



Science Experiment: Magic Orbs

Project: Arts & Crafts, Food Science

Supplies:

- **Unflavored gelatin or agar** (Agar, or agar flakes can be found in the Asian food section of many grocery stores)
- **Water**
- **Vinegar**
- **Food coloring**
- **Cold vegetable oil in a tall container. Chill oil in freezer or on ice for at least an hour, or until it is cloudy, but still liquid.**

HINT: Orbs made with vinegar and agar shrink better than those made with gelatin

Time: 20-30 minutes

What to Do:

Standard Orbs:

1. With adult supervision, dissolve 5 packets unflavored gelatin or 2 Tbs. agar in 1 cup hot water. Add 2 tsp. vinegar. Microwave and stir until completely dissolved.
2. Pour into smaller containers and add food coloring. When cooler, but not solid, add the melted, colored gelatin or agar to an empty glue container or squeeze bottle.
3. Drip gelatin or agar solution into the cold oil, a few drops at a time so it forms into marble-sized orbs and sinks. Drip two colors together to make multi-colored orbs! Allow to cool for 30 seconds or so and retrieve with a slotted spoon or strainer. Rinse with water and repeat, re-chilling the oil as needed until you have as many orbs as you want.
4. Rinse orbs with water. Dry them out by setting them on a plate overnight if you want to see them shrink and then re-hydrate them with water. Orbs can be kept in a plastic bag in the refrigerator. (Keep away from small children, since they may be a choking hazard.)

To make floating orbs, follow directions above, but make with 1 cup white vinegar and 2 Tbs. agar. They will sink and float when added to water with a few tsp. of baking soda mixed in as the vinegar and baking soda react to form carbon dioxide gas.

To make color-changing orbs, dissolve 2 Tbs. agar or 5 packs unflavored gelatin in 1 cup **red cabbage juice (magic potion)** and follow directions for making orbs. Then drop them in vinegar to watch them turn pink or in water containing baking soda to watch them turn blue!

Note to facilitator: Some chefs use a technique called oil spherification to make tiny round morsels using everything from balsamic vinegar to fruit juice, mixed with gelatin and agar. It's known to cooks as a "molecular gastronomy" technique, and takes advantage of the fact that water and oil don't mix. Water-based droplets falling through chilled oil form into perfect spheres due to surface tension, and gelatin and agar added to the mix are colloids that solidify as they cool. Note: This experiment is inedible.

Reflect:

1. What did you think would happen when you added the gelatin or agar solution to the cold oil? What really happened?
2. What did you observe about the orbs?
3. Does water and oil mix? Why or why not?

Apply:

1. In what other areas have you observed orbs or similar creations?
2. How can orbs be used in food science?
3. What other items can be made with this similar process?

Source: <http://kitchenpantryscientist.com/>

****Note to facilitator: Adult supervision is required for this project, since it involves hot liquids. The orbs may also be a choking hazard, so keep them away from toddlers.**