



Buffered Reactor Media (BFM) / Feed Preparation (2 L)

1. Stir or aerate water (overnight) to removed chlorine from tap water; or use bottled water (still water). Do not use carbonated water or distilled water, but water treated by reverse osmosis (RO) is OK. To stir, you need a magnetic stirrer and a stir plate. If you aerate, then just use a fish pump and aeration stone (available at a pet store).
2. Add (2) BOD pillows to 2 liters of water with stirring, or add and then just mix it by shaking by hand for about half a minute.
3. Add 1 teaspoon each of NaH_2PO_4 and Na_2HPO_4 with stirring (or shaking).
4. Your media is now ready to use. Store at room temperature (hopefully around $20\text{ }^\circ\text{C}$) until feeding. If you store it for longer than a few days, keep it in the fridge and then let it warm to room temperature before adding to the reactor.

Weekly Feeding Instructions

1. "Feed" the reactor every 2-4 days (3 days is optimal).
2. Before feeding, disconnect the circuit to stop the fan.
3. Add about 25 mL of BFM into each of the two feed syringes.
4. Drain about the same amount (about 50 mL) of liquid from the MFC through the bottom stopcock into any convenient bottle or container. Draining out the liquid should draw fluid from the syringes into the MFC. Leave a small amount of liquid in the syringes (about 1-2 mL of BFM is fine) to avoid pulling air into the reactor.
5. Add (using the pipet) the acetic acid to the MFC reactor solution. You will add 1.5 mL if it is pure acetic acid (100% as purchased) into the ~50 mL of solution that you drained from the MFC. If you do not have pure acetic acid, see instructions below. Swirl by hand to mix in the vinegar in the bottle of reactor solution.

6. Add this solution containing the vinegar into the two feed syringes.
7. Drain another ~50 mL from the reactor through the bottom stopcock into a bottle, which will draw in the solution from the syringes.
8. Repeat the solution removal and addition one more time.
9. Leave the remaining solution in the feed syringes, and cap loosely with the black rubber caps to avoid contamination or evaporation.
10. This solution in the syringes (approximately 10-15 mL of water) will be pulled into the reactor to replace the water that will evaporate through the cathode membranes each day.
11. Refill the feed syringes with water or media as needed to maintain volume and avoid getting any air pulled into the reactor through the syringes.

Monthly feeding instructions

1. Over time, the salts will build up in the solution (the water evaporates, leaving behind more concentrated salts).
2. Every 4-6 weeks, you will need to replace the solution with and fill with fresh medium (about 2 liters). To do this, make up a batch (2 L) of fresh medium.
3. Add the acetic acid (1.5 mL as above or equivalent concentration) to the 2 L of BFM. Mix or shake by hand.
4. While letting the old MFC medium drain through the bottom stopcock, add fresh medium to the syringes (without pulling in air) until all of the 2 L of fresh medium have been added to the reactor.
5. Discard the used MFC medium in a toilet.

Notes on Acetic acid solution.

1. If you cannot buy pure acetic acid, you can use dilute household vinegar. Check the percentage, and make sure it is only vinegar (no oil!). If it is 5% acetic acid (typical in the USA), you would use 30 mL (that is, 1.5 mL of 100% vinegar = 30 mL of 5% vinegar). If it is 40%, then add 3.75 mL.
2. Try not to add too much vinegar at once. It is okay to dilute it out more.