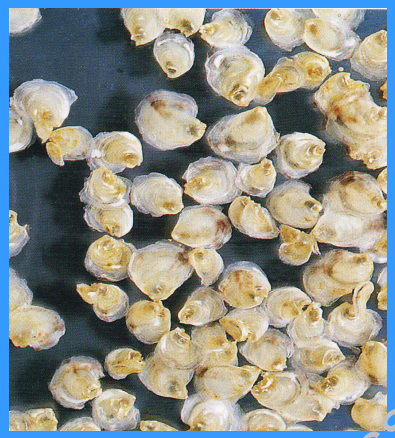
# Disinfectants and antiseptics used in mollusc hatcheries and nurseries





C. FRANCOIS cfrancoi@ifremer.fr
J.F. PEPIN jfpepin@ifremer.fr

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Laboratoire de Génétique et de Pathologie, La Tremblade
OIE Reference Laboratory for marteiliosis and bonamiosis, EU Community Reference Laboratory for diseases of molluscs

# CONTEXT :

- Different approaches has been tested with more and less success to avoid disease appearance and spread in mollusc hatcheries and nurseries. One way is to employ anti-infectives for preventive and curative purposes.

- Anti-infectives are widely used in terrestrial and aquatic animal production. Regulation has been established to give a framework for the use of these components, in particular for antibiotics. But few antibiotics have been labelled for aquatic species, very few for a specific indication. There is for example no antibiotics dedicated for mollusc hatchery and nursery.

- In that context, older anti-infectives like disinfectants and antiseptics could be again observed with full of interest….

➢ Great experience

Mostly in terrestrial and fish farming (OIE guidelines).

➢ Formulation

Active principle(s), few and well known excipients.

➢ Low cost

➢ Regulation

Not obliged to fill a prescription.

Disinfection of premises, tanks and equipment (no animal) : approval for agricultural and hygiene use (and not as a veterinary medicine).
Antisepsy of operator : Directive 98/8/CE (Biocide), Regulation n°2032/03/CE
Antisepsy of animal : Directive 2001/82/EC modified by Directive 2004/28/EC, Regulation n°2377/90/CEE (MRL), Art.L.5111-1 and L.5143 CSP.



→ Anyway, use for anti-infectives in aquaculture must be limited to structure owning an effluent management.

Anti-infectives ?

Medicines ?

Chemotherapeutants ?

# About the terms employed…

Disinfectants ?

Antiseptics ?

# CLASSIFICATION OF ANTI-INFECTIVES :

➢ **Anti-infectives with unspecific mode of action :**

- Disinfectant

- Antiseptic

➢ **Anti-infectives with specific mode of action :**

- Antibiotic
- Antifungal
- Antiviral
- Antiparasitic : acaricide, insecticide…

Note : Immunologic products : serum, vaccine.

# COMMON CHARACTERISTICS :

- Substances which inhibit or destroy various micro-organisms, mainly bacteria and fungi, eventually virus and parasites.
- By an unspecific action ,
- Working at high concentrations,
- Characterized by a quick and short action,
- Owning a general toxicity that is to high for an internal use in animals.

# DISTINCTION BETWEEN DISINFECTANT AND ANTISEPTIC :

- This is mostly a difference of use, as the majority of these molecules is employed for both : antisepy and disinfection ; this is often a difference of concentration.
- Some disinfectants are strictly reserved for inert materials because they are too toxic for living organisms, even in external administration.



## Disinfectants :

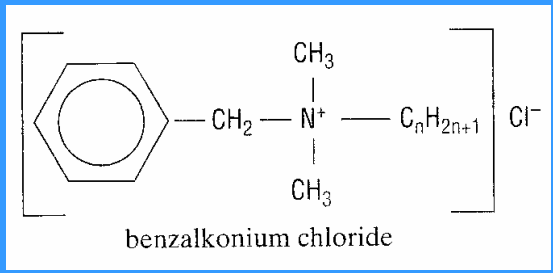
reserved **for inert materials** (premise, rearing equipment),

**Very high concentrations** of active ingredient(s)

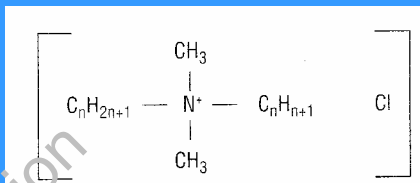
## Antiseptics :

