

Vaccination Manual

The purpose of this manual is to give general recommendations for vaccination of tilapia, including preparations and follow-up. The manual is the product of many years of evaluating vaccines and vaccination. However, this is a project under continuous development, and any feedback is much appreciated.

Please contact PHARMAQ if you have any questions regarding vaccination and choice of vaccine.



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1. GETTING READY

1A. RECEIVING VACCINE

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Temperature	Maintain between 2-8 °C (see picture 1)	Vaccines must be stored and transported at temperatures between 2 and 8°C
Type of vaccine and number of doses	Check if received vaccine type and amount is correct	Always check if vaccine received is as ordered
Appearance of vaccine	A white creamy liquid without separation (see picture 2)	DO NOT USE IF: There is a watery layer in the bottom of the container or clear water droplets in the vaccine (see picture 4), or the vaccine is separated into 3 distinct layers Can be used: There is a layer of clear oil on top (see pictures 3)
Use by	Check use by date	Ensure quality of emulsion
Batch number	Check batch no. on bag	Ensure traceability
Control form for vaccine reception	Use a standard form to document vaccine received. This is for internal use and is optional (see Supplement A)	Ask the vaccine producer for advice if needed

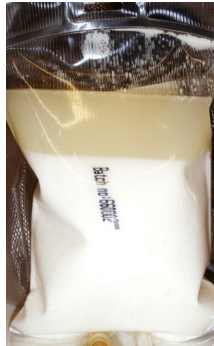


Picture 1: Always store the vaccine in a cooler between 2-8 °C

Picture 2



Picture 3



Picture 4



Picture 2 and 3: Normal appearance of vaccine. Picture 2: Homogeneous. Picture 3: Oily layer on top, must be shaken before use. Picture 4: Separated vaccine with clear water droplets - DO NOT USE

1B. PREPARATION: VACCINE AND FISH

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Vaccine separation prior to use	Check that the vaccine stays homogeneous at room temperature over night	Mix the vaccine by shaking prior to use (see supplement A)
Vaccine temperature	20-25 °C is ideal for injection. Protect the vaccine from high temperature and direct light (see picture 5 and 6)	The vaccine is easier to work with and easier to homogenize at 20 °C

1B. PREPARATION: VACCINE AND FISH - CONTINUATION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Grading	Grade fish shortly before vaccination	Well graded fish increase speed and accuracy of injection
Fish size	Minimum 15 grams average size	
Fish health	Fish should have best possible health	Have fish checked by fish health services. Vaccination may trigger outbreaks of latent diseases. Fish that appear abnormal or unhealthy should not be vaccinated
Starving	PHARMAQ recommends to stop feeding the fish 24 hours prior to vaccination	The need to withhold feed will vary between installations and at different temperatures. Distended stomachs and/or intestines may lead to injection into the digestive system. The fish should not be starved so long that they become aggressive and that welfare is affected

Picture 5



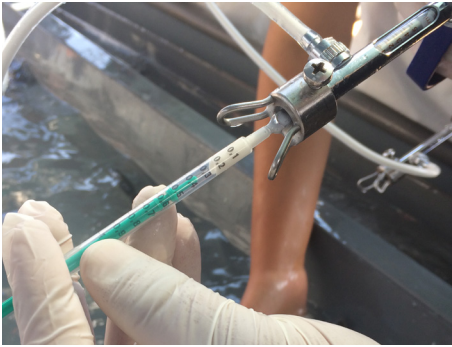
Picture 6



Picture 5 and 6: Vaccine at the site: protect from high temperature and direct light.
 Picture 5; vaccine is not adequately protected

