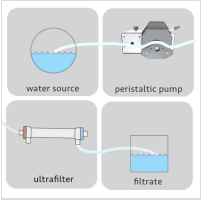

Apr 22, 2022

Dead-end Ultrafiltration Water Collection

Andrea Ottesen[1], Brandon Kocurek[1]

[1]CVM NARMS FDA

1

dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

Andrea Ottesen

Dead end ultrafiltration is the most basic form of filtration. In this case a Rexeed #25S Filter is used with a peristaltic pump to pull volumes from 10L to 100 L through nanometer sized pores (approximately 30 kDa). This size selection is perfect for capture of viruses, bacteria, protists and even larger particles and organisms.
The large collection volumes made possible by this method have great value if there is a need to examine rare members of a community such as pathogens.

DOI

dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

Andrea Ottesen, Brandon Kocurek 2022. Dead-end Ultrafiltration Water Collection. **protocols.io** https://dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

protocol ,

Andrea Ottesen

Nov 04, 2021

Apr 22, 2022

54855

- Geotech Geopump Peristaltic Pump with EZLoad II pump head and two batteries (for non-pressurized water sources)
- Optional: Flow totalizing meter (optional) fitted with 1/2"
- ID Hose x Swivel FGHT Nylon Swivel Female Inserts (2)
- Geotech Geopump Peristaltic Pump with EZLoad II pump head and two batteries
- Sodium thiosulfate (if de-chlorination necessary)
- Dialysis filter – Rexeed-25S (Dial Medical Supply)
- L/S 36 tubing (Cole Parmer EW-96410-36 or EW-06434-36)
- DIN adapter (Molded Products MPC855NS.375)
- SNP-8 hose clamps (Cole Parmer EW-06832-08)
- Blood port (End) cap (Molded Products Cat. No. MPC-40)
- Pliers
- Sharpie
- Appropriate Personal protective equipment (PPE)
- Optional: 20-L collapsible cubitainers (Cole Parmer EW-06100-40 or EW-35204-86)

Ensure all appropriate Personal protective equipment (PPE) is used. Put on gloves prior to starting the water collection procedure.

:

Before starting the procedure, fill out pertinent sample collection information for each sample taken and the sample site. Note the date, time, description of water source, latitude, longitude any any other relevant metadata.

Select the number of ultrafilters to be used in your sampling endeavor. Remove ultrafilter from packaging and write any relevant sample metadata on the ultrafilter.

Citation: Andrea Ottesen, Brandon Kocurek Dead-end Ultrafiltration Water Collection
https://dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

Prepare pump, tubing and filter

1 Position the peristaltic pump in a convenient location for sampling (preferably a straight surface).

2 Remove the end port cap from the blue end of the ultrafilter.

2.1 Set aside this end port cap for later use.

3 Attach a DIN adaptor to the top (blue end) of the ultrafilter (influent from the water source being sampled). Screw the DIN adapter into the ultrafilter.

3.1 Ensure the plastic cap is left on the side of the blue port where the DIN adapter was just placed. Hand tighten the cap so as to prevent leaking.

4 Using scissors, cut a piece of tubing (L/S 36) long enough to cover the distance from the water source you will be sampling, through the peristaltic pump, to the ultrafilter.

5 Push influent tubing (L/S 36) into the DIN adapter and seal with zip tie (#12) or clamp (#123).

5.1 Use pliers to secure the clamp in place if needed.

6 Feed the influent tubing through the peristaltic pump head and close the pump head using the lever.

7 Remove end port cap from the other port (orange). Screw in blood port cap to this port.

Citation: Andrea Ottesen, Brandon Kocurek Dead-end Ultrafiltration Water Collection
https://dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

7.1 Set aside end port cap for later use.

8 Cut a second piece of tubing (L/S 36) that will run from the lower side port (orange) of the ultrafilter into a collection vessel. Secure with a zip tie or clamp.

8.1 It is useful to have a collection vessel (e.g. cubitainer) with clearly defined volumes so you can keep track of how much water has been filtered (if you do not have a flowmeter).

9 Place the influent tubing into the body of water and ensure the end of the tubing will stay below the surface of the water (away from plant material or other large debris which may be present).

9.1 Be cautious as to not disturb the water significantly near the sampling site.

Pumping

10 Once the tubing, pump, ultrafiltration cartridge, and effluent collection tubing have been set up, plug the appropriate power cord into the outlet in the back of the pump and the other end of the power cord into the battery power source.

11 Determine the desired direction of water flow and toggle the switch for flow direction. Turn the pump on in the direction that pulls water towards the filter.

11.1 Depending on the turbidity of the water and the volume of water to be collected, there are different speeds with which to operate the pump. Pump head can also be adjusted for higher speeds.

11.2 We typically start with a medium speed to ensure that the ultrafilter field setup has tight connections and is working properly before turning up the speed to the highest setting.

12 Monitor the volume being collected by the effluent receptacle and continue pumping until the desired volume has been achieved.

Citation: Andrea Ottesen, Brandon Kocurek Dead-end Ultrafiltration Water Collection
https://dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

Dis-assemble pump and prepare cartridge for transport

13 When pumping is finished and the pump is stopped, open the pump head and remove the filtration tubing from the pump head.

14 Disconnect the effluent tubing (from the bottom side of the cartridge) and cap the port (orange) with the end port cap that was saved in Step 7.1.

15 Remove the zip ties and/or clamps and disconnect the influent tubing from the top (blue) of the filter. Cap the port the end port cap that was saved in Step 2.1.

15.1 Ensure end caps are attached as snug as possible as they have a tendency to leak if not secure.

16 Unplug the pump from the battery power source. Repackage the pump and battery in transport pelican case/or other specialized carrying equipment.

17 Place the filter with all ends capped into a ziplock bag, or back in the plastic wrapping it came in. Seal with tape or other means and use an indelible marker to record the date, time, location, and volume collected (or record this information with the use of an external application e.g. Epicollect).

18 Store the filter in a cooler at **4 °C** or at **Room temperature** for transport back to the lab (depending on how much time is involved in transport).

18.1 Use ice packs to keep the cooler cold if necessary, for the target/suspected microorganism collected.

19 Ensure all materials used in the procedure are taken from the collection site and no materials are left behind. Bring all materials back to the laboratory to ensure all used materials are placed in the appropriate biohazard waste containers.

Laboratory Arrival 3d

20 Store the cartridge at **4 °C** for **24:00:00** to **48:00:00** (max) before backflushing and further downstream processing. 3d

Citation: Andrea Ottesen, Brandon Kocurek Dead-end Ultrafiltration Water Collection
https://dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1

Citation: Andrea Ottesen, Brandon Kocurek Dead-end Ultrafiltration Water Collection
https://dx.doi.org/10.17504/protocols.io.q26g78qy9lwz/v1