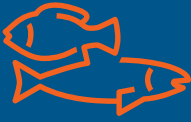


Vaccination Manual



The purpose of this manual is to provide general recommendations applicable before, during and after the vaccination of fish. The manual is based on many years' evaluations of vaccines and vaccination, and should be kept at locations where vaccination takes place.

Feel free to contact PHARMAQ if you have any questions regarding vaccination and vaccine selection.



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1. PRIOR TO VACCINATION

1A. TAKING DELIVERY OF VACCINE

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Temperature	2-8 °C	Vaccines must be kept cool during storage and transport
Vaccine type and number of doses	Correct vaccine and number of units received	On delivery of vaccine, always check that contents agree with the order
Appearance of vaccine on receipt and in use	Appears as a white, creamy liquid. Not separated (Photo 1)	Aqueous phase at bottom (Photo 2) or three colours/phases: MUST NOT BE USED Clear oil on top: May be used (Photos 3-4)
Shelf life	Check expiry date	Ensures the quality of the emulsion
Batch number	Check batch number printed on bag	Ensures traceability in manufacturer's system
Inspection form for delivery	Use a standard inspection form for delivery (Attachment A)	Be consistent. If in doubt, ask the vaccine manufacturer



Photo 1: Homogeneous and ready for use



Photo 2: Separated vaccine with brown aqueous phase at bottom **MUST NOT BE USED**



Photo 3: Normal appearance when stored upright



Photo 4: Lying in refrigerator. Must be shaken before use (oil on top)



Photo 5: Calibration using syringe and long 1 ml pipette



Photo 6: Calibration using 1 ml syringe

1B. PREPARATION FOR VACCINATION. VACCINE AND FISH

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Vaccine separation before use	Check that the vaccine is homogeneous and was kept at room temperature overnight	Shake the vaccine the day before and keep it at room temperature (Attachment A)
Bringing vaccine to room temperature	Ideally 15-20°C for manual vaccination. Not above normal room temperature or below 2°C	The vaccine is easier to work with at a temperature of 15-20°C. Easier to homogenise vaccine at 20°C than at 10°C
Homogeneous vaccine at start-up and in use	Well shaken	Non-homogeneous vaccine can cause differences in effects and side effects. Colder vaccine must be shaken for longer
Calibrated dose	Correct dose in each fish. Correct number of doses per vaccine bag	Calibrated with, for example, 1 ml syringe/pipette (Photos 5 and 6). Count the number of vaccinated fish per bag
Sorting and number of fish	Fish well sorted close to vaccination	Good sorting improves the speed and precision of injection
Health of fish	Best possible state of health with no disease	Inspection and assessment by the fish health service. Latent disease may break out after vaccination
Light control	Vaccination in winter season/darkness	Avoid vaccination during smoltification process
Withholding feed	At low temperatures, PHARMAQ recommends withholding feed for 12-15 degree days	At least 2 days withholding of feed for first-year fish. 2-4 days without feed is acceptable. Small fish at higher temperature: be observant of aggression or snapping. Varies depending on vessel size and time taken to empty vessels

1C. PREPARATION FOR VACCINATION: ENVIRONMENT AND EQUIPMENT

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Water temperature	2-15°C recommended. Avoid large temperature variations before, during and after vaccination	High water temperature increases the risk of side effects
Vaccinators	Well-trained personnel. See information about continuous quality control in Section 2g	Requisition adequate personnel in plenty of time. Telephone for confirmation as the date approaches. Confirm fish size to ensure that needle size does not present problems
Communication with hired vaccinators	Ensure that the hired vaccination team are familiar with the vaccine dose to be used so that they bring the correct equipment	Vaccination equipment (e.g. pistols) may vary somewhat, depending on whether the dose is 0.05 ml (micro-dose) or 1.0 ml
Machine	One person must bear over-all responsibility	Overhauled, with spare parts and enough needles. Personnel should not carry out other tasks while handling machine
Other equipment	Pumps, tubing, sieves, vessels, etc. shall be overhauled, clean and disinfected, and also free of sharp edges	Careful handling reduces the risk of mucus and scale loss during the vaccination process

