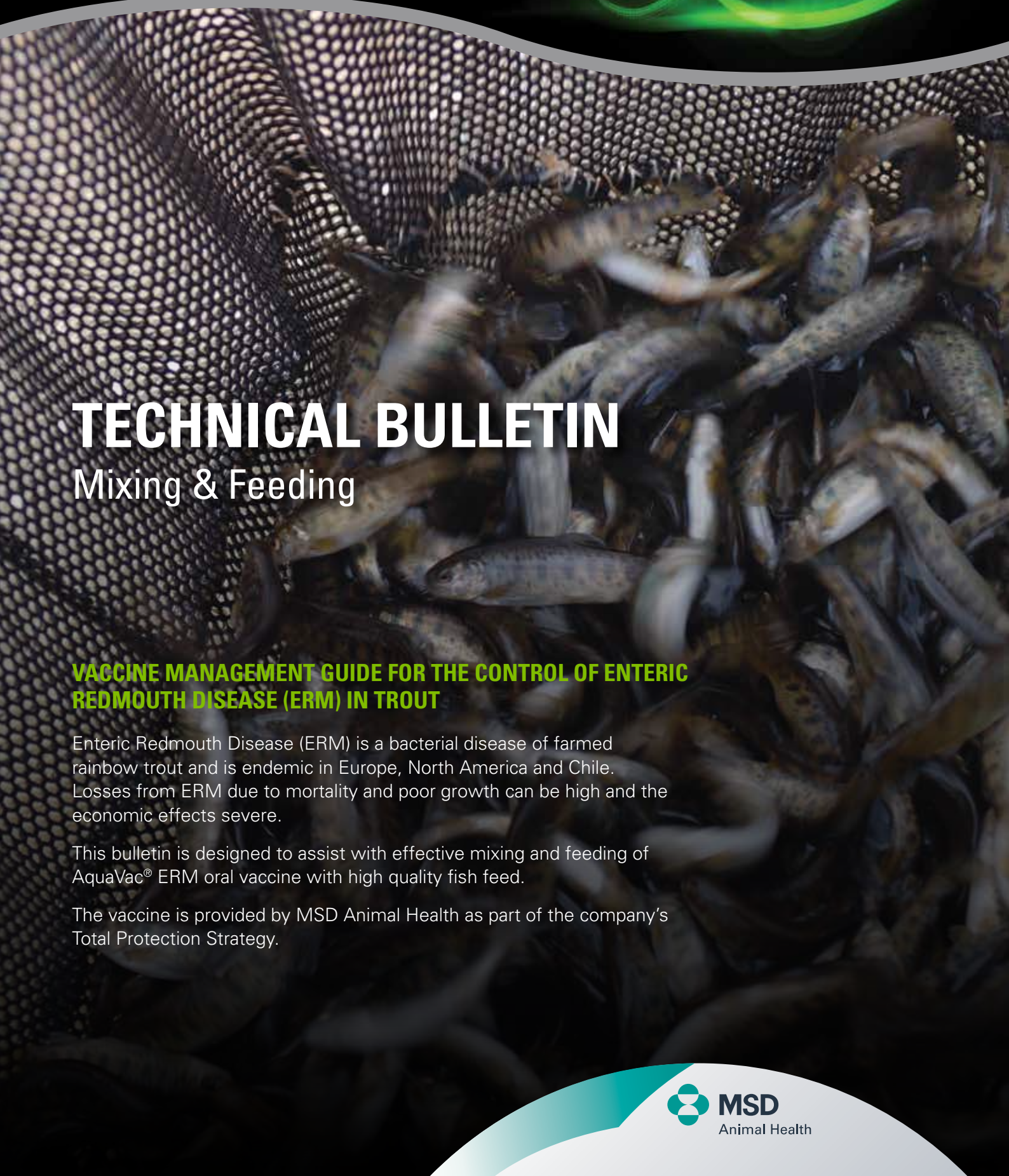
Sustainable Performance

AQUAVAC® ERM ORAL



TECHNICAL BULLETIN

Mixing & Feeding

VACCINE MANAGEMENT GUIDE FOR THE CONTROL OF ENTERIC REDMOUTH DISEASE (ERM) IN TROUT

Enteric Redmouth Disease (ERM) is a bacterial disease of farmed rainbow trout and is endemic in Europe, North America and Chile. Losses from ERM due to mortality and poor growth can be high and the economic effects severe.

