
EVANS VANODINE DISINFECTION IN AQUACULTURE



FISH EGG AND EQUIPMENT DISINFECTION





100 YEARS



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INTRODUCTION

Aquaculture, the controlled process of cultivating aquatic organisms, especially for human consumption, and sometimes referred to as fish farming, accounts for 50% of all seafood consumption.

As in all food production, the prevention and control of disease is of paramount importance.

At all stages of production, from the hatchery to the processing plant, a cleaning and disinfection programme is required to maintain the health of the fish and to prevent the transmission of harmful microorganisms.

Iodophor disinfectants have been used in aquaculture for many years. In the 1970s, buffered iodophor disinfectants were developed; these were specifically formulated to halt vertical transmission of viruses, such as IPN, on the outer membranes of the eggs of salmonid species, without penetration or damage to the eggs.

Buffodine[®] was one of the first of this disinfectant type to be developed and patented. Since then, this class of product has been used worldwide for egg disinfection of salmonid and other marine species, including shellfish.

Buffodine[®] is currently the **ONLY Biocidal Product Regulation (BPR)** approved, iodine-based, fish egg disinfectant in Europe. Authorised biocide: UK-2019-1172.

Disinfection of equipment used in aquaculture is equally important. **FAM**[®] **30**, another BPR authorised biocidal product, is recommended for all hard surface disinfection in and around the hatchery, rearing and fattening facilities and transport.

Personal hygiene, in particular hand hygiene, is also important and should form part of any cleaning and disinfection programme.

Cleaning and disinfection should be a part of the Best Aquaculture Practice to ensure a safe and sustainable supply of fish to the consumer.

This guide details the procedures and products to be used at each step of production.



PRODUCTS

BUFFODINE®

Fish egg disinfectant



1L 5L

- Authorised biocide.
- Virucidal against VHS, IPN and ISA.
- For the disinfection of eyed salmonid eggs and newly stripped non-hardened eggs.
- Colour coded to indicate activity.
- Neutral pH, allows disinfection without harming eggs.

FAM® 30

Iodophor disinfectant; BPR Approved



5L 25L 200L

- Authorised biocide.
- Passes EN* 1656, EN 1657, EN 14349 and EN 14675.
- Bactericidal, virucidal and yeasticidal.
- Suitable for cleaning fish nets, holding tanks, buckets and crates in-between batches of egg disinfection.
- Used as a foot dip on entry to the hatchery.
- Extremely powerful and fast acting.
- Biodegradable and stable.

HANDSAN™

70% Alcohol-based hand disinfectant



5L 500ml

- Authorised biocide.
- Passes EN 1500, EN 13727 and EN 1276 with a 30 second contact time. Also passes EN 14476 against enveloped viruses with a 1 minute contact time.
- Bactericidal, virucidal and yeasticidal.
- Hand sanitiser with added moisturiser.
- Evaporates from hands without leaving a residue.
- Ideal for use where soap and water are not readily available.

TRIGON® PLUS

Bactericidal hand wash



5L 1L 500ml

- Proven bactericidal, unperfumed hand wash; will remove visible soiling and simultaneously kill a wide range of bacteria.
- Passes EN 1499, EN 13727 and EN 1276; proven to kill 99,999% of bacteria.
- Suitable for use when frequent hand washing is necessary.
- Ideal wherever hand hygiene is of the utmost importance.
- Contains extra moisturisers to leave hands soft and smooth.



BIOSECURITY AND EQUIPMENT

BIOSECURITY

OBSERVATION / INSPECTION / IDENTIFICATION

EGGS AND NEWLY HATCHED FISH ARE SUSCEPTIBLE TO MANY PATHOGENS AND A STRICT BIOSECURITY PROGRAMME SHOULD BE FOLLOWED AT ALL TIMES.

STAFF AND VISITORS

All personnel entering the hatchery should follow the procedures at all times. Hand washing and sanitising and changes of clothing and footwear should be made at each entry and exit of each biosecure area.