1D. PREPARATION FOR VACCINATION – PERSONNEL AND HEALTH

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Employees' familiarity with safety procedures. The facility should have a person responsible for HSE	Personnel shall be familiar with the location of safety data sheets (for anaesthetic and vaccine), and be familiar with procedures in the event of self-injection	See Attachment B: Advice in the event of unintentional self-injection. Following self-injection: Quick assessment and any treatment is critical
Injection team safety procedures	The injection team shall have practised safety procedures	An EpiPen (Photo 7) is not always available). In that case, access to a doctor is essential
Notifying the local doctor's surgery	Clearly displayed poster stating the telephone number and location of the doctor's surgery	The local surgery staff know how to deal with self-injection cases

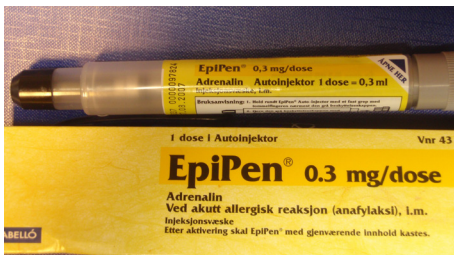


Photo 7: An example of an adrenalin auto-injector used in cases of anaphylactic shock

1E. HYGIENE

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Clean equipment	Equipment which may come into direct or indirect contact with fish shall be clean and sterile	Vaccination equipment moved between facilities presents a special risk
Clean receiving vessel	The receiving vessel should be washed (steamed) before vaccinated fish are put in it	Minimises the risk of transmission of infection from plankton. Ensures good water quality

1F. SORTING

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Sort first-year fish	Sort fish as close to vaccination time as possible	May be sorted in connection with vaccination, with the smallest sorted class being returned for later vaccination
Sort one-year fish	Sort immediately before vaccination	Uniform size of fish during vaccination makes the job easier

2. VACCINATION

2A. ANAESTHETISATION

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Time in anaesthetic	40-50 seconds	Shorter time may cause fish to be more agitated on the table. Longer time increases risk of overdose and CO ₂ poisoning
Anaesthetisation	Fish shall lose consciousness as a result of anaesthetic, not because of lack of oxygen	Low oxygen content stresses fish and results in longer recovery time. Ethically irresponsible. Monitor oxygen level
Type of anaesthetic	Fresh water: Tricaine PHARMAQ must be buffered with equal amount of sodium bicarbonate	Be particularly careful at high temperatures
Type of anaesthetic	Benzocaine (proprietary name Benzoak Vet)	Be particularly careful at high temperatures
Changing anaesthetic	After 3000-5000 fish (per 100 litres)	Avoid contamination with mucus and faeces. Change more frequently if the anaesthetic effect declines rapidly
Time on the vaccination table	Do not let fish lie for more than 3 minutes or be directly exposed to drying out and/or sunlight	At low temperatures fish may be on table for up to 3 minutes. At higher temperature no more than 2 minutes
Recovery in vessel after vaccination	About 60 to 90 seconds after leaving the table	Check that fish recover in reasonable time after vaccination (Photo 8)
Manual anaesthetising, netting	Use knot-free, wide and shallow net	In a deep net, the lowest fish may be injured by weight of fish above (Photo 9)

2B. NEEDLE LENGTHS AND DIAMETERS

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Needle length	The entire bevel of the needle must penetrate 1 mm into the peritoneum of the largest fish	Ensure that deposition is in the abdominal cavity in the entire group. See photo 10
Poor condition	Consider using shorter needle	Reduces risk of injection into intestine
Low vaccine temperature	Increase needle diameter or raise vaccine to room temperature	Easier injection. Cold vaccine is more viscous during injection and may cause uneven dosing because of incomplete filling of vaccine chamber



Photo 8: Inspection sheet for recovery. Large vessel

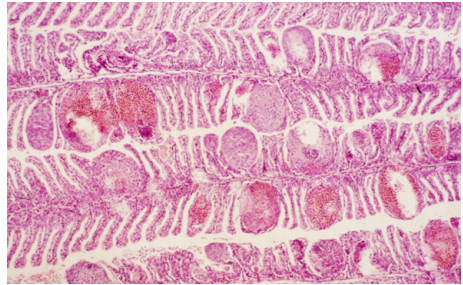


Photo 9: Histological section of gills with bulging secondary lamellae caused by subjection to pressure in net
Photo T. Poppe



Photo 10: Correct, with entire bevel inside the peritoneum before deposition

THE FOLLOWING TABLE PROVIDES GENERAL GUIDELINES FOR THE SELECTION OF ALPHA JECT® VACCINES FOR USE ON SALMON

MANUAL VACCINATION

Needle size (mm)	FISH SIZE, GRAMS		
	Lower limit	Recommended	Upper limit
3 × 0,7	20	25-35	35
4 × 0,7	30	35-45	50
4.5 × 0,7	35	40-60	70
5 × 0,7	40	45-80	90
6 × 0,7	60	70-100	110
8 × 0,7	100	110+	200

