulations by government and improved health extension support to the farmers would result in a more prudent and responsible use of veterinary medicines in aquaculture development.

In view of the above, the FAO Expert Workshop on Improving Biosecurity through Prudent and Responsible Use of Veterinary Medicine in Aquatic Food Production, was convened at the Rama Gardens Hotel, Bangkok, from 15 to 18 December 2009 and hosted by the Aquatic Animal Health Research Institute (AAHRI) of Thailand's Department of Fisheries. Thirty nine experts from 14 countries (Canada, Chile, China, Croatia, India, Indonesia, Ireland, Norway, the Philippines, Spain, Thailand, United States of America (USA), United Kingdom and Viet Nam) as well as experts from the Association of Southeast Asian Nations, the World Organisation for Animal Health (OIE) and the World Health Organization participated in the expert workshop.

The workshop highlighted the importance of aquaculture; a key feature for its success is improving sustainability; disease and health are major sustainability issues; and aquaculture concerns and the way they are addressed differs from country to country. The veterinary medicine sector is complex and diverse and is governed by such factors as knowledge, research, capacity and policy. Major concerns identified during the expert workshop include: firstly, authorization system of veterinary medicines and related issues; secondly, technical assistance (e.g. capacity, environmental and human impact evaluation capacity, trading compliance); and thirdly, harmonization of international standards.

The responsible use of veterinary medicines is an essential component to ensure successful and sustainable commercial aquaculture production. Safe and effective veterinary medicines need to be available for efficient aquaculture production, and their use should be in line with established principles on prudent use of veterinary medicines to safeguard public and animal health. The use of such medicines should be part of national and on-farm biosecurity plans and in accordance with an overall national policy for aquatic animal health management and sustainable aquaculture.

The detailed outcomes of the workshop will be contained in a workshop proceedings which will also include technical papers presented during the workshop: (i) public health and trade impact of antimicrobial use in aquaculture, (ii) environmental impacts and management of veterinary medicines in aquaculture: the case of salmon aquaculture in Chile, (iii) good

aquaculture practices to minimize bacterial resistance, (iv) antimicrobial resistance: complexities and difficulties of determination; (v) legislation and regulatory efforts in the USA relevant to the use of antimicrobials in aquaculture; (vi) oral delivery of veterinary medicines through aquafeed in Mediterranean aquaculture; (vii) disease prevention as a basis for sustainable aquaculture; (viii) health management tools from a manufacturing point of view; and (ix) alternatives to antibiotics in aquaculture; and (x) antimicrobial use and resistance in selected zoonotic bacteria in aquaculture: preliminary findings of a survey of aquaculture-allied professionals. The outcomes of the international survey on the use of veterinary medicines in aquaculture and the current status on the use of veterinary medicines in Chinese, Philippine, Thai and Vietnamese aquaculture conducted by FAO are also included.

The above proceedings will serve as background document to support the preparation of the FAO Code of Conduct for Responsible Fisheries (CCRF) Technical Guidelines on Prudent and Responsible Use of Veterinary Medicines in Aquaculture. Their objective is to assist countries in encouraging the proper use of veterinary medicines in aquaculture production through appropriate government regulation and the promotion and encouragement of awareness and responsible use by government agencies, private sector aquaculture producers and aquatic animal health professionals/practitioners. ■

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¹Veterinary medicines – any substance or combination of substances presented for treating or preventing disease in animals or which may be administered to animals with a view to making a medical diagnosis or to restoring, correcting or modifying physiological functions in animals (EU, 2004). EU (European Union). 2004. Directive 2001/82/EC of the European Parliament and of the Council of 6 November 2001 on the Community Code relating to Veterinary Medicinal Products. Official Journal L -311, 28/11/2004, pp. 1– 66. as amended by Directive 2004/28/EC of the European Parliament and the Council of the 31 March 2004 amending Directive 2001/82/EC on the Community code relating to veterinary medicinal products. *Official Journal L - 136, 30/04/2004, pp. 58–84.*

²Excerpts from unpublished workshop proceedings and draft FAO Code of Conduct for Responsible Fisheries (CCRF) Technical Guidelines on Prudent and Responsible Use of Veterinary Medicines in Aquaculture (both documents currently in preparation).