EQUIPMENT

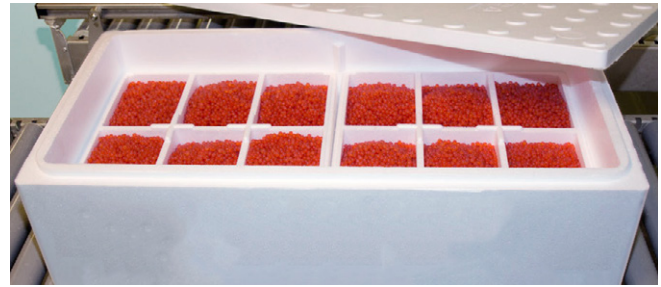
Each biosecure area should have its own dedicated equipment. If movement is essential, then a thorough cleaning and disinfection procedure should be carried out.

Each hatchery cycle provides a period of inactivity where equipment can be cleaned, repaired and disinfected. All equipment should be checked and any repairs or replacements carried out well before the arrival of new stock.

It is essential that the system has been cleaned, disinfected and re-filled with water. This must be run at operational flow rates for at least 3 days prior to receiving the next batch of eggs.

EGG RECEPTION

Regulations require that eggs are disinfected after fertilisation and before packaging. Boxes and eggs can be disinfected on arrival at the hatchery.



EQUIPMENT DISINFECTION

A STRICT DISINFECTION PROGRAMME SHOULD BE FOLLOWED AT ALL TIMES.

EQUIPMENT

Before disinfection, all equipment must be cleaned of soil or organic material. Transportation tanks represent one of the most likely sources of spreading an infectious disease to other fish farms. It is vitally important that these are disinfected with **FAM® 30** between each use.

Similarly, when fish are removed from a pond or tank, this should be drained and treated with a suitable solution of **FAM® 30** before a fresh batch of fish is introduced. This is to prevent an infection occurring in the introduced fish, which have been subjected to the stress of handling and may be susceptible to infection.

All equipment used within the hatchery, including nets, buckets, crates and holding tanks, should also be cleaned of soil and organic material and disinfected using a solution of **FAM® 30** between each use.

FOOT BATH

For disinfection of boots, all mud or visible soiling must be removed before using the foot dip bath. Either clean the boots with water then step into the foot dip bath containing a solution of **FAM® 30**, or use a pressure sprayer containing **FAM® 30** to both remove mud and apply disinfectant. After treatment, the boots should be left in a contamination-free site for at least 10 minutes before being used again.

VEHICLES

Iodophors may be used for disinfecting vehicles, which may otherwise bring infection onto a fish farm.

Ideally, a high-powered pressure washer containing a solution of **FAM® 30** should be used to clean and disinfect simultaneously. It must be remembered that truck beds will be contaminated by spilt water and therefore the whole vehicle, wheels, wheel arches, chassis and the truck bed will need to be treated thoroughly, if the disinfection is to be effective.

Run-off from the site of disinfection will contain contaminated solids, so a site should be selected where this run-off, and the disinfectant, itself will not be a pollution hazard.



EGG DISINFECTION

BUFFODINE®

A STRICT DISINFECTION PROCEDURE SHOULD BE FOLLOWED AT ALL TIMES WITHIN THE HATCHERY.



Appropriate personal protective equipment (PPE) must be worn at all times within the hatchery, including:

Overalls, apron, cap, gloves and boots

PPE should be changed at each entrance and exit of each biosecure area to avoid contamination.

FISH EGG DISINFECTION

Disinfection of salmonid eggs can be carried out using **BUFFODINE®**

BUFFODINE®

Is a patented iodophor containing iodine and surfactants, which when diluted with water slowly releases iodine.

BUFFODINE®

Is a fish farming disinfectant for the disinfection of eyed salmonid eggs and newly stripped non-hardened eggs.

BUFFODINE®

Is an iodine based product, which has a strong inactivation effect on the major fish viruses.

BUFFODINE®

Is the result of intensive research and has been specially formulated so that the pH of an in-use dilution is practically neutral, which ensures that disinfection occurs without harming the eggs.