MACHINE VACCINATION (LUMIC)

Needle size (mm)	NORMAL PRACTICE	FISH SIZE, GRAMS	
	Needle size (mm)	Recommended	Large
	8 × 0,7	25-50	50
	9 × 0,7	50-70	70
10 × 0,7		<40	
	10 × 0,7	70-100	100
12 × 0,7		40-70	
	12 × 0,7	>90	
13 × 0,7		70-110	
	13 × 0,7		
15 × 0,7		>110	
NFT	15 × 0,7	for all sizes	

When using values in the "Normal practice" column, particular care is recommended in checking for injection in the belly flap. If this happens, a longer needle is recommended.

2C. INJECTION SITE AND INJECTION TECHNIQUE (PHOTOS 11 TO 22)

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Anaesthetised fish	All fish must be docile on the table	Agitated fish result in incorrect injection and increased risk of self-injection
Tempo	Shall not compromise quality	
Injection angle	As near perpendicular as possible using manual or pneumatic pistol. No lateral movement	Minimises damage to tissue. Recommended needle length is based on perpendicular injection
Injection site	3/4 of length of ventral fin in front of ventral fin base, maximum 10 mm forward, along the centre line	Minimises the risk of tissue damage. See PHARMAQ's poster for recommended injection site (Attachment C)
Pressure on the fish	The needle shall slide in easily	Blunt needle may cause laceration and tissue damage
Pneumatic pistol pressure	Recommended 3 bar when using ALPHA JECT vaccines at 10-15°C	Excessive pressure may result in more deposition dorsally and vaccine entering organs. Too low pressure may result in insufficient dose and deposition in the injection channel
Deposition	The entire dose shall be deposited in the abdominal cavity before the needle is withdrawn	
Needle guard	Shall be used	Reduces risk of self-injection and controls fish for better injection
Vaccine deposition	In injection area, beneath rear part of pyloric caeca	Deposition in the pyloric caeca or far forward indicates incorrect injection or too long needle



Photo 11:
Correct vaccination,
using guard, good glo-
ves, good grip, low pres-
sure on abdomen (easy
needle penetration)



Photo 12:
Faulty vaccination, with
excessive pressure on
fish and too tight guard

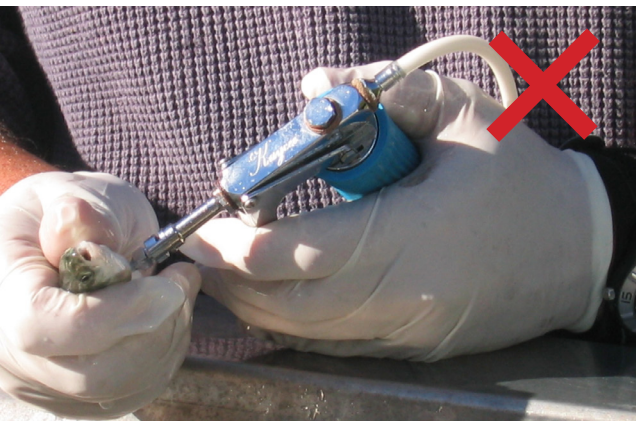


Photo 13:
Hazardous vaccination
of small fish, without
guard and with smooth
gloves

Photo 14



Photo 15



Photo 14 and 15: Two different injections. Both penetrate neatly, but Photo 15 shows laceration of the peritoneum of the individual on the right, caused by lateral movement during injection or withdrawal and/or blunt needle

Photo 16

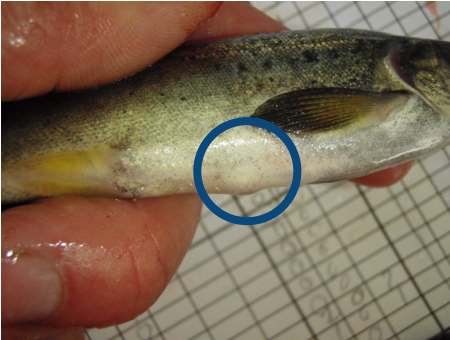


Photo 17

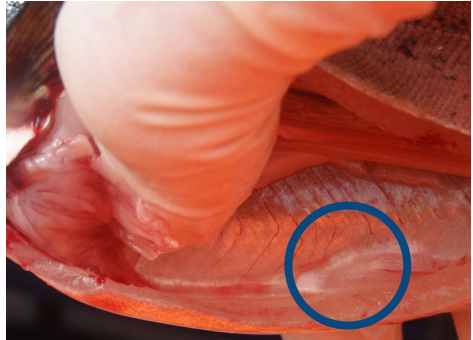


Photo 16 and 17: : Deposition in muscle (swelling) caused by incorrect injection angle (may be caused by short or blunt needle, deposition during insertion or withdrawal or movement of fish)



