

The Ancient Art *of Raw* **VINEGARS**



**101+ USES FOR RAW, GOURMET VINEGARS
YOU CAN MAKE YOURSELF FOR PENNIES**

www.TheGrowNetwork.com

Disclaimers and Legal Notices

You do not have the right to reprint or resell this e-book. You also may not give away, sell, or share the content herein.

© 2017 The Grow Network Inc.

ALL RIGHTS RESERVED. No part of this e-book may be reproduced or transmitted in any form whatsoever—electronic or mechanical, including photocopying, recording, or by any informational storage or retrieval system—without express written, dated, and signed permission from the author.

MEDICAL DISCLAIMER: The contents of this report, made available via The Grow Network, are for informational purposes only and do not constitute medical advice. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment.

Always seek the advice of a qualified health care provider with any questions you may have regarding a medical condition.

If you think you may be suffering from any medical condition, you should seek immediate medical attention.

You should never delay seeking medical advice, disregard medical advice, or discontinue medical treatment because of information provided by TGN.

Reliance on any information provided by this report is solely at your own risk.

LEGAL NOTICES: The information presented herein represents the view of the author as of the date of publication. The author reserves the right to alter and update her views for any reason and at any time.

This e-book is for study and discussion purposes only. While every attempt has been made to verify the information provided in this report, neither the author nor her affiliates or partners assume any responsibility for errors, inaccuracies, or omissions. Any slights of people or organizations are unintentional. If advice concerning legal or related matters is needed, the services of a fully qualified professional should be sought.

This report is not intended for use as a source of legal or accounting advice. You should be aware of any laws that govern business transactions or other business practices in your country and state.

About The Grow Network

This e-book is brought to you by Marjory Wildcraft and The Grow Network.

We like to think of ourselves as “backyard researchers.”

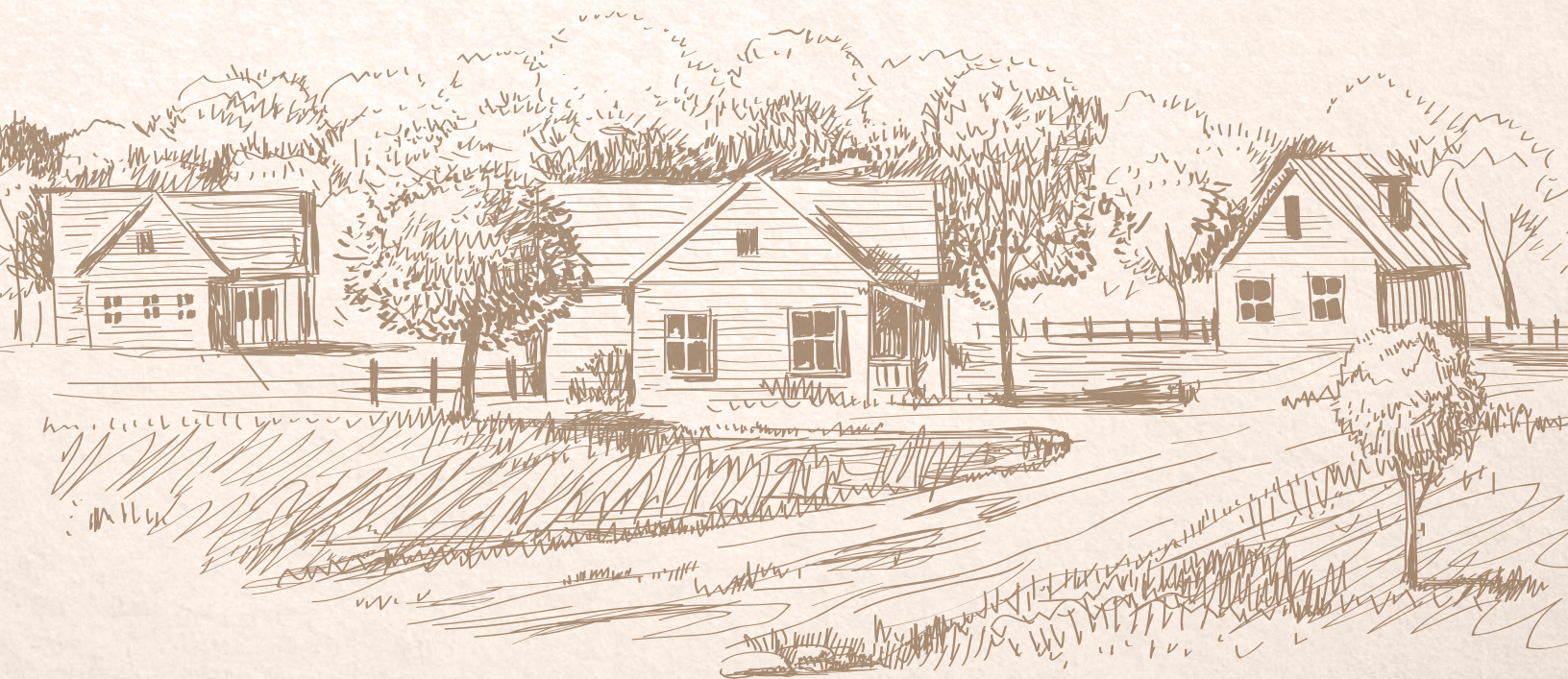
We’re constantly experimenting and sharing our discoveries with one another—testing new paths for sustainable living while reconnecting with the “old ways” that seem to be slipping away too quickly in our modern world.

Our catalyzing statement—the thing that gets us up every morning—is “Homegrown Food on Every Table!”

We value soil, water, sunlight, simplicity, sustainability, usefulness, and freedom.

And we strive to be the most useful site on the web for producing, preparing, and preserving your own food and medicine.

Visit us online at www.TheGrowNetwork.com.



About the Authors



Marjory Wildcraft is the founder of The Grow Network (TGN), the online home of a global community of people who grow their own food and medicine. The vision of TGN is “Homegrown food on every table.”

Marjory has been featured as an expert in sustainable living by *National Geographic*, and she is the host of the Mother Earth News Online Homesteading Summit. She is best known for her DVD series *Grow Your Own Groceries*, which has over a half million copies in use by homesteaders, foodies, preppers, universities, and missionary organizations around the world.

Marjory and her husband are raising two teenage kids in Central Texas. When she’s not building an online network, being “Mom,” and tending her family’s food supply, