

## **What is an Emulsifier?**

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No doubt, many of you have looked at food ingredient lines and wondered what purpose is served by some of the things listed there. This is particularly true of the ingredients with strange looking chemical names. Not only are they confusing, but their very presence can make you feel a bit leery about eating them.

You may have seen items such as soy lecithin and the somewhat more daunting sodium stearoyl lactylate included in salad dressings. They are part of a group of compounds classed as “emulsifiers”. If I said that the function of an emulsifier was to stabilize an emulsion, this would come across as a lot of chemistry mumbo-jumbo and circuitous logic that really wouldn’t shed any light on the topic whatsoever.

So let’s take a step back and look at what emulsions are and why they need to be stabilized.

If you pour some water into a bottle and add some vegetable oil to it, the first thing you should notice is that the two liquids do not mix. The oil will float as a layer on top of the water. Putting a lid on the bottle and shaking its contents vigorously will result in oil droplets of various sizes being dispersed in the water phase. This dispersion of the oil droplets in the water is referred to as an emulsion. However, the mixture is unstable and the oil droplets soon go back to forming a layer on top of the water. What we have here is a temporary emulsion. In the case of an oil and vinegar salad dressing, vinegar, which is primarily water, will form the bottom layer with the oil on top of it.

If you whip the oil and water mixture to make the oil droplets quite small, the emulsion will take longer to separate, but it still won’t be stable. In order to keep the oil droplets from coalescing to form larger droplets and eventually separate, certain additives can be incorporated into the product – these are the emulsifiers.

A typical emulsifier molecule has one end that is “water-loving” while the other end has an aversion to water. When blended into the oil and water, the emulsifier molecules line themselves up around the oil droplets with their “water-loving” ends in the water and the other end pushing into the oil droplets. They then act to keep the oil droplets apart and dispersed or suspended in the water phase of the mixture.

Egg yolks contain a significant amount of lecithin that is a commonly used emulsifying agent, or emulsifier. In mayonnaise, lecithin from egg yolks forms a protective coating

around the individual oil droplets that prevents them from coalescing, and helps hold them in suspension.

Lecithin can also be extracted from soybeans. It is used as an emulsifier in such things as the chocolate chips in my favourite cookies. There are even ingredients in mustard which make it a suitable emulsifying agent for certain applications.

Finely divided powdered material can also act as an emulsifier. Adding pepper or paprika to an oil and water mixture will set up a system where the fine particles coat the oil droplet surfaces and help keep them apart.

Naturally occurring milk protein molecules can form a thin film around the fat droplets in the milk that will help stabilize the emulsion formed when milk is homogenized.

Gums may be added to salad dressings to thicken them, thereby helping to stabilize the emulsions. If the water-based portion of the dressing is sufficiently thickened, it becomes viscous enough so that the dispersed oil droplets cannot move easily, which prevents them from joining together and rising to the surface. You may see ingredients such as xanthan, carrageenan, or other gums listed on the product label. These are commonly used thickening agents in many food products.

In preparing to write this article, I bought a bottle of Greek dressing at the local supermarket. The combination of soybean and canola oils was quite distinct from the water-based ingredients. The fact that the majority of ingredients were either dissolved or suspended in the water phase in the bottle made the clear oil phase on the top stand out rather noticeably. The instructions on the bottle simply said to “shake well”. Vigorous shaking would produce a temporary emulsion that would exist until you immediately poured it on your salad, and then it would begin to separate on the lettuce leaves and other surfaces in your salad. Anyone using the bottle of dressing after you would also have to shake it to re-form the temporary emulsion once again.

The next time you use mayonnaise or a salad dressing, check out the ingredient line and see if you can spot the emulsifiers.



**An oil and vinegar-based salad dressing with ingredients in the water phase on the bottom and the oil layer on the top.**