Photo 18:
3 months after
vaccination with
injection into
cartilage and deposition
in muscle



Photo 19:
Tearing of injection
channel caused by
blunt needle or lateral
movement of needle
while inserted in fish

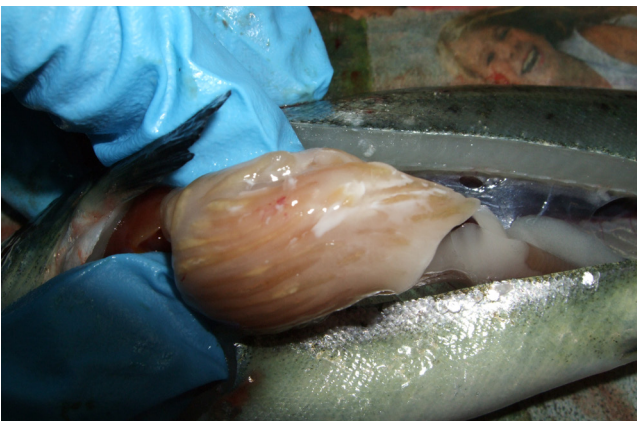


Photo 20:
Deep injection with
bleeding and deposition
in pyloric caeca

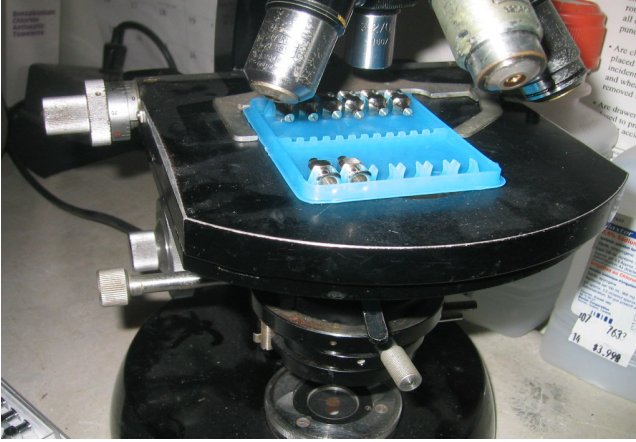


Photo 21:
Inspection of new needles using microscope or magnifying glass. Even new needles may be faulty



Photo 22:
New needle from box, not good enough

2D. CHANGING NEEDLES AND VACCINE BAGS

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Homogenisation of vaccine	2 minutes' shaking and squeezing of bag	Homogeneous vaccine is essential for optimal protection of entire fish group
Tubing and tubing attachment	Use sterile tubing. No leaks. The same tubing shall never be used for more than one day	
Storage and re-use of used bags	Opened bags should be used within 12 hours	If the vaccine separates in the tubing during storage, this phase must be ejected before vaccination resumes (Photo 23)
Air bubbles in vaccination equipment	Shall not occur and must be removed	Air bubbles may cause incorrect dosage
Replacing needles	When a needle becomes blunt or damaged, normally after 2000-3000 fish, or if it causes lacerations or wounding	Take special care when using a machine and vaccinating fish with large size variation
Removing scales from needle	Remove scales frequently so that needle length is not affected	Use fingers or a tool which does not cause scraping or damage to the needle

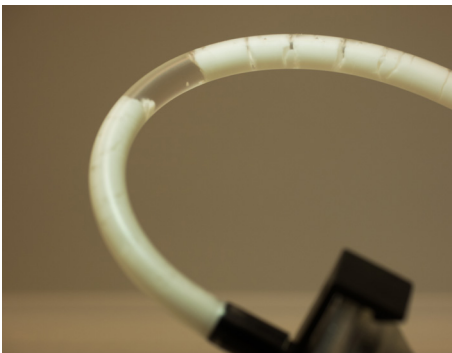


Photo 23: Tubing stored overnight may look like this. MUST NOT BE USED



Photo 24: Duo adapter allows one bag to be used by more than one user

2E. FISH WELFARE

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Destruction of selected fish	Destroy fish using old, previously used anaesthetic	Destruction with minimum suffering is important, and is required by law
Handling fish	Fish shall be handled with care. General minimisation of distress to fish	Fish are subject to considerable stress during vaccination and are out of their element