The Centre for Environment, Fisheries and Aquaculture Science have shown that **BUFFODINE®** is effective against :

Haemorrhagic Septicaemia Virus (VHS)
Infectious Pancreatic Necrosis Virus (IPN)
Infectious Salmon Anaemia Virus (ISA)

and that there is a wide margin of safety in toxicity to eggs.

DISPOSAL

ALWAYS FOLLOW LOCAL RECYCLING GUIDELINES.

Two important points to remember when clearing up after disinfection with iodophors, particularly after disinfecting eggs:

- (i) Safe disposal or disinfection of containers.
- (ii) Safe disposal of disinfectant.

Any contaminated equipment e.g. containers, vehicles, clothing and boots, will need disinfecting before re-use.

Any container or item of clothing that you want to keep must be disinfected.

Before disinfection, all equipment, including nets, buckets, crates and holding tanks must be cleaned of soil or organic material and then disinfected using a solution of **FAM® 30**.

Contaminated packing materials should be disposed of safely.

It is also important to clean and disinfect hands after touching any contaminated material. They should be disinfected by washing with **TRIGON® PLUS** and sanitising with **HANDSAN™**.

Although **BUFFODINE®** is not toxic to ova, it is toxic to fish, even in low concentrations, and should not be used to treat hatching eggs or sac fry.

Care should be taken to avoid discharging **BUFFODINE®** solutions into ponds or streams. Egg washings should be poured into drains, where any remaining iodophor will be inactivated by organic matter.

STABILITY

Mixed solutions of **BUFFODINE®** should be used immediately.

It is recommended that new bottles of **BUFFODINE®** are obtained at the beginning of each season.

Any opened, unused **BUFFODINE®** from the previous season can be used for disinfecting equipment and tools. However, **FAM® 30** is a more suitable iodophor for this purpose.

The shelf life of **BUFFODINE®** is 18 months and **FAM® 30** is 3 years.



HOW TO USE

DISINFECTION PROCEDURE

NEWLY STRIPPED EGGS (GREEN EGGS):

1. Wash the milt from the fertilised eggs with a solution of 9 parts sodium chloride (edible quality salt) to 1,000 parts water (90 g per 10 litres) until the eggs are clean.
2. Dissolve 9 parts sodium chloride in 1,000 parts water and add 10 parts **BUFFODINE®** (90 g sodium chloride and 100 ml **BUFFODINE®** per 10 litres). Mix thoroughly.
3. Immerse eggs in the prepared solution of **BUFFODINE®** for a period of 10 minutes.
4. After the above treatment, the eggs must be washed gently four or five times in a solution of 9 parts sodium chloride to 1,000 parts water (90 g per 10 litres).
5. Place eggs in trays of clean fresh water.
6. Mixed solutions should be used only once. After use, dispose of unused product, packaging and any contaminated materials in accordance with local requirements.
7. Used product can be flushed to the municipal sewer, depending on local requirements. Avoid release to an individual waste water treatment plant.

TRANSPORTATION OF EGGS TO THE HATCHERY:

