



# Food Science/ Healthy Living:

## Project: Vegetables - Emulsions

### Supplies:

- Choice of vinegar – balsamic, white wine vinegar, red wine vinegar, apple cider vinegar (6 Tablespoons)
- Dijon mustard (4 ½ teaspoons)
- Salt and pepper (to taste)
- Choice of oil – extra virgin olive, canola, corn, sunflower (1/3 cup)
- Clean bowl and whisk
- Choice of salad greens – romaine, arugula, spinach, kale
- Choice of vegetables in a variety of colors – carrots, cherry tomatoes, broccoli, cauliflower, purple kohlrabi or cabbage, yellow bell pepper

**Time: 1 hour**

### What to Do:

Control:

1. Measure the vinegar, mustard, salt and pepper into a bowl and whisk until well blended.
2. Slowly begin adding the oil in a steady stream while whisking very quickly.
3. Continue whisking until all the oil has been added to the dressing and it is emulsified and thickened.

Variable:

4. In a separate bowl, make the recipe a second time. This time, measure **all** the ingredients, including the oil, into the bowl all at once. Now, try to whisk these ingredients into an emulsion.

Have different groups of students use different mixtures of vinegar and oil. Have everyone taste all recipes using the salad greens and cut up vegetables. Record your findings

### Reflect:

Table 1. Comparison of Blending Techniques of Oil and Water Emulsions

	Appearance	Texture	Flavor	Overall Results
Control				
Variable				

1. Explain the difference in texture of the control and the variable.
2. What is the emulsifier in this recipe?
3. What are some other food products that use an emulsifier? (products that mix oil and water)

## Apply:

An emulsion is a dispersion of one immiscible liquid in another. Dispersions of water and oil are the most common food emulsions. Emulsions may be either *permanent* or *temporary*. Without emulsifiers or stabilizers, the components of emulsions separate quickly. These emulsions are called *temporary*. Emulsifying agent such as egg yolk, or Dijon mustard will enable the emulsion to remain *permanent*.

Some of the most recognizable emulsions that are easy to make at home include vinaigrette-style dressings, mayonnaise, and hollandaise sauce. The emulsifier in a vinaigrette is Dijon mustard, while the emulsifier in mayonnaise and hollandaise sauce is egg yolk.

Purdue Extension 4-H Food Curriculum. You're the Chef: Emulsions pg. 10-11.

## Salad in a Jar!

A great use for these homemade emulsion dressings is a salad in a jar! This super easy recipe makes lunches so much easier when you are trying to get out the door in the mornings, when you don't have time to make lunch, or to take on a picnic. Just follow these steps to put together a salad in a jar that won't get soggy and can showcase your homemade salad dressing.

1. Pour 1 to 4 tablespoons of your salad dressing into the bottom of your jar (or shake your dressing in the jar and allow it to settle in the bottom before adding other ingredients).
2. Add your hard vegetables and any heavy ingredients like carrots, cucumbers, and bell peppers.
3. Next add any beans, cooked grains, and cooked pastas.
4. Cheese and protein could get soggy and unappetizing if left in the fridge for more than 1 day, so if you plan to eat this salad within a day, add cheese and any meats at this point. If not, wait and add them right before you eat the salad.
5. Softer fruits and vegetables should also be added the day you're planning to eat the salad, but if you are going to eat it soon, add them at this point.
6. Nuts, seeds, and light grains are less heavy and dense than all of the other ingredients so add things like sunflower seeds, almonds, and walnuts here.
7. Top your toppings with your salad greens at the top of the jar! Tearing the greens into bite-sized pieces will make the salad easier to eat and will be easier to pack more into the jar.

These salads can be kept in the refrigerator for up to 5 days, but make sure you only include the ingredients that won't get soggy fast. When you're ready to eat, pour the salad out onto a plate or into a bowl and all of the ingredients will fall right into place!

## Background:

Emulsified salad dressings often accompany vegetables. Salad dressing can enhance the flavor of many vegetables making them more appealing and encouraging consumption.

### Vegetables:

Vegetables are an important part of healthy eating. Vegetables provide a source of many nutrients, including:

Potassium – may help keep blood pressure in check (white and sweet potatoes, white beans, tomato products, spinach)

Fiber – helps reduce cholesterol and may lower risk of heart disease and is important in bowel function

Folate – helps your body form red blood cells and reduces the risk of neural tube defects during fetal development (fortified foods)

Vitamins A – keeps eyes and skin healthy and helps protect against infections (cabbage, carrots, red bell peppers, spinach, sweet potato, tomato)

Vitamin C – helps heal cuts and wounds and keeps teeth and gums healthy. Also aids in iron absorption (bell peppers, cabbage, cauliflower, summer squash, sweet potato).

Eating a diet rich in vegetables may reduce the risk for stroke, cancer, heart disease, and type 2 diabetes. All types of vegetables including fresh, frozen, canned, raw or cooked, are good choices. Aim to fill half your plate with vegetables and/or fruits for every meal. Try to eat a wide variety of colorful vegetables daily.

U.S. Department of Agriculture. ChooseMyPlate.gov Website. Washington, DC. Why is it Important to Eat Vegetables? <http://www.choosemyplate.gov/food-groups/vegetables-why.html>. Accessed May 12, 2017.

Info regarding emulsions: <https://stellaculinary.com/cooking-videos/food-science-101/fs-001-what-emulsion-cooks-guide>