1C. PREPARATIONS: ENVIRONMENT AND EQUIPMENT

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Water temperature	Avoid very high temperatures (>28°C) and major variations in temperature prior to, during and after vaccination	Causes stress to the fish
Vaccination personnel	Use well trained personnel. See section 2g: Quality control	Ensure that sufficient personnel are available
Vaccine dosage	<p>Make sure that the recommended dose is injected.</p> <p>Ensure that hired vaccination team is aware of what dosage is to be used, and that suitable equipment is available</p> <p>Calibrate the syringe before use (see picture 7)</p>	<p>Reduction in dose volume will affect efficacy</p> <p>Different dosage volumes may require different injection devices (see picture 8)</p> <p>To ensure correct dose to the fish</p>
Vaccination machines	The machine should be prepared, operated and continuously monitored by a trained technician	Inappropriate overhauled machine can cause incorrect vaccination
Other equipment	Pumps, hoses, vaccination table, pistols etc. should be well maintained, clean, disinfected and free of surfaces and edges that can harm fish (see picture 9)	Optimal equipment and handling reduces risk of fish injury



Picture 7: Calibration with 1 ml syringe



Picture 9: Vaccination table ready for vaccination



Picture 8: Examples of vaccination pistols used for vaccination

1D. PREPARATIONS: PERSONNEL AND HEALTH

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
<p>Knowledge of safety procedures</p>	<p>Personnel should know where to find product information for both anaesthesia and vaccine, and know safety procedures in case of self-injection</p>	<p>See supplement B: Advice regarding unintentional self-injection</p> <p>In case of self-injection: Rapid response is of the utmost importance</p>

1D. PREPARATIONS: PERSONNEL AND HEALTH - CONTINUATION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Safety procedures and the vaccination team	Any vaccination team should be trained in vaccination procedures It is obligatory for the vaccinator to use the optimal equipment for protection of hands and fingers	If the teams are not equipped with adrenalin auto-injectors a physician should be readily available (see picture 10) Gloves, protection of fingers, vaccination guard for the injectors
Notification of local physician/ medical centre	Location and telephone number of nearest physician should be readily available (e. g. posted on notice board)	Contact physician in any cases involving self-injection. Bring the brochure «Advice regarding unintentional self-injection» to the physician



Picture 10: Adrenalin auto-injector for use in case of anaphylactic shock

1E. HYGIENE

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Clean equipment	Any equipment that can come in contact with the fish, directly or indirectly, must be clean and disinfected	Equipment that is transported from site to site represents a risk of transferring infectious material

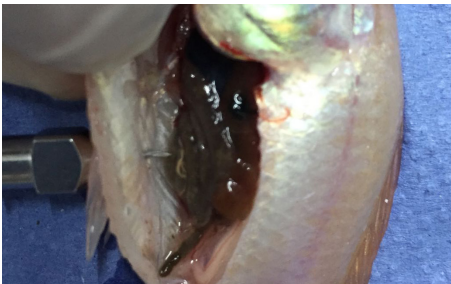
1E. GRADING

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Grading	Grade prior to vaccination if possible	Homogenous fish size will simplify choice of correct needle length

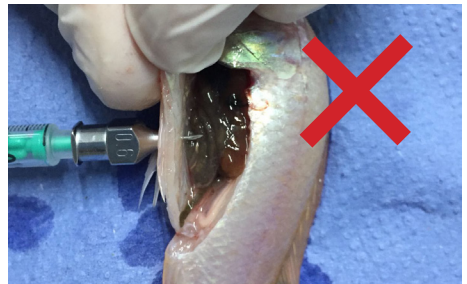
2. VACCINATION

2A. PREPARATION OF VACCINE AND INJECTION DEVICE

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Keeping the vaccine homogeneous during use	Shake well before use	Non-homogeneous vaccine can vary in effect and side-effects. Vaccines need to be shaken longer if cold
Calibration	The injection device must be calibrated prior to injection, and the dose volume should be checked regularly during use	To ensure correct dose in each fish Calibrate with 1 ml syringe (see picture 7). It is recommended to record the number of fish injected per vaccine container use
Needle length	The whole bevel must be 1 mm within the peritoneum on the largest fish (see picture 11 and 12)	Ensure that the vaccine is deposited within the peritoneal cavity on all fish
Fish size	Determine the length of the needle according to the size of the fish, thickness of the abdominal wall and the injection point	Avoid injection into muscle or internal organs