2F. HYGIENE

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Clean needle	Replace or sterilise needles frequently if in doubt	Reduces contamination risk (Photo 25)
Washing and disinfecting gloves	At breaks and after handling sick or injured fish	Avoid increasing contamination risk
Washing and disinfection of surfaces	After handling fish with injuries and at breaks	Avoid increasing contamination risk (Photo 26)



Photo 25: Sterilisation of needle using sponge and 70% alcohol

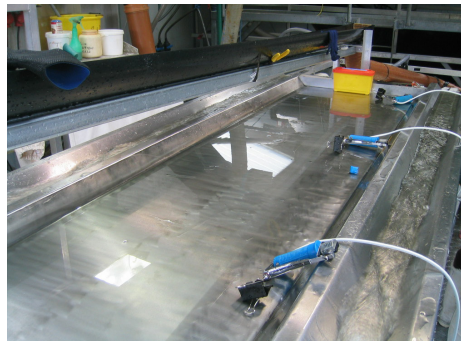


Photo 26: Example of good organisation. Wet table is easy to keep clean

2G. CONTINUOUS QUALITY CONTROL (PHOTOS 27-30)

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Internal inspection	<p>Should be carried out in addition to any external vaccinators inspection</p> <p>Entire size class shall be checked, especially at start</p>	<p>The same persons should always carry out this task.</p> <p>Most frequent monitoring at the start will improve the result.</p> <p>Both external injection site and internal deposition shall be inspected. Good documentation is proof of the value of the treated fish</p>

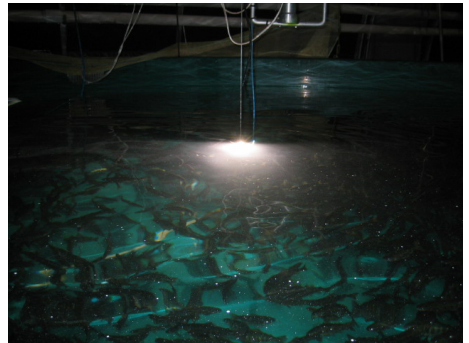


Photo 27 and 28: Part of quality control. Evaluation of vaccine at surface after vaccination: large amount (Photo 27) and moderate (Photo 28)

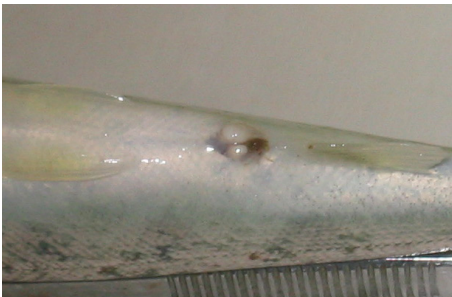


Photo 29: Quality control and evaluation after vaccination. Vaccine leakage through abdominal pore, common when injecting smaller fish at high temperature



Photo 30: Quality control and evaluation after vaccination. Inflammatory reaction in anal region after vaccination.

3. AFTER VACCINATION

3A. HYGIENE AND DISINFECTION

IMPORTANT CONSIDERATIONS	REQUIREMENT/ RECOMMENDATION	EXPLANATION
Disinfecting and washing equipment	<p>Regular washing and disinfection of vaccination units.</p> <p>Regular washing and disinfection of vaccination table and anaesthetising bath</p>	<p>Soapy water followed by disinfection.</p> <p>Water and scrubbing brush followed by disinfectant</p>
Opened vaccine bag	Shall be used within 12 hours	Storage increases contamination risk. Use branch or Y-connector to empty the bags. Get one delivered if necessary
Maintenance of machines	Cleaning, lubrication, inspection and tightening	

