

Make an Emulsion

Estimated Time: 30 minutes

SUMMARY

An emulsion is a mixture of two liquids that don't dissolve in each other, one just disperses into the other. The liquid that disperses is referred to as being in a dispersed phase while the other is referred to as being in the continuous phase. Emulsions are temporary unless you add an emulsifier. Emulsifiers are molecules that help liquids bind together. Some common emulsifiers found in food science are honey, egg yolks, and mustard.

WHAT YOU'LL LEARN

- Examples of commonly found emulsions in your home
- Emulsifiers keep emulsions intact and prevent an immediate separation of liquids

Materials Used	Resources Used
<ul style="list-style-type: none"> • Measuring spoons • Clear cups or glasses • Mustard • Honey • Vinegar • Oil • Fork or whisk • Seasonings and herbs • Lettuce leaves or bread for dipping 	<ul style="list-style-type: none"> • https://www.finecooking.com/article/how-to-make-and-fix-emulsion-sauces

WHAT TO DO

1. When you eat a salad, you want the leaves to be crispy and fresh. If you just put oil and herbs on lettuce, the thin waxy layer that covers the leaves is permeable and the leaves would become wilted and greasy. You can demonstrate this by pulling two small pieces of lettuce and covering one with oil and the other save as a control. Observe the leaves after a few minutes to see if they are wilted.
2. To combat this, salad dressings are created with an emulsifier, which keeps the oil surrounded by other molecules and prevents it from saturating the lettuce! There are two types of basic emulsions: oil in water and water in oil. This recipe can make both, it depends on how quickly you add oil to the mixture. If you add too quickly the result is oil in the continuous phase and vinegar in the dispersal phase.
3. Prepare a basic vinaigrette using the following recipe:
 - a. Whisk together 1 teaspoon of honey or mustard and 1 tablespoon vinegar in your cup or glass
 - b. Add 3 tablespoons of oil, a few drops at a time, whisking continuously (this helps break the oil into smaller drops)
 - c. Tilt the glass or cup to help mixing. You might need another set of hands to help.
4. Now you should have an oil in water emulsion, with vinegar acting as the water. The honey or mustard you added will keep the molecules of vinegar around the oil and help prevent the oil from soaking the lettuce. If your salad dressing is oily and thin, this is a

water in oil emulsion. This can also work for this experiment but it may cause your lettuce to be oily.

5. Next, add some flavorings, making sure to note which you added and how much. Common flavor combinations include honey and garlic or mustard and sugar, but be creative!
6. Taste test your emulsion by dipping bread or a lettuce leaf into it. Adjust the flavors and see if you can come up with a winning recipe that everyone in your family likes!

TIPS

- Proportions are important - the key ratio is three parts oil to one part vinegar with at least one third part emulsifier to keep the oil droplets crowded together.
- An extension activity might be to mix up several different dressings and have a blind taste test. Can your family members discern the different herbs and spices you used?
- If your vinaigrette seems too thin, add more oil, but make sure to constantly whisk and add slowly.
- Flavors that balance your sense of taste are tricky but generally people can detect salts, sweet sugars, sour acids, bitter alkaloids, and savory amino acids. Fats, like oil, spread the flavor across the tongue.
- Other products in your home are emulsions - look at lotion, sunscreen, some paints, asphalt, milk, and butter.