Picture 11: Correct needle length, with the whole bevel within the peritoneum



Picture 12: Long needle may give damage to internal organs

2B. SEDATION AND ANAESTHETIZATION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Type of anaesthetic	Products approved for fish must be used	Read package insert before use. Be especially attentive at high water temperatures Always monitor the reaction of the fish to the anaesthetic
Capture of fish	Gather the fish using a wide bottom and knotless dip-net (see picture 13). Assure correct level of O ₂ . Exposure to sedation should be as short as possible (see picture 14) Net a suitable number of fish using a wide bottom and knotless dip-net or a perforated bucket. Transfer the fish to the transport tank or directly into an aerated anaesthetic solution (see picture 15 and 16)	Gentle and effective handling of fish reduces the risk of stress and injury
Exposure to anaesthetic bath	Transfer an adequate number of fish to the anaesthetic bath lasting 40-120 seconds	Shorter period results in poor anaesthesia. A longer period increases risk of overdose and CO ₂ poisoning
Changing anaesthetic solution	According to manufacturer's recommendation	The anaesthetic bath should be clean. Change more frequently if effect is reduced
Time on vaccination table	Anaesthetize suitable numbers of fish and do not let fish lie longer than 3 minutes on the table. Avoid direct sunlight	Make sure the fish is anaesthetized during vaccination
Recovery in pond/cage after vaccination	Within 3 minutes	Monitor that the fish wake up within normal time after vaccination

2B. SEDATION AND ANAESTHETIZATION - CONTINUATION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Nets	Use a wide bottom and knot-less dip-net	Catching too many fish into the net may cause injury
Pumps	Use of pumps for transfer of fish is recommended	This reduces stress to the fish. Always check the flow of fish and never leave fish for prolonged times in the pipes



Picture 13: The fish are collected from the tank/pond by using a net. Picture 14: Avoid to transport too many fish at the same time



Picture 15 and 16: Do not catch and anaesthetize too many fish at the time (as seen in picture 16). Make sure the fish are fully anaesthetized before they are put onto the vaccination table

2C. INJECTION METHOD AND POINT OF INJECTION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Anaesthetized fish	All fish should be completely still on the table	Fish which are awake are often incorrectly injected, and may increase the risk of self-injection. Do not put anaesthetised fish back into the anaesthetic solution as this could cause overdose
Speed	Work speed should never reduce quality.	High speed vaccination can reduce accuracy
Angle of injection	90 degrees to the abdominal wall	Causes the least tissue damage. Recommendations for needle length are based on a 90 degree angle
Point of injection	The entire needle should be inserted into the midline between the pelvic fins (see picture 18)	Causes the least tissue damage. See PHARMAQ's poster for recommended point of injection (See supplement C)
Needles	The needle should glide smoothly into the fish, with minimal pressure	Blunt or malformed needles may tear or otherwise damage tissue
Injection pressure	Excessive pressure could cause injury to the fish. See picture 19 for correct pressure	Too high pressure may cause dorsal deposition or injection of vaccine in organs (see picture 20)
Depositing	The complete dose should be deposited in the abdominal cavity before the needle is withdrawn (see pictures 21 and 22)	Avoid intramuscular vaccine deposits (see picture 23)
Needle guards	Should always be used (see picture 24)	Reduces the risk of self-injection and helps to find the correct injection. Should be adjusted to the size of the fish



Picture 17: There are different ways to organize vaccination



Picture 18: Ideal injection point for tilapia. The entire needle should be inserted into the midline between the pelvic fins



Picture 19: Correct vaccination: With guard, good gloves, gentle but good grip, minimal pressure on fish



