Medicated feed and its pitfalls

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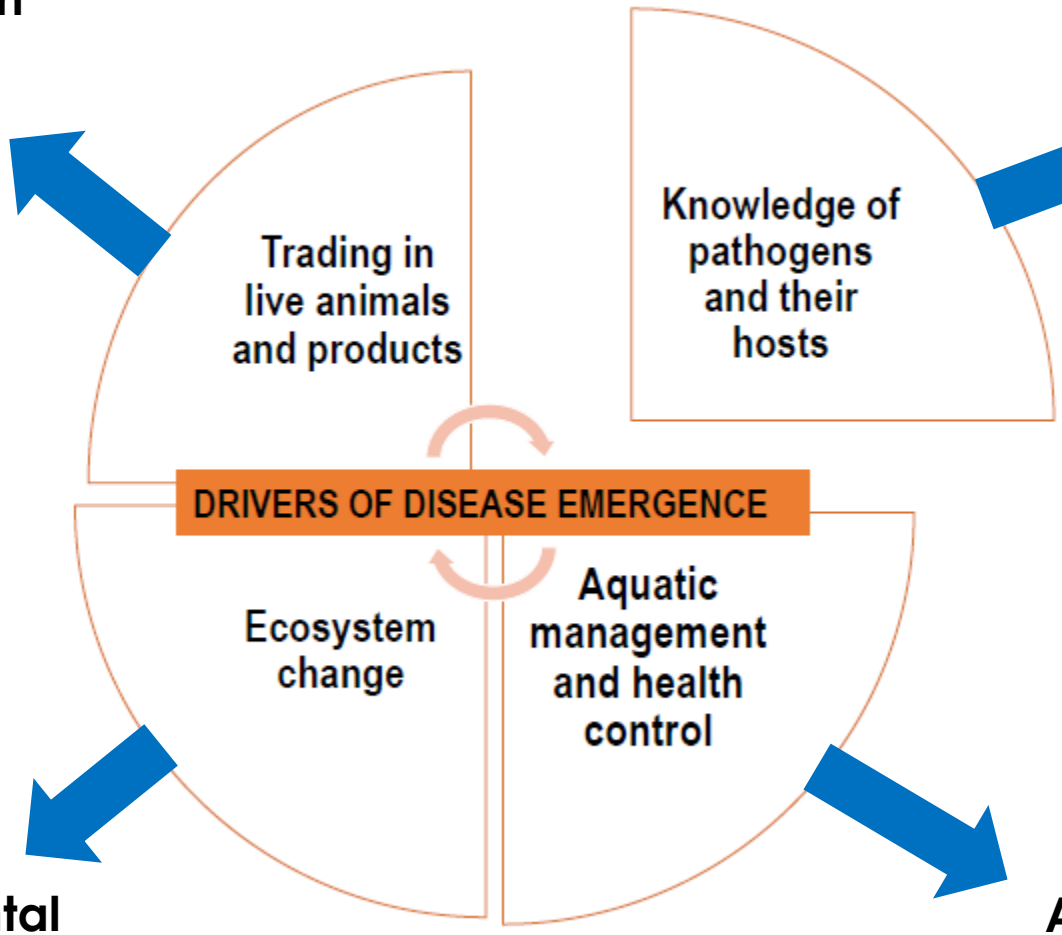
Background / Overview

One Health Concept



OIE Aquatic Code & Manual

Ecological/ Environmental Risk Analysis

Aquaculture practice

Background

- **Medicated feed?**
  - Medicated feed is a mixture of large quantities of animal feed and a veterinary premix (medicinal product containing one or more active substances)
  - undergoes extensive testing prior to approval for use in fish

- **Antibiotics?**
  - Drugs specifically designed to control bacterial infections such as amoxicillin, florfenicol and various agents in the tetracycline, quinolone, fluoroquinolone and sulphonamide group

Antibiotics used in aquaculture

- Examples used in aquaculture are **Terramycin** and **Romet**
  - **Terramycin** contains ***oxytetracyclin***, a broad-spectrum drug that acts against a range of fish bacterial pathogens, esp *Aeromonas* & *Pseudomonas*
  - 10 days treatment and 21 days withdrawal
  - **Romet** is a potentiated sulphonamide – contains 2 drugs: *sulphadimethoxine* & *ormetoprim*.
  - 3 days reatment and 5 days withdrawal
  - Effective against many terramycin-resistant bacteria

Feed Eaten by Fish (% of Body Weight)	Grams of Romet-B® to mix with 5-gallon bucket full of feed (17 pounds)
1	172
2	86
3	57
4	43
5	34

Application of medicated feed in aquaculture

- Antimicrobials => most important VMPs (Veterinary Medicinal Product) currently used for the production of medicated feed
- Continuous and improper use of specific antibiotics in feeds => increase of drug resistant strains of pathogenic microorganisms
- Unfortunately, there are very few drugs approved by the FDA for use in fish
- Thus, medicated feeds should only be used when absolutely necessary and strictly according to label to avoid AMR development

Applications (cont'd)

- For dry pellets, medication is dispersed in water or oil in advance, and then poured over the feed.
- For moist pellets, the medicine is well mixed with the other feed material and then extruded.
- In both cases, make sure the proper amount of medication is uniformly included and mixed in the final feed.
- Drying the surface of pellets or coating them with oil will decrease leaching of the medication.
- The medicated feed should be offered quickly to the entire pond.
- If fed slowly, only active fish will consume the feed while sick and inactive fish will be devoid of feed

Pitfalls

- 70-80% of the antibiotics administered to fish as medicated feed released into aquatic environment via urine & feaces and/or as unused medicated food
- The effects of antibiotics on the environment are mainly due to:
  - unregulated dumping in pond
  - overuse of these drugs by the aquaculture industry
  - presence of drug residues in fish products
- Unfortunately, very few studies conducted to analyse the side effects of antibiotics on fish themselves in immersion and through in feed formulation,
- Immersion application has very poor control of the amount and effective dose of administration, resulting in non target and hazardous effects.
- The use of antibiotics in aquaculture can cause microbial resistance and there is fear that this may spread to bacteria of veterinary and human importance

Environmental effects

Livestock

Human

Aquatic life

Wildlife

Alternatives to antimicrobial disease control strategies

- Effective vaccines.
- If forced to use antimicrobials, proper toxicity and pharmacological studies must be ensure to safe and hazard free use at low dose.
- Other effective biological means of disease control include:
  - species combination
  - vaccine,
  - phytobiotics
  - bioflocs
  - probiotics and prebiotics
- most of these can be administered through feed.

Conclusions / Recommendations

- Responsible management of bacterial diseases and use of antimicrobials in aquaculture to avoid AMR
  - AMR risk analysis recommended before use
- Use of alternative disease control strategies
- One Health approach to disease prevention and control
- Continuous training and capacity building
  - Need for guidance on diagnostic methods and antimicrobial susceptibility testing

Recommendations (cont)

- Good aquaculture practice, inclusive of biosecurity and environmental management
  - Strict adherence to standards (e.g. OIE Aquatic Code)
- Bacterial diseases are often a consequence of poor water quality, improper nutrition, excessive parasitism, or improper handling.
- These management problems must be corrected for successful, long-term control of infections.

Thank you!