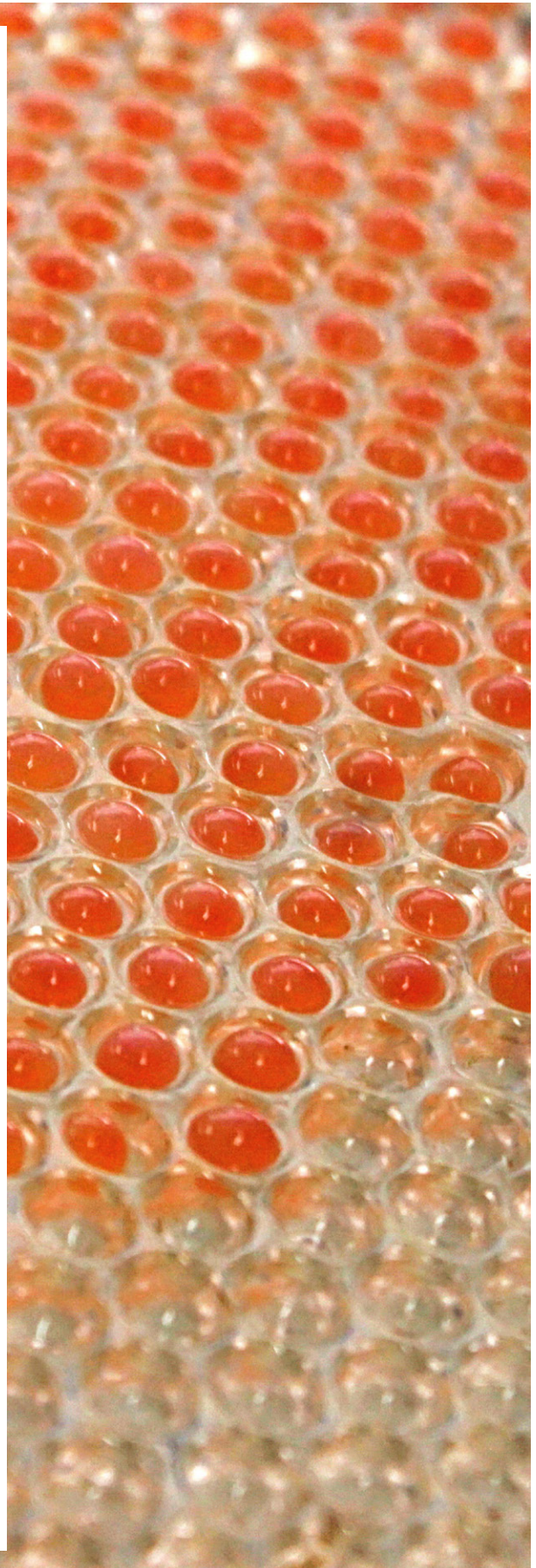
If eggs are received from a brood stock at another facility they must be disinfected immediately on arrival at the receiving fish hatchery. A disinfection procedure should be developed for each hatchery, dependant on layout and equipment.

1. Make up a solution of **BUFFODINE®** by dissolving 9 parts sodium chloride in 1,000 parts water and add 10 parts **BUFFODINE®** (90 g sodium chloride and 100 ml **BUFFODINE®** per 10 litres). Mix thoroughly.
2. The outer surfaces of the transportation boxes should be regarded as unclean. Wipe off the outside with the solution of **BUFFODINE®**.
3. Only disinfected, innermost boxes, which contain the eggs, should be taken into the hatchery.
4. Measure the temperature of the eggs so that water temperature during disinfection can be adjusted, preventing temperature shock to the eggs. Eggs are usually transported at a temperature of 2-5°C. Sudden exposure of eggs to temperatures of + or - 2°C may cause premature hatching.
5. Add the prepared solution of **BUFFODINE®** to the transportation boxes, or other suitable container, so that the eggs are fully immersed for a period of 10 minutes.
6. Flush the eggs gently after disinfection, four or five times, in a solution of 9 parts sodium chloride to 1,000 parts water (90 g per 10 litres), avoiding temperature shock.
7. Place eggs in trays of clean, fresh water.
8. Transfer into the hatching system.

EYED EGGS:

BUFFODINE® requires dilution before use.

1. Make a solution at a ratio of 1:100 (100 ml **BUFFODINE®** per 10 litres water).
2. Place eggs in solution for 10 minutes.
3. After treatment eggs must be washed gently four or five times in clean, fresh water and placed in trays.



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AUTHORISED BIOCIDES:

BUFFODINE®	UK-2019-1172
FAM® 30	UK-2019-1179-02
HANDSAN™	UK-2019-1195-0001

FAM® 30 is authorised under The Biocidal Products Regulation for specific uses at a dilution of 1:100.

In the UK, **FAM® 30** is approved by DEFRA under The Disease of Animals Act, for use in the event of a notifiable disease outbreak at the following dilutions:

Foot and Mouth order	1:550
Swine Vesicular order	1:100
Diseases of Poultry order	1:100
Tuberculosis order	1:20
General orders	1:49