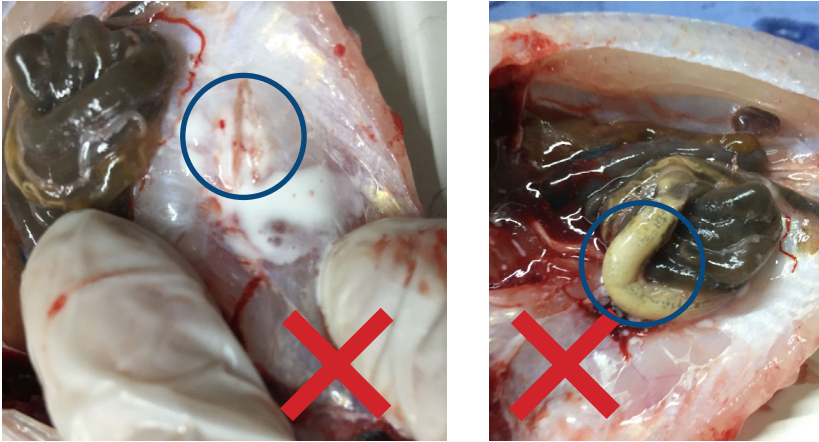
Picture 20: Incorrect vaccination: Too much pressure on fish



Picture 21: Correct deposit of vaccine in abdominal cavity



Picture 22: Withdrawal of the syringe before the whole vaccine dose has been injected will result in insufficient amount of vaccine in the fish



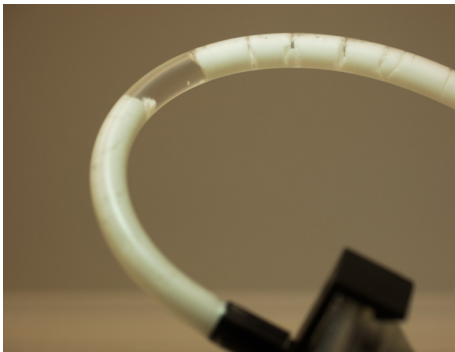
Picture 23: Incorrect vaccination – injection in muscle (left) and injection in gut (right). May be caused by incorrect injection angle, short or blunt needle, depositing while inserting or withdrawing the needle or poorly anaesthetized fish



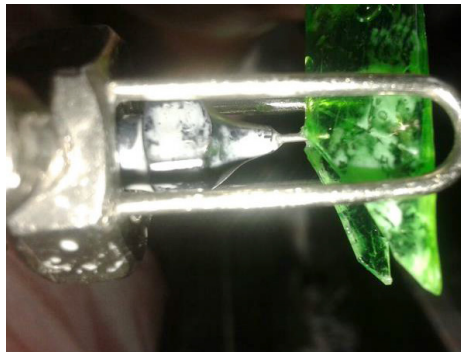
Picture 24: Needle guard is highly recommended

2D. REPLACING NEEDLES AND VACCINE BAGS

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Homogenizing the vaccine	Shake the bag for 2 minutes	A homogenous vaccine is essential to ensuring a best possible protection for the whole fish group
Vaccine tube	Use only sterile tubes. There should be no leakage. Never use the same tube for more than one day	
Storage and use of opened bag	An opened bag should be used within 12 hours	If there is separation of vaccine in the tubing, change the tube (see picture 25)
Air bubbles in vaccination equipment	Should not occur. Remove	Air bubbles may cause incorrect dosage
Change of needle	Whenever the needle is blunt or damaged, typically after 1.000-1.500 fish, or when it causes tears/lesions	Show special care when using machine vaccination or when vaccinating unevenly sized fish
Removal of scales from needle	Remove often, to avoid variation in needle length	Remove with implement that does not damage needle or hand (see picture 26)



Picture 25: Tubes stored overnight may look as shown. DO NOT USE



Picture 26: Scale remover

2E. FISH WELFARE

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Culls	Sedate before culling	Culling without unnecessary suffering is important, and may be required in legislation
Handling fish	Fish should be handled gently, to minimize discomfort	During vaccination, the fish is out of its environment and is subject to much handling and potential strain

2F. HYGIENE

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Clean equipment	Any equipment which comes in contact with the fish directly or indirectly must be clean and disinfected	Moving equipment from site to site increases the risk of spreading disease; Avoid!
Clean needles	Change the needle often. In general between 1.000-1.500 fish	Reduces risk of disease transmission
Wash and disinfect hands and gloves	At breaks, and after handling diseased or damaged fish	Minimize horizontal transmission
Wash and disinfect surfaces	At breaks, and after/start of vaccination day and if any damaged or diseased fish has been on the table	Minimize horizontal transmission