This bulletin is designed to assist with effective mixing and feeding of AquaVac® ERM oral vaccine with high quality fish feed.

The vaccine is provided by MSD Animal Health as part of the company's Total Protection Strategy.

MSD Animal Health

Planning the oral vaccination booster

Vaccine timing

AquaVac® ERM Oral vaccine is administered in normal fish feed and is designed for use as a booster to immunity, given 4-6 months following the primary vaccination using AquaVac® ERM immersion.

When planning the booster vaccination a number of elements must be taken into account to optimise the booster effect:

1) The quality of the primary vaccination
    - The primary immersion vaccination (size of fish, water temperature, health status of fish).
2) The ERM disease cycle
    - The water temperature and the seasonality of the ERM disease in the specific site being vaccinated.
3) Production targets
    - Production cycles on the site being vaccinated

For further information on vaccine booster timing please refer to your vet.

On Farm or Feed mill mixing

AquaVac ERM Oral provides the flexibility needed to suit the wide variety of farm sizes and farming practices within the trout farming industry today.

It can be mixed at the location that is most appropriate for the individual farm unit or the site that is vaccinating.

i) **Feed mill mixing:** When a large biomass or number of fish are to be vaccinated, the vaccine can be mixed into the feed at your feed mill and delivered to the site as with normal feed deliveries.

ii) **On Farm mixing:** For smaller scale use or for farmers vaccinating only a few fish, on farm mixing may be the most appropriate method.

The sections of this technical bulletin on recommendations to determine vaccine feed mix, calculating the feed vaccine mixture, and feed preparation and mixing, are designed for use by farmers who mix the vaccine feed on site. However the following sections on feeding of the vaccinated diet and monitoring of the vaccination sections are applicable to all oral vaccination.

If the mixing is to be done at the feed mill and multiple batches of fish must be vaccinated, please contact our prescribing vet to discuss the instructions for calculating the optimum vaccine, feed and oil mix to be used.

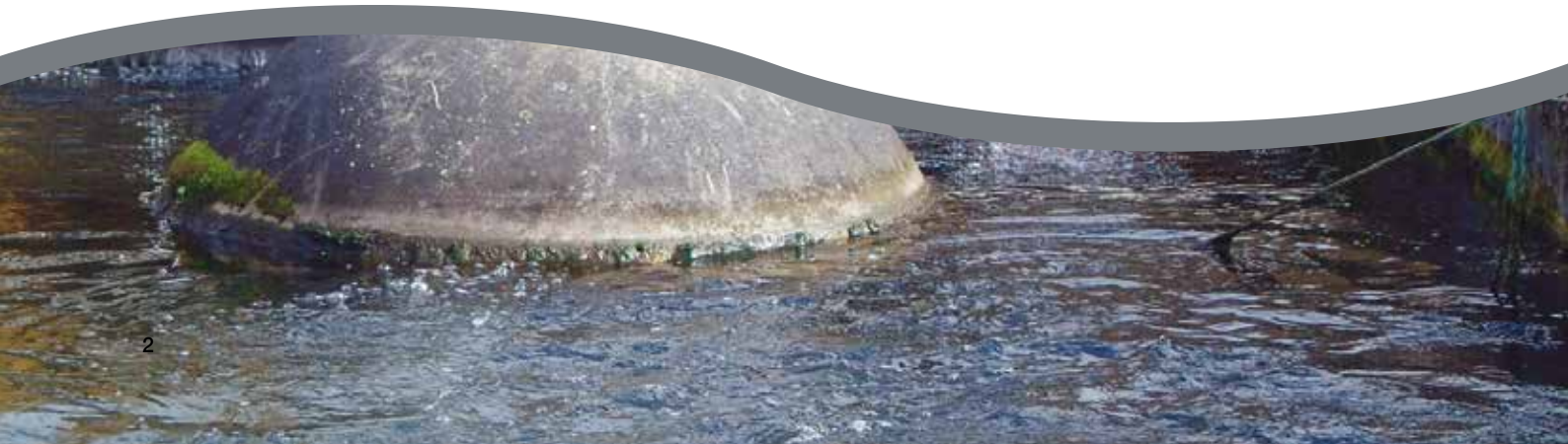
Handling and storage of AquaVac ERM Oral

