Guideline for medical interventions
Veterinary Medicine
Aquatic Animal Medicine

Water and Feed Samples Submission

Version Code: EHC–AAM–GL–2024–V1
Version: V1 | **Release Date:** 2024 | **Last Updated:** May 2024.

Committee Chair: Prof. Ahmed M Byomi

The Decision of the Committee: Prof. Dr Mohamed Mohamady Ghanem.

Committee Members: Prof. Nabil Abd Elgaber; Prof. Ashraf Aldesoky Shamaa; Prof. Amany Abbass; Prof. Dalia Mansour; Dr Essam Sobhy.

Authors: Mohamed Faisal[1,2]; Amany A. Abbass[1] ; Adel A. Shaheen[1]; Amel M. El Asely[1]; Eman A. Abd El-Gawad[1]; Hiam S. Elabd[1]; Aya F. Matter[1]; Hadeer A. Youssef[1], and Amira M. El-Daim[1].

[1]Department of Aquatic Animal Medicine, Faculty of Veterinary Medicine, Benha University, Egypt.

[2]College of Veterinary Medicine, Michigan State University, USA.

1- Water samples collection

Why collect water samples?

- In most cases, it is suggested that a water sample be submitted for basic water chemistry analysis along with fish sample submission so that water quality can be ruled out as the cause or a contributing factor to fish mortalities.

What to consider when collecting water samples?

- Samples should be collected in clean, plastic bottles with a screw cap.
- Ensure the cap is tight prior to shipping.
- Clearly identify each bottle with a sample I.D. using the owner's last name or the facility name, date of collection, source format (i.e. Name, 01/01/2024, well water).
- It is preferable not to submit samples in glass containers because of the higher potential for breakage and most laboratories do not accept receiving samples in glass containers.
- Make sure not to disturb any sediments prior to or during sample collection. Sediments picked along with the water sample can change the results of water chemistry analysis.
- The water sample is acceptable "as is" if sediment is already suspended in the water column although sediment was not disturbed during sample collection.
- Also, make sure the sample bottle contains no vegetation, insects, snails, tadpoles, small fish or other organisms after collecting the sample, as they will

change the water chemistry and the result of the water test will not be accurate.
- Dissolved oxygen should be immediately measured by the sample collector at the site and not at the laboratory.
- Do not combine fish and water in the same container.

2- Types of water samples

How to collect a surface water sample?

- Place your thumb over the mouth of the empty collection bottle, place the bottle 6 to 24 inches below the surface of the water, and remove your thumb allowing water to fill the sample bottle.
- Make sure all the air has been removed from the bottle and then place the cap on the bottle before removing from the water.
- Check the sample to determine that no air is trapped inside the bottle.
- If air is trapped inside the bottle, empty the bottle and repeat the process again.

Advantages of surface water sampling:

- Evaluate changes in water quality as poor water quality can cause fish kills and is often a major factor contributing to fish disease.
- Boats can be used in obtaining clean surface samples away from the water's edge.
- Aids in diagnosis.
- Provide better water quality.
- Prevention of disease.

Disadvantages/limitations:

- The sample can only be taken from near the surface and close to shore.
- The person remains in an uncomfortable position until the bottle is filled.
- The water near the pond edge often is stagnant, and may contain debris.
- Submerging the bottle in shallow water often disturbs the bottom, and water entering the bottle can be contaminated with sediment.
- Must be taken in deeper water, wading usually is unsatisfactory, for it disturbs sediments around the person doing the sampling.

Trouble shooting

- Long-handled dippers facilitate the collection of water samples from pond or banks in a comfortable position and the sample can be transferred to a plastic bottle for transport to the laboratory.
- Water column sampling provides a better representation of water quality than can be obtained with surface water samples.

Water samples from ponds, lakes, and aquaculture facilities

Provide as much information as possible about the condition of the tank (flow through or recirculation) or pond.

- When samples are taken from salt-water systems or ponds where fresh water may be added, gather water from both the top and bottom of the pond. If freshwater is running into the tank or pond, collect the sample in the area least affected by the fresh water.
- Dissolved oxygen or free carbon dioxide must be tested on-site, using commercially available kits.

Well Water

- Let the pump operate ten minutes to an hour before taking the sample. Take the sample as close to the pump as possible.

3- Number of samples and laboratory assay

How many samples should be collected?

- Two separate water samples may be required to address water related problems due to plumbing and/or fixtures.
- One sample should be collected at the point of entry (well or water service) and another at the point of use (tank, pond, etc.). This sampling method will help to pinpoint to where plumbing repair is needed.