3B. MORTALITY, BEHAVIOUR, APPETITE AND ENVIRONMENT

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Mortality	Normally minimal, less than 0.5%	
Behaviour	Some anomalies can be expected. Agitation most common at high temperatures	Normally some reduction in shoaling. Some darting and jumping for a week, depending on temperature
Appetite	Depends on temperature, size, vaccine type, smolt status and environment	Full appetite normally returns after approx. 1 week at 15°C, 2-3 weeks at 5°C. May be particularly docile at falling temperatures
Yellow/white strings in the water (Photo 32)	May vary somewhat, and should be minimal	Injection in the intestine, or of fish which have not eaten for a period (Photos 31 and 32)
Vaccine at surface	May vary somewhat, and should be minimal	Often more noticeable in connection with vaccination of smaller fish and poor injection technique. Leakage from injection passage or perianal pore, or contamination originating from vaccinating table. Supplying water over the surface quickly breaks this down
Avoid stress	Fish should not be stressed in the first week after vaccination	This applies to temperature, salinity, light and handling



Photo 31: Injection in intestine



Photo 32: Mucous membrane secretion from intestines (yellowish and grey), with vaccine (white/palest). Vaccine was injected into intestine and excreted

**Photo 33:**

Casting, intestine content containing vaccine injected into intestine. Close-up using magnifying glass

3C. FEEDING AFTER VACCINATION

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
When to commence feeding	Never commence feeding until at least a couple of days after vaccination (depends somewhat on temperature)	Transport of content through intestine ceases 1-2 days after vaccination. If fish are fed before this or not starved sufficiently before vaccination, intestinal content may be retained and ferment, resulting in inflammation of the intestinal wall. This may cause prolonged diarrhoea and digestive problems
Feeding resumed	Practically all fish have resumed feeding	A few individuals can be expected to become emaciated and die after vaccination





3D. FOLLOW-UP EXAMINATION

IMPORTANT CONSIDERATIONS	REQUIREMENT/RECOMMENDATION	EXPLANATION
Vaccination inspection before releasing	At least 20 fish should be inspected internally for vaccine absorption and residue, as well as side effects. At least 100 fish should be inspected externally at the injection site	Small amounts of residue indicate good absorption of vaccine
Monitoring in the sea	Vaccination evaluation during the second quarter after release (30 fish). Evaluation of vaccine side-effects in connection with slaughtering	

4. ATTACHMENTS

A. DELIVERY INSPECTION OF VACCINE



Control of vaccine received			
Date received		Type of vaccine	
Time in transit		Batch no.	
Method of delivery		Use by date	
		Amount (liters)	
Freeze indicators / temperature logger	Number of loggers:	OK? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Comment		
<p>Possible vaccine separation</p> <p>The vaccine bags may be visually inspected while lying flat (e. g. in a refrigerator). Avoid shaking the bags before they are checked for possible watery layer in the bottom of the bag.</p> <p>A brown layer in the bottom of the bag (fig. 4), indicates that the vaccine emulsion has separated. This vaccine SHALL NOT BE USED. It is normal to find an upper layer of oil in the vaccine bag before it is shaken and does not indicate a problem (fig. 2 and 3). If you have doubts, please contact PHARMAQ or your veterinarian immediately.</p>		<p>Check vaccine as follows. If the vaccine is received immediately prior to vaccination perform only one check.</p> <p>1. Check on arrival: Check 10 % of the bags, but not more than 10 bags. Visually inspect for separation or change of color in the bottom of the bag.</p> <p>2. Main check 2 - 3 days before start: As in point 1. Note: The vaccine must be shaken thoroughly right before use until oil is mixed into the emulsion (fig. 1).</p>	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Figure 1 Homogenous vaccine</p> </div> <div style="text-align: center;">  <p>Figure 2 Upper oily layer is normal during storage</p> </div> <div style="text-align: center;">  <p>Figure 3 Separated vaccine</p> </div> <div style="text-align: center;">  <p>Figure 4 Separated vaccine</p> </div> </div>			
Number of bags checked:		OK? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Sign.
Number of bags checked before use:		OK? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Sign.
<p>Comment</p> <p>If vaccine received is not as ordered, if indicators or loggers show that the vaccine may have frozen, or if the method above indicates vaccine separation do NOT use the vaccine. Contact your prescription veterinarian and site manager immediately. Set the vaccine in quarantine in a refrigerator until the vaccine has been inspected. If the vaccine is declared OK, store refrigerated (2 - 8°C) until it is to be used. Ensure that there is sufficient room for air circulation, and that vaccine bags are not in direct contact with refrigeration panels.</p>			

B. UNINTENTIONAL SELF-INJECTION OF FISH VACCINE

Advice in the event of accidental self-injection with fish vaccine

Preventive safety measures

It is important that personnel carrying out the vaccination of farmed fish follow the recommended safety measures which have been designed in order to prevent or, at least, minimise the risk of accidental self-injection. These measures include the following:

