

## Barger Lab Dishwashing Protocol

### Basic Protocol:

1. SAFETY: lab coat, nitrile gloves (blue gloves), thick dish gloves (green gloves), and safety goggles
2. WASH: Rinse out dirty dishes first with tap water. Then soak and wash in Citranox bath. Rinse off Citranox.
3. ACID: Carefully place CLEAN dishes in acid bath. Soak at least 2 hours or overnight.
4. RINSE: Move dishes out of the acid bath into the rinse water bath and allow to soak. Rinse the dishes 3-5 times in either House DI or with the Nanopure DI water.
5. DRY: Place rinsed dishes on lab paper or peg board to dry.

### The Complete Protocol for Doing Dishes: All the Questions You Ever Had About Dishwashing in a Lab Answered.

Now that you're all grown up and work in a lab, you found out the ugly truth: you still have to do dishes, even at work. Since you're washing dishes in a lab, the consequences of doing a bad job on the lab dishes have far reaching consequences. Not only can a bad job on the dishes screw up your experiment, but they can screw up someone else's. Don't do it.

Here's how to do lab dishes without too much hairpulling, swearing, or anxiety. Once you master these steps and understand the dish system, it is very easy and stress-free. I try to think of doing dishes as a paid meditation practice. If you drop out of school, you can write *Zen and the Art of Doing Dishes* to support yourself while becoming a recluse beachcomber.

### 3 Bath System

1. Citranox bath (WASH)
2. Acid Bath (ACID)
3. Rinse Bath (RINSE)

#### Citranox Bath Recipe:

- Use the small dish tub. Add a cap-full of phosphorus free soap, such as Citranox, to the tub. Fill with tap water. Label tub and lid.

**Acid Bath Recipe:** The acid bath is should be made with ~10L of 0.5N HCl. Increase your calculations accordingly for larger baths.

**Recipe: 415 mL of 12M HCl to 9585 mL DI H<sub>2</sub>O**

**\*\*\*The acid bath should be made using lab coat, goggles, and appropriate gloves by a graduate student or the lab manager\*\*\***

- Make enough acid solution to cover your dishes when submerged. 10L is a good size to start.
- Use the designated plastic tubs for acid baths. Make sure acid bath tub is doubled with a secondary containment tub for safety.
- Fill acid bath tub with the correct amount of Nanopure water. Then add the concentrated acid *gently and carefully* to the water. Be careful! This is the most dangerous phase of dishwashing. Concentrated acid will give off strong fumes when added to water.
- Label your acid bath on the side of the tub and the lid.

**ABSOLUTELY NEVER PLACE METAL OR RUBBER IN THE ACID BATH.**

## ALWAYS ADD ACID TO WATER

### Rinse Bath Recipe:

- This is a rinse tub used after the acid bath. Use a large tub and fill it with Nanopure DI water.

### Complete Dish Protocol with Details and Tips

**1. SAFETY:** Put on your safety gear. Working with acid is hazardous and the goal is to protect your skin and eyes. Note: if you have never worked with hazardous chemicals before, please consult the lab manager for the University's Hazardous Materials Training.

Please wear:

- lab coat
- safety glasses or goggles
- blue nitrile gloves (in boxes next to the sink)
- heavy protective green gloves (these look like dish gloves, kept near sink)

Yes, you will look really bad. So does everyone else in this outfit. Get over it.

### 2. WASH:

- Rinse and dump out any bottles/dishes filled with sediment, dirt, etc. Rinse to clear any dirt, chemicals, etc.
- For anything containing hazardous materials, dispose in the appropriate Haz Waste location.
- For tough crusts, soak overnight.
- Scrub out with dishwashing brushes by the sink.
- Rinse dishes with tap water.

**3. ACID:** The acid bath is the vital stage of dishwashing in a lab. PAY ATTENTION TO THIS SECTION!!

- The acid bath should be kept as clean as possible. Inspect dishes before putting them in the acid bath. If they are dirty, filmy, or in any way suspect, wash them in the Citranox bath again.
- Wearing all your safety gear, place dishes gently and carefully into this bath. The acid can irritate your skin and really hurts in your eyes.
- Dishes must soak in the acid bath for a *minimum* of two hours. An overnight soak (or over the weekend) is fine and won't hurt the dishes.

**4. RINSE:** This is the stage moving dishes from the acid to the next bath.

- Wearing all your safety gear, open the acid bath after the soaking time and gently pour any acid contained in a vessel back into the acid bath. Let the acid drip back into the bath for a few moments. Try not to shake it, as you can shake the acid onto yourself.

- **Goal:** to put the least amount of acid into the rinse bath and down the drain.
- Place the dish in the rinse bath. Move all the dishes from the acid bath into the rinse bath before moving on to the next stage.
- After all your dishes are into the rinse bath, begin by rinsing each dish at least 3 times in DI water. For meticulously clean dishes on very sensitive projects, rinse each dish 5 times in DI water.

5. **DRY:** The last stage! Our lab air-dries all our dishes. You will need to prepare for this stage before taking dishes out of the rinse bath if it isn't already set up.

- Make sure there is an adequate area to dry the dishes on the counter if you have a lot of dishes. For drying on the counter, lay down a double layer of lab cloth.
- After rinsing your dish, place on the counter on lab cloth or use the pegboard mounted on the wall for small items, like beakers and flasks.
- Let air dry. Cover the dishes with another piece of lab cloth while they are drying to prevent the dust from getting onto the clean dishes.
- Check the dishes to make sure all the water is gone. Often the volumetric and Erlenmeyer flasks need to be gently dumped out and dried for longer.
- Place the dishes back in the glass cabinet.

**Once you are done with the dishes, please wipe up all spills and water. If there is significant acid on the counter, ask the lab manager if it needs to be neutralized before wiping up.**

#### **Tips on Dishwashing:**

- **Be Mindful.** Goes back to the *Zen and the Art of Dishwashing* idea. Everyone knows that dishes can get boring and monotonous. Try to pay attention, especially when you are working with the acid.
- **Do it right the first time.** Rather than rushing through dishes and doing a sloppy job that leaves the acid bath full of crud and the dishes filmy, please slow down and pay attention to what you are doing. Having to do the same dishes twice takes far longer than spending an extra ten minutes.
- **Ask for help.** Sometimes you will find that both of your gloves are covered in acid and you don't want to spread acid all over the sink/lab/faucets. Ask a labmate to come over and wash off one of your gloves.
- **It's ok to make mistakes.** If for some reason you break a dish, or spill some acid, please ask for help from anyone in the lab if you need it. Dishes are replaceable. You are not. We are more concerned about the safety of people in the lab than a broken dish.