2G. QUALITY CONTROL DURING VACCINATION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Quality checks	The site staff should perform their own quality control, in addition to any performed by an external vaccination team (see picture 27). Make sure that all fish sizes are checked	<p>The same personnel should perform quality control throughout the vaccination period. Thorough control at the start generally improves the result. There should be at least 4 quality checks during the day. If there are problems more checks should be done</p> <p>Check both point of injection and internal placement of the vaccine. This is valuable documentation of the fish quality</p>
Anaesthetization	This is a critical point to be observed	To assure fish are not overdosed
Deviations	Supervisor should be able to spot problems and correct them (see picture 28). If problems lie with the fish, vaccination should stop	To assure fish welfare and the best possible vaccination process



Picture 27: Quality control during vaccination



Picture 28: Incorrect vaccination

3. POST-VACCINATION

3A. HYGIENE AND DISINFECTION

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Cleaning and disinfecting equipment	Wash and disinfect vaccination equipment regularly Also wash and disinfect the vaccination table and the anaesthetic bath regularly	Use degreaser, followed by a recommended disinfectant
Opened vaccine bags	Should be used within 12 hours	Storing opened bags increases the risk of contamination. Use a y-connector to allow two operators to use the same bag (see picture 29). Y-connectors may be ordered from PHARMAQ or PHARMAQ-distributor



Picture 29: Duo adapter allows several users per bag

3B. MORTALITY, APPETITE AND ENVIRONMENT

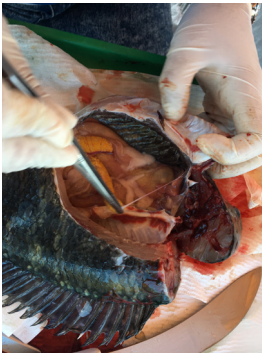
CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Mortality	Normally low	If high mortalities are seen the whole vaccination process has to be checked. Good fish health prior to vaccination is critical
Appetite	Dependent on temperature, stress and environment	Normally full appetite after 1 day post-vaccination
Vaccine on surface	May vary, but should be minimal	May be more if fish are small and/or temperatures are high. May indicate poor vaccination technique. Caused by leakage from the vaccination canal, the perianal pores, or from spillage on the vaccination table. Usually broken down quickly by inflow of water breaking the surface
Stress	Avoid stressing the fish during the first weeks post-vaccination	

3C. POST-VACCINATION FEEDING

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Restarting feeding	Start feeding the fish 1 day post vaccination	Start feeding carefully and according to the appetite of the fish
Return to normal feeding	More or less all fish should return to normal feed consumption 2 days post vaccination	A small number of fish may stay off feed and die after vaccination

3D. POST-VACCINATION CONTROL

CONTROL POINTS	RECOMMENDATIONS	COMMENTS
Follow up post vaccination	Minimum 20 fish should be checked for vaccine absorption/residue and side effects.	Minimal residue indicates good vaccine absorption. In oil based vaccine some side effects after vaccination may occur as adhesions (see picture 30)
Follow up at on-growing pond/cage	Evaluate vaccine side effects 3rd month after vaccination (30 fish). Repeat a couple of times during the production cycle and at harvest	







Picture 30: As a standard post vaccination control check for adhesions. In these pictures some expected local effects as adhesions and vaccine residues are seen

4. SUPPLEMENTS

A. CONTROL-FORM FOR RECEIVING 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 inaction.

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

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Contact information

General practitioner:
Local casualty clinic:
Emergency telephone:

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

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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 oil 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 itchiness 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 at 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, nausea 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 painkillers are not sufficient! If the finger is not treated by a surgeon in time, the reaction may be so severe as to require amputation.

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

Manual vaccination

If the syringe tip 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

Håkon Lasse Leira,
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St Olavs Hospital
Trondheim, Norway

C. RECOMMENDED POINT OF INJECTION

Ideal injection point for tilapia vaccination



The entire needle should be inserted into the midline between the pelvic fins

PHARMAQ
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zoetis

Copies of the supplements can be obtained from our sales representatives and downloaded from our web page

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