Prior to use, AquaVac ERM Oral should be kept refrigerated. On the day of use, the correct amount of vaccine should removed from refrigeration and kept at room temperature (20-22°C) for at least 1 hour prior to use or until vaccine consistency is completely fluid. During this period it is important to avoid exposure to direct sunlight or to direct heat sources.

Optimising vaccine response in fish

Fish health and nutritional status are important at vaccination to ensure the best possible immune response to the vaccine. To help maintain good health and optimise the nutritional status of fish, a high quality diet should be used.

The health of the fish should be checked prior to vaccination and only fish which are at peak nutritional status and disease free should be vaccinated.



Recommendations to determine vaccine feed mix

There are five recommendations, which determine the correct mix of vaccine in the feed:

1. The vaccine dose = 0.1ml of vaccine per fish - 1 litre of vaccine = 10,000 fish
2. The vaccine feed should be fed over a period of ten days, split into two periods of five days with a five days break in the middle, as shown below;

   Day 1-5 0.01ml per fish per day

   Day 6-10 No vaccine

   Day 11-15 0.01ml per fish per day
3. To ensure 0.01ml of vaccine is fed to each fish each day, the exact amount of feed to be mixed with the vaccine is determined by the average fish size and the desired average percentage feed rate for the batch of fish being treated.
4. To ensure homogeneity of the vaccine feed, the vaccine inclusion in the feed should be at least 3% (3 litres vaccine: 100kg feed). If the vaccine to feed ratio falls beneath this level, fish oil can be pre-mixed with the vaccine prior to adding it to the feed to bring the liquid volume up to the 3% minimum level.
5. Feeding of the vaccine feed should commence within 4 days of mixing.

Calculating the feed vaccine mixture

- The daily amount of vaccine per fish is fixed throughout the programme – 0.01ml
- The length of the programme is fixed – 10 days

Step 1. Collate data from each batch of fish to be vaccinated

- Fish numbers
- Average fish size
- Feeding rate

Step 2. Calculate the average fish weight and the suitable average feed rate for each batch to be vaccinated

This data can then be used to calculate

- How much feed to mix with the fixed amount of vaccine
- How much fish oil (if any) must be used to ensure homogeneity

Working Example:

Calculating Vaccine inclusion and feed quantity

For 30,000 fish of 40g that are being fed at 1% per day, the following must be calculated:

10,000 fish	= 1 litre of vaccine
30,000 fish / 10,000	= 3 litres of vaccine
Weight of fish	= 30,000 fish x 0.040kg (1,200kg)
Weight of feed (10 days)	= (1,200kg x 1%) 10 days (120kg/10 day programme)

Ensuring Homogeneity

If only 3 litres of vaccine were mixed to 120Kg of feed, homogeneity could not be achieved because this is only 2.49% of the volume of feed.

To ensure homogeneity the following is required;

120 Kg of feed x 3% = 3.6 Litres of fluid

Therefore in this case, only 3 litres of vaccine is used. The additional 0.6 litres of fish oil must be pre-mixed with the vaccine.

Feed preparation and mixing

1. As stated, the vaccine should be removed from refrigeration and left at room temperature for 3 hours or until consistency is completely fluid, and be well shaken prior to mixing with feed.
2. Vaccine (or any fish oil and vaccine mixture) should be added to a rotating mixer containing the feed and allowed to circulate for 5 minutes ensuring even distribution of the vaccine in the feed.
3. When the mixing cycle is complete, it is important that the feed should then be allowed to absorb the vaccine fully and then dry. The drying process ensures the prescribed vaccine intake is fully maintained. The vaccine feed should not be exposed to direct sunlight or heat source.
4. The vaccine feed should be stored in a cool dry place. It should be clearly marked with the following information:

i. the date of preparation
ii. the batch of vaccine used
iii. the incorporation rate of vaccine on feed
iv. the tank or batch of fish for which the vaccine feed has been prepared
v. the amount of vaccine feed to be fed per day
vi. when the vaccine feed should be fed.

