

Polymer Worms

Supplies:

- Sodium Alginate - <http://www.willpowder.net/sodiumAlginate.html> (can also get from Amazon)
- Calcium Chloride - <http://www.willpowder.net/calciumChloride.html> (can also get from Amazon)
- Deionized Water (Do not substitute tap water, will not work!)
- Food Coloring
- Yellow Highlighter
- Blender - Single-serving blenders like this (<http://www.hamiltonbeach.com/products/blenders-single-serve-blenders.html>) work best, but any will do
- Empty Condiment Squeeze Bottles – Can buy at Kroger/Walmart
- Small food balance/scale of some sort that can measure mass in grams
- Clear plastic cups
- Fine mesh strainer
- Paper Towels
- Vinegar
- Dish Soap

Instructions:

Sodium Alginate Solution (1 mg/mL) - aka "WORM GOO!"

1. Weigh out 5 g of Sodium Alginate - use a clean spoon if you plan on making edible worms in the future so you don't contaminate anything.
2. In your blender, add 500 mL (approx. 17oz) of deionized water.
3. Add about 1/2 of the alginate (weighed above in step 1) to the water in the blender - it will probably float on the top of the water - this is okay.
4. Place the lid on your blender and blend at its fastest setting for about 20 seconds.
5. Remove the lid, and add the remaining alginate.
6. Replace the lid - blend for another 20-30 seconds until you see no more chunks of alginate powder. The solution will be thick like maple syrup and quite bubbly. Pour this into your condiment squeeze bottle, leaving some room at the top.
7. Add your favorite food coloring (15-20 drops is usually good), cap the container and shake it up to mix.
8. Once mixed, let this stand at room temperature for at least 1-2 hours to allow most of the bubbles from blending work themselves out.
9. {GLOWING WORMS ALTERNATIVE} - Add 1 L of deionized water to a clean, dry container. Carefully cut open your yellow highlighter using a pair of heavy scissors (adults only!). Take the felt highlighter insert (or liquid if a non-felt highlighter and add it to the water. Shake thoroughly and let sit for 1-2 hours to mix. Use this water in place of the regular deionized water in step 2. The solution will glow in the dark if you have a blacklight (UV lamp)!

Calcium Chloride Solution (5 mg/mL) - aka "WORM BATH!"

1. Weigh out 25 g of calcium chloride - use a clean spoon if you plan on making edible worms in the future so you don't contaminate anything.
2. Add 1 L (approx. 34 oz) of deionized water to a clean, dry container - dry 2 L pop bottles work great.
3. Add the calcium chloride to the water, cap your container, and shake until all solids are dissolved. The water will get very warm - this is normal.

Instant Worms!

1. Fill a clear plastic cup with the worm bath (calcium chloride solution)
2. Pick your favorite color of worm goo (sodium alginate solution), and squirt it into the worm bath.
3. Wait at least 15 seconds, and then try to pick up the worms!
4. To collect your worms, place the fine mesh strainer over a separate empty clear plastic cup and slowly pour the worm bath through it. The strainer will catch the worms, and you can take them out and play with them.
5. Try making all different sizes and colors of worms!
6. Remember! The inside of the worms remains a liquid, so if you squeeze them too hard they will pop and get your hands sticky!
7. The worms will last for a while in a plastic baggie, but will eventually dry out into a plastic-like material.

Cleanup

1. Add a small amount of vinegar to your blender and any other containers that had the alginate solution (about 1/8 cup. Shake this up vigorously (or blend it), add a lot of hot tap water, and shake it up (or blend it) again. Pour this down the drain with running hot water. The acid in the vinegar helps break down any chunks of alginate that may form, so that you don't have any film left behind.
2. Clean the containers again with hot soapy water.

For more information about this and other "molecular gastronomy" techniques that you can have fun with in the kitchen, visit <http://www.molecularrecipes.com/>.

For the science behind instant worms, please read our poster attached in the email (Please remember that the procedure on the poster is outdated, the procedure here has been optimized!)