reserved for **an external administration on animals**,

**High concentrations** of active ingredient(s)



benzalkonium chloride

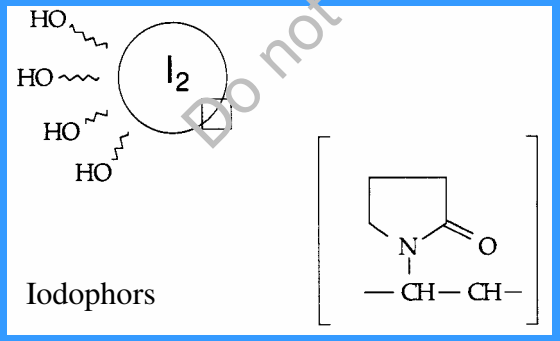


dialkyldimethyl ammonium chloride

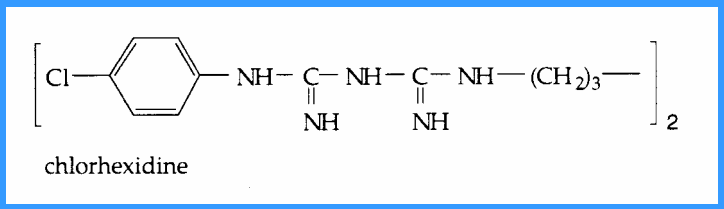
# Screening of candidates

## Analysis of the available bibliography





Iodophors



chlorhexidine

(ENVN)

# IMPORTANT CONSIDERATIONS :

Which goal? **SANISATION** and not sterilization

- Destruction of pathogens in priority
- Keeping other agents at a small and harmless level.

# CRITERIA OF SELECTION :

| | |
|---|---|
| I | Efficacy |
| II | Safety |
| III | Ease of use |
| IV | Cost |

Based on an analysis of avalaible bibliography
- Active ingredients characteristics
- Terrestrial and aquaculture farming experiences

# SELECTED DISINFECTANTS :

## ➢ Oxydants :

- Peroxydes : Hydrogene peroxyde
- Peracids : Peracetic acid
- Persalts : Potassium permanganate
- Chlorinated agents : Sodium hypochlorite, Chlore dioxyde
- Iodized agents : Iodophors PVPI

## ➢ Biomembrane denaturants :

- Alcohols : Ethyl alcohol 70°
- Ammoniums IV : Benzalkonium chloride
- Biguanides : Chlorhexidine
- (Aldehydes : formaldéhyde)

(2003, OIE Manual of Diagnostic Tests for Aquatic Animals, chapter 1.1.5.,

1995, Rev.sci. tech. Off. Int. Epiz., volume 14)

# SCOPE OF APPLICATIONS, INDICATIONS :

➢ Routine disinfection of livestock premises :

UP the premises : treatment of the inputs

IN the premises : during the rearing

DOWN the premises : treatment of the outputs (effluent)

➢ Terminal disinfection, depopulated period :

Three important steps : cleaning, disinfection and exsiccation period.

➢ Disinfection during an outbreak of a disease :

Contingency plan

# SELECTED ANTISEPTICS

➢ Oxydants :

- Persalts : Potassium permanganate
- Iodized agents : Iodophors

➢ Biomembrane denaturants :

- Alcohols : Ethyl alcohol 70°, Isopropyl alcohol 60°
- Ammoniums IV : Benzalkonium chloride
- Biguanides : Chlorhexidine



(2003, OIE Manual of Diagnostic Tests for Aquatic Animals, chapter 1.1.5.,
1995, Rev.sci. tech. Off. Int. Epiz., volume 14)

# SCOPE OF APPLICATIONS, INDICATIONS :

➢ Hygiene and antisepsy of operator :

- Critical steps of the production

- Experimental context

➢ Preventive and curative antisepsy of animal :

- External antisepsy of shell (production and experimental context)

- External antisepsy of flesh before making a biopsy to estimate ploïdie (experimental context)

- Antisepsy of products : gametes and eggs, larvae ? (production and experimetal context)

→ Balneation ?

# AN EXAMPLE : MOLLUSC HATCHERY OF LA TREMBLADE (LGP IFREMER) :

## ➢ Disinfectants :

- Water supply and pipelines : Sodium hypochlorite
- Floor and large surfaces : SIDAL® (Chlorhydric acid)
- Footbaths : Sodium hypochlorite or BAKIT ® (Benzalkonium chloride)
- Tanks : ARVOXY ® (hydrogen peroxyd) or SIDAL® (Chlorhydric acid)
- Little equipment : VIRKON ® (potassium persulfate)
- Clothing : none

## ➢ Antiseptics :

- Hygiene & antisepsy of operator : PROPALCO-SID ® (isopropyl alcohol)
- Antisepsy of animal : BAKIT ® (Benzalkonium chloride), external administration on shells.

# Future experiments :

## Testing pure ingredients and commercial products





(DMV)

➢ Knowledge of the micro-organisms involved in diseases occuring in hatchery-nursery

➢ Instruction for use of disinfectants and antiseptics according to indications

- Posology : very few accurate data (concentration, mode of administration, duration, rhythm of exposure, relation with environment parameters) ?

- Evaluation of their efficacy : AFNOR standards, which pathogen models could be used ?

- Possibility to use these chemicals (toxics) for other applications : to avoid escape of experimental products (gametes, eggs, larvae) ?

- Possibility to use antiseptics in balneation for curative purposes with enough safety for animals ?