Mixing of AquaVac ERM oral vaccine - Check list:

1. Store vaccine correctly.
2. Keep the vaccine at room temperature for 1 hour before using the vaccine.
3. Calculate the quantity of feed to be mixed with the vaccine.
4. Ensure the vaccine feed is mixed accurately and to instruction.
5. Allow the vaccine feed to dry and ensure all vaccine is absorbed.
6. Maintain detailed vaccination record.

Feeding of the vaccinated diet

Vaccination preparation

To ensure that the most effective vaccination with AquaVac ERM Oral is achieved, there are a number of principles to observe and practical steps to follow.

1. Trout health is an important factor as it affects the immune response capability of the fish. Also, correct dosing of the vaccine is dependent on feed intake, and unhealthy fish will either not eat or suffer from reduced appetite. Therefore only vaccinate healthy fish
2. If ponds/raceways contain any diseased trout, treat prior to vaccination, and allow fish to recover fully before vaccinating
3. Monitor feed intake in the days prior to vaccination to ensure targeted intake levels are achieved
4. Do not stress, move or mix trout during the vaccination period or in the immune induction period after vaccination. Any factors that depress immune response and feed intake will limit immune induction
5. Monitor water flow, temperature and quality throughout the vaccine period

Introduction of vaccinated feed

1. Ensure that you have the required amount of vaccinated feed prepared for the first half of the treatment
2. Keep feed fresh and protected from moisture and sunlight
3. Maintain your standard daily feeding routine throughout the vaccination
4. Check that the dosing levels are correct for the trout population
5. Vaccinated feed should be fed at up to 90% of the daily ration over the treatment period; however, farmers can top up with regular feed at the end of each day. The objective is to ensure the vaccine feed is completely consumed during each day but that no growth is lost
6. When feeding the vaccinated feed, ensure even distribution to the trout population
7. Do not over feed. Ensure that all feed is consumed at each feeding point

Monitoring the vaccination

1. Observe trout behaviour and general health at feeding
2. Make sure any major deviation in feed intake is recorded so that your vet can give you the best practical advice to ensure the best alternative vaccination strategy
3. Check that there is enough vaccine feed prepared in advance to ensure continuous vaccination
4. Ensure that the correct amount of vaccine feed is fed to each separate tank or holding unit
5. Ensure that the interval days are correct – No vaccination days 6-10
6. Maintain complete records of vaccination dates and rates for each tank

AquaVac ERM Oral vaccination feeding – Check List

1. Monitor the fish (feeding, behaviour & health)
2. Water quality checked
3. Vaccinated feed prepared and fresh
4. Feed intake levels monitored
5. Correct cut off and restart days (Days 6-10)
6. Vaccination records updated

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AQUAVAC® ERM

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AQUAVAC® ERM and AQUAVAC® ERM Oral are only available via your animal prescriber or veterinary surgeon from whom advice should be sought. AQUAVAC® ERM contains inactivated cells of *Yersinia ruckeri* (Hagerman type I strain). Also contains ≤0.5mg/ml formaldehyde. **POM-VPS**. AQUAVAC® ERM Oral contains inactivated cells of *Yersinia ruckeri* (Hagerman type I strain). Also contains ≤0.5mg/ml formaldehyde. **POM-VPS**.

Further information including side effects, precautions, warnings and contraindications is available on the product SPC or datasheet or from MSD Animal Health UK Limited. Registered office Walton Manor, Walton, Milton Keynes MK7 7AJ, UK. Registered in England & Wales no. 946942 • Tel: 0370 060 3380 • vet-support.uk@msd.com • www.msd-animal-health.co.uk

Use medicines responsibly.

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