How much water should be included in the sample?

- In ponds larger than 4000 m^2, a minimum of two 500 ml water samples should be collected from opposite ends of the pond for analysis.

What to test?

- If fish are stressed or dying, immediately test the water for dissolved oxygen, carbon dioxide, conductivity, pH, temperature, ammonia nitrogen, nitrite, alkalinity and hardness.
- Additional water quality parameters to be analyzed include color, biological oxygen demand (BOD), calcium, iron, manganese, nitrate nitrogen, total suspended solids, turbidity, sulfate, chloride and phosphate.
- Organic contaminants
- Inorganics, such as heavy metals

When to do the water sampling?

- The timing for sampling water is critical for some variables.
- Water temperature, dissolved oxygen, and pH are lowest in the early morning and highest in the afternoon.
- Carbon dioxide concentrations follow the opposite trend.
- Although total ammonia nitrogen concentration does not exhibit a daily trend, non-ionized ammonia concentration does. The percentage of total ammonia in the unionized form is highest in the afternoon because of the higher water temperature and pH.
- Most other variables do not exhibit well-defined daily variations.

What information should be included with the samples?

- With each fish sample sent to the diagnostic or toxicology laboratory the following information needs to be submitted:
- Name, address and phone number of the submitter.
- Date of collection.
- Designation of pond or tank from which fish were collected..
- Dimensions of pond or tank, including depth.
- Species, number and average size of fish.
- Date of last fish stocking, including number, species and size.
- Amount of food fed per day. Indicate if fish are still eating or stopped eating.
- Date first morbidity or mortality observed.
- Approximate number of dead fish per day since mortalities first observed.
- Identify most recent chemical treatment, including date and amount.
- Determine clarity of water by Secchi disk depth.
- Provide water quality data of ponds or tanks.
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Label water samples for the toxic substances laboratory with the following information:

- Name, address and telephone number of submitter.
- Date of collection.
- Designation of pond or tank from which water was collected.
- Method of preservation (ice, acid, etc.).

4-Fish feed samples submission

Why to sample feed and what to look for?

- is needed to monitor compliance with nutritional standards.
- Should be conducted separately on at least 10% of the stocks (i.e., bags) for each production batch. For the following 60 days, an additional 100 g sample

for each production batch should be stored in a sealed plastic bag for future reference.
- When the feed is suspected to be causing a problem, other compartments within the facility that were fed from the same feed batch for the last four weeks should be identified, and the health condition and production data of the animals compared.
- In case of dry feeds, no specific pretreatment (i.e., homogenization by cutting, chopping, blending) is necessary.

Any microbiological or chemical contamination should be avoided during the sampling through the general precautions described below:

- Cool, dry, well-ventilated store room.
- Keep the storage area away from sources of fungal or insect contamination.
- Use wooden pallets; do not stack directly on the floor.
- Adequate spacing.
- Avoid rough handling.
- Protect the storage from insects and rodents and keep it clean.

Representativeness

Samples should represent the entire batch from which they were collected.

Advantages

- Aids in diagnosis of fish disease conditions.
- Selection of optimum feed type meeting the fish's requirements.
- Improve formula.
- Help maximize feed efficiencies and productivity.
- Feed management is also a part of environmental management.

Risks/limitations

- Non-representative sample can lead to false interpretation.
- Wastage and pollution.
- The resulting diagnosis will not lead to an appropriate and costly decision.

5- Alternative evaluation of feed quality (Cruz, 1996)

Sensory evaluation, physical examination, water stability test and palatability test are alternative methods for evaluating the quality of feeds without the use of laboratory equipment as following:

Feed quality problems indicators include:

- Minimal or no improvement after drug or antibiotic treatment.
- Signs of rancidity.
- Disease occurrence that is associated with a particular feed batch.

Smell and taste

- Depends on experience, can spot major formulation changes as, fresh feeds have a pleasant odor, high protein (> 30%) diets possess a strong odor of animal meal, old feeds has weak odor, spoiled feeds have a musty smell due to fat rancidity and fungal growth, and spoiled feeds taste sour, bitter, or rancid.

Moisture and hardness

- Moist feeds are quite soft and easily compressed. When placed in a bottle/bag and shaken, the sound is muffled and does not move freely.

Color

- Feed color reflects the type of raw, cooking temperature, degree of cooking. Feed deterioration also affects the color.

6- References

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