

# PROBLEMS ENCOUNTERED DURING THE REGISTRATION OF NEW PRODUCT APPLICATIONS FOR FISH VACCINES

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# PARTICULARS OF FISH VACCINES

- \* Physiology of fish
- \* Breeding in water
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- \* Particulars of the assessment of the efficacy
- \* MUMS

# REFERENCE DOCUMENTATION

Directive  
2001/82 CE



GUIDELINE: Specific requirements for the production and control of live and inactivated vaccines intended for Fish

European Pharmacopeia  
Specific monographs



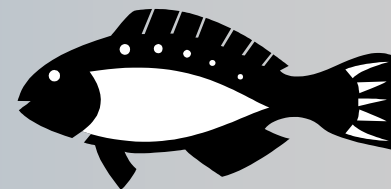
# PHYSIOLOGY OF FISH

- ❖ Slow growth and initial reduced size (egg)

  - ✓ Mass vaccination

- ❖ Immune system less developed than mammals or birds / Immunological memory

  - ✓ Need of booster vaccinations



- ❖ Cold-blooded animals

  - ✓ Influence of the water temperature on the kinetic of the immunological response

# BREEDING IN WATER



- ❖ Particulars of the water environment
- ❖ Particulars of fish moving from freshwater to sea water
- ❖ Consequences on the routes of administration and challenge
- ❖ Consequences in term of handling and follow-up
- ❖ Consequences in term of risk for the environment

# PHYSIOLOGY AND BREEDING IN WATER (1)

## ❖ WATER TEMPERATURE

Cold blooded animals

The lower the temperature, the longer the onset of immunity, clinical signs and adverse reaction

- Particular attention to pay to the conditions of the trials



# PHYSIOLOGY AND BREEDING IN WATER (2)

## ❖ OTHER ENVIRONMENTAL PARAMETERS (OXYGENATION, BIOBURDEN...)

- Mix vaccinates and controls in the same tanks to avoid bias
- Record of the water parameters

# PHYSIOLOGY AND BREEDING IN WATER (3)

## ❖ MOVING FROM FRESH WATER TO SEAWATER

- Case of salmonids in particular
- Whole modification of the physiology
- Modification of the pathogenic agents which the fish are exposed to





# PHYSIOLOGY AND BREEDING IN WATER

## (4)

### ❖ ROUTE OF VACCINATION

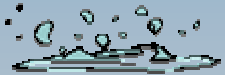


#### ➤ INJECTION

- ✓ Advantages: efficient, less antigen needed, adjuvant possible
- ✓ Drawbacks: only for big fish, time and money consuming, stress

#### ➤ BATH OR IMMERSION

- ✓ Advantages: easy to perform, applicable to small fish
- ✓ Drawbacks: less efficient, stability, efficiency after serial vaccination in the same bath, exposition of the environment



#### ➤ ORAL ROUTE

- ✓ Advantages: easy to perform
- ✓ Drawbacks: less efficient, stability, destruction in the stomach, exposition of the environment, need more antigen, production of medicated feeding stuff



# PHYSIOLOGY AND BREEDING IN WATER (5)

## ❖ CONSEQUENCES IN TERM OF HANDLING AND FOLLOW-UP

Handling is an important stress.

To reduce it as much as possible:

- Weight of the whole group or of a representative sample
- No daily individual examination; only record of mortality, food intake, behaviour, lesions
- Carefull Anatomopathological examination

# PHYSIOLOGY AND BREEDING IN WATER (6)

## ❖ CONSEQUENCES IN TERM OF RISK FOR THE ENVIRONMENT

Methods of vaccination (bath, food) lead to a high exposition of the environment

- Importance of the validation of the inactivation / control of the extraneous agents
- Particular attention to pay to any live vaccine

# PARTICULARS OF THE ASSESSMENT OF THE EFFICIENCY OF THE VACCINATION

- ❖ At present, only inactivated bacterial vaccines registered
- ❖ Most of the time, no marker of protection established
  - ✓ Need of a virulent challenge to assess the efficacy
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- ❖ Attention to pay to the compartment of vaccination and challenge
- ❖ Duration of observation sufficient to record delayed mortality in vaccinates after a challenge
- ❖ Strength of challenge sufficient but not too high

# MUMS

- ❖ CLASSIFICATION AS MUMS MAY BE CONTROVERSIAL DEPENDING ON THE COUNTRIES

- ❖ GENERALLY, LIMITED MARKET LEADING TO REDUCED DEVELOPMENTAL STUDIES



- ❖ GETTING EPIDEMIOLOGICAL DATA

- ❖ MINIMAL REQUIREMENTS



