

## HERB INFUSED OILS

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Infusing oil with fresh herbs and vegetables is a creative way to add flavor and interest to cooking. The basic concept is that the essence of fresh garlic and herbs is infused into oil. Oil infusions are easy to make, but they have a real potential to become unsafe when not properly prepared and stored.

Infused oils are only safe for shelf storage when research-based methods are meticulously followed. Added ingredients (garlic and herbs are common) must be acidified before they are added to oils. That does not mean that you cannot infuse oils without acidifying the added ingredients. But, failure to acidify will result in a final product that must be stored under refrigeration and used within two or three days.

In 1991, the Food and Drug Administration mandated the addition of an acid to all commercial garlic-in-oil preparations as a safeguard. The proper addition of acid was thought to be virtually impossible to do correctly in a home or restaurant kitchen. However, current research at the University of Idaho has proven a safe method for infusing oils with home acidified garlic, basil, oregano or rosemary.



Rosemary Oil  
Photo by Adair Hoover, ©2014 HGIC,  
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### Why Acidify?

*Clostridium botulinum* is the biggest safety concern related to storing jarred and canned foods at room temperatures. That is because the ideal conditions for the botulism toxin to be activated are created in an environment that is low acid, low oxygen, moist, and held at temperatures between 38 ° – 118 °F. Those are exactly the set of conditions that are created when oil is combined with low-acid foods (i.e., garlic and herbs). The oil creates a low oxygen environment, garlic and herbs are low acid, there is abundant moisture and shelf storage temperatures are well within the zone for pathogens to thrive.

There is only one scientifically tested method for infusing oils with garlic and herbs. This researched method was created and tested at the University of Idaho and is specific to fresh garlic, basil, oregano and rosemary. No variations or substitutions have been tested and proven safe.

Again, oils may be infused with fresh herbs or garlic without acidification, but those infusions must be stored in the refrigerator and used within two to three days. And, infused oil (non-acidified) that is left at room temperature for more than two hours must be discarded. Additionally, there are no science-based recommendations for pressure or water-bath canning infused oils.

### Procedure

**Prepare for Safety:** Top quality and safety requires practicing very best sanitation and personal hygiene during each phase of infusion. This includes washing and drying herbs and/or garlic during prep and

using high quality, clean bottles for storage. Dark colored, food-grade bottles will help prolong quality storage.



Sanitized workspace.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Wash and dry herbs thoroughly before use.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Peel and wash garlic before use.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Use properly sanitized bottles for infusing oil.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension

**Acidify the Garlic & Herbs:** Acidifying involves immersing raw, chopped garlic or fresh herbs in a 3 percent solution of citric acid (1 tablespoon citric acid dissolved in 2 cups potable water) soaking for 24 hours, and then removing the garlic or herbs from the soaking solution.

Citric acid is the only acid product tested and approved for making oil infusions at home. It is optimal because it contributes fewer flavors than other acids like lemon juice or vinegar. It is often available at health food stores, pharmacies, grocery stores, and retailers that sell canning supplies. Lemon juice and vinegar have not been tested for acidifying garlic and herbs in oil infusions and cannot be substituted for citric acid. And lastly, be careful not to confuse citric acid with ascorbic acid (vitamin C). Ascorbic acid does not have the same acidifying properties as citric acid.

The acidification procedure was developed for garlic, basil, oregano and rosemary. Do not use other vegetables or herbs. To acidify, soak the garlic or herbs in 3% citric acid at room temperature for 24 hours. This is the amount of time required for the acid to fully penetrate the ingredients and bring the acidity beyond the growth limit of the botulism bacteria. Less-concentrated acid solutions or shorter soaking times can result in an unsafe product.

Garlic requires a soaking ratio of one part garlic to three parts 3% citric acid solution, by weight.

This is the equivalent to  $\frac{2}{3}$  cup peeled, coarsely chopped, garlic cloves to 2 cups of citric acid solution. Garlic cloves must be peeled and coarsely chopped prior to soaking, with pieces no larger than  $\frac{1}{4}$  inch in

any direction to allow complete penetration by citric acid.

**Table 1. Citric Acid Solution for Garlic**

Citric Acid	Water	Garlic (chopped)
½ T	1 cup	1/3 cup
1 T	2 cups	2/3 cup
1 ½ T	3 cups	1 cup
2 T	4 cups	1 1/3 cup
*T = tablespoon		



Garlic cloves prepared for coarse chopping.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Strained garlic after soaking for 24 hours in 3% citric acid solution.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension

Basil, oregano or rosemary require a soaking solution of one part fresh herb (stems with leaves attached) to 10 parts of 3% citric acid solution, by weight. This is roughly equivalent to 1½ cups of loosely packed herbs to 2 cups of 3% citric acid solution, but it is best to weigh out 1.7 ounces (47 grams) of herbs. Weighing the herbs is more accurate than using a volume measure because the density of fresh herbs can vary.

**Table 2. Citric Acid Solution for Basil, Oregano, and Rosemary**

Citric Acid	Water	Herb
½ T	1 cup	0.85 oz
1 T	2 cups	1.70 oz
1 ½ T	3 cups	2.55 oz
2 T	4 cups	3.40 oz
*T = tablespoon		

During soaking, place a weight on the herbs to keep them submerged in the acid solution for the full 24 hours. When completed, drain off the citric acid. The garlic, basil, oregano or rosemary is now acidified and safe to add to oil.

**Infuse the Oil:** Olive oil is ideal for accepting the garlic and herb essence because it complements their distinct flavor. However, if you want the garlic or herb flavor to dominate, a milder oil (canola, for example) should be used. Canola and olive oil are preferred over other vegetable oils because they contain fewer polyunsaturated fatty acids and that helps hinder oxidation and rancidity.

There are two factors that affect how long it will take to fully infuse oils: proportion of garlic/herb to oil and temperature during infusing. You can adjust these conditions to achieve the flavor you prefer.

**Proportion:** The ratio of flavoring material to oil used in The University of Idaho's research was 1 part acidified garlic or herb to 10 parts of oil. This ratio may be increased or decreased to achieve desired intensity.

**Temperature:** The University of Idaho had success infusing oils at room temperature (about 70 °F) for 1 to 10 days with the intensity of flavor increasing over time. For quicker results, oils may be heated. Successful infusions were created at a temperature of 140 °F for 5 minutes. Exceeding a temperature of 140 °F is not recommended because higher heats will damage oil flavor. The flavor of oil infusions will continue to intensify as long as herbs and garlic are left in the oil. For this reason it is recommended that acidified additions be removed once the desired flavor is reached.

**Storage:** Infused oils are safe for shelf storage when using these scientifically-tested methods. Dark-colored containers and storage in a cool, dark cabinet are optimal. To obtain the longest storage time, store oil infusions in a refrigerator.



Properly weigh herb and garlic proportions using a scale.

Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Double bag method for weighting submerged herb or garlic in 3% citric acid solution.

Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Double bowl method for weighting submerged herb or garlic in 3% citric acid solution.  
Photo by LayLa Burgess, ©2016 HGIC, Clemson Extension



Herbs and/or garlic remain in oil for 1-10 days, depending on intensity of flavor desired.  
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### Source:

1. Barbara Abo, Josh Bevan, Surine Greenway, Beverly Healy, Sandra M. McCurdy, Joey Peutz and Grace Wittman. 10/2014. "Making Garlic and Herb-Infused Oils at Home. Universality of Idaho
2. Barbara Abo, et al. 2014. Acidification of Garlic and Herbs for Consumer Preparation of Infused Oils. *Food Protection Trends* 34(4): 247-257

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