- Provide personnel with effective training in vaccination technique and first aid as well as an introduction to the procedure which must be followed in the event of accidental self-injection.
- Use a well-fitting needle-guard on the syringe in order to protect the fingers and hand from the needle point.
- Use appropriate gloves to ensure a good grip on the fish.
- Take regular breaks and ensure a comfortable working position and good lighting. Make sure the rate at which vaccination is carried out does not affect quality and safety.
- It is extremely important to ensure that the fish are properly anaesthetised. Most accidental self-injections occur when fish wriggle.
- Notify the local doctor prior to the commencement of vaccination.
- Woman in pregnancy should not administer products containing fish vaccine.
- Make sure that first aid equipment is at hand.
- During machine vaccination operations it is important to comply with the manufacturer's warnings regarding the risks of self-injection. You must never attempt to approach or interfere with the needle path while the machine is in operation.

PHARMAQ's advice in the event of accidental self-injection

To the vaccinator

If you have been accidentally injected with fish vaccine, seek the assistance of a doctor immediately, even if the injected amount is small. Take the printed information from the vaccine package with you to the doctor. If pain persists for more than 12 hours after medical examination, you must consult the doctor again.

Accidental injection of fish vaccine into the human body can lead to severe pain and swelling, especially if the preparation is injected into a joint or a finger. In rare cases, the loss of an affected finger may result if treatment is not commenced immediately.

Self-injection may result in sensitisation to fish vaccine such that any subsequent self injection may produce an allergic reaction leading to anaphylactic shock. This could be life-threatening without rapid and proper treatment.

To the doctor

The introduction of even a small amount of a fish vaccine product into a person can result in pronounced swelling which may result in ischaemic necrosis at the injection site or even the loss of an affected finger.

The site of injection must IMMEDIATELY be examined by a surgically competent person, and if necessary, incision and irrigation of the affected area must be performed, especially when ligaments or soft finger tissue are involved. However this type of intervention should only be undertaken if the risks associated with it outweigh those of injection.

Repeated self-injection may reinforce the reaction thereby elevating the risk of anaphylactic shock.

PHARMAQ
part of zoetis



Contact information

General practitioner:
Local casualty clinic:
Emergency telephone:

For further information about PHARMAQ's pharmaceutical products, contact:

PHARMAQ AS
P.O. Box 267 Skøyen
N-2213 Oslo
Norway
Telephone: +47 23 29 85 33
E-mail: customer.service@pharmaq.no

PHARMAQ shall be notified in the event of the unintended self-injection of PHARMAQ's products. Håkon Lasse Leira, who is Chief Physician at the Department of Occupational Health at St Olavs Hospital in Trondheim, Norway, also wishes to be informed.

www.pharmaq.com 

Procedure for the vaccinator and doctor in the event of self-vaccination of fish vaccine.

General remarks

Modern fish vaccines contain formalin-inactivated bacterial and/or viral antigens, as well as adjuvants. The standard dose is 0.05-0.1 ml, or in some cases, 0.2 ml. The injection is made into the abdominal cavity of the fish, either manually or by machine. Almost 450 million vaccinations of fish were carried out in Norway in 2011, approximately half manually and half by machine.

In the event that the entire dose is injected accidentally into the vaccinator's finger, the injury may become serious if the finger is not treated properly. The injured operator must be taken urgently to hospital for surgical treatment within the space of a few hours.

In the past it was recommended that vaccinators should have access to adrenalin as a contingency in the event of anaphylactic shock. However, the risk of shock must be extremely small since in over 20 years no incidence has been reported. Today, this contingency is best provided for by the regular health services. It is recommended that the municipal health services are notified when vaccination operations commence and of the health risks associated with this procedure. A copy of this advisory leaflet can be provided to the local health care centre.

Personnel assigned to carry out vaccinations must have thorough training prior to starting work. They must be familiar with safety procedures and the measures to be taken in the event of self-vaccination.

It is the responsibility of the Operations Manager, to prepare a contingency plan which includes notification of the local health services prior to the commencement of vaccination operations.

Information for the vaccinator

There is a theoretical risk of anaphylactic shock following self-injection. In such cases the symptoms will become apparent a few minutes after injection. In addition to these local symptoms, the person will feel unwell, and may experience itches of the skin or around the eyes or mouth. At the same time he or she may feel warm, and a bright red rash may develop. This is often followed by heart palpitations, anxiety and pronounced listlessness. Irritation of the stomach and intestinal canal may give rise to stomach pains, nausea and vomiting. In especially serious cases, a person may experience difficulties in breathing, become confused and lose consciousness. Involuntary urinary or fecal incontinence may occur.

If shock is suspected, he or she must be taken to a casualty clinic or hospital as soon as possible. Call the local emergency services immediately and notify them that you have a patient who may be of risk of undergoing anaphylaxis following unintended vaccination. Every minute counts!

Machine vaccination

In the event of self-injection, most if not all of the dose will be injected into a finger. The injury should be examined by a surgeon within a few hours. As well as the reaction associated with the finger (pain, swelling, discoloration), swelling may also develop further up the arm, accompanied by listlessness, dizziness and a high temperature. If the finger receives the proper treatment, these symptoms will normally pass in due course.

Antibiotics (penicillin or similar), anti-inflammatory drugs or paracetamol are not sufficient! If the finger is not treated by a surgeon in time, the reaction may be so severe as to require amputation.

NB! Never use your fingers to remove fish from the vaccination machine. Use sausage tongs or something similar!

Manual vaccination

If the syringe lip only scrapes the skin, this will result only in local inflammation, and will require no treatment other than painkillers, if required. However, if the vaccinator becomes listless, or experiences nausea or a high temperature, it is likely that a larger proportion of the dose has been injected. In such cases he or she should seek medical advice if the symptoms continue for more than six hours.

If the entire dose has been injected into the finger, the injury must be examined by a surgeon, as described for machine vaccination.

Information for doctors

Modern injected fish vaccines contain formalin-inactivated bacterial and/or viral antigens, as well as a variety of oils used as adjuvants, such as mineral oils. The standard dose is 0.05-0.1 ml. The injection is made into the abdominal cavity of the fish, either manually or by machine. In the event of self-injection, most if not all of the dose will be injected into the vaccinator's finger.

In the event of self-injection with fish vaccine, there is a theoretical risk of anaphylactic shock which, if it occurs, will require immediate treatment according to standard guidelines.

Any suspected cases of anaphylaxis must be fully investigated and reported afterwards.

In cases of self-injection in which some or the entire dose has been injected, it is the concentration of mineral oil which is the critical factor. Oils used as adjuvants in fish vaccines contain powerful tissue toxins and without surgical intervention (incision and irrigation, etc.) may result in necrosis and subsequent amputation. For this reason it is important that all cases of vaccine self-injection are urgently examined by an experienced surgeon.

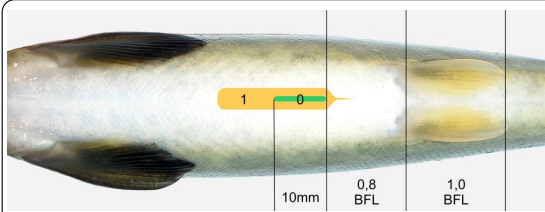
In addition to the local reaction at the site of injection, the vaccinator may also experience local pain and oedema, lymphangitis and lymphadenitis of the arm, accompanied by nausea, vomiting and a high temperature. Antibiotics and anti-inflammatory drugs are insufficient as exclusive treatments in such cases. The finger must be examined by a surgeon! An anti-tetanus injection is not required.

Trondheim, 14 May 2012

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C. RECOMMENDED INJECTION SITE

Recommended injection point



From the front of the pelvic fin cartilage (ca. 80% pelvic fin length) and maximum 10 mm forward along the pelvic fin base

- Pelvic fin cartilage is longer in Rainbow trout than in salmon

Injection in front of the posterior end of the pectoral fin should be avoided on smaller fish (<45 grams)

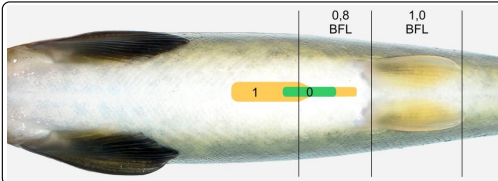
- Retardation of growth and increased adhesions in front of end of abdominal cavity has been observed from injection into pyloric caeca.

Optimal injection area:

From the front of the pelvic fin cartilage and 10 mm forward along the mid line

Acceptable side deviation

Injection point should be closer to the mid line than the belly edge line.



Injection with Lumic machine

At vaccination with a Lumic machine with a side angled injection, place the injection point further to the back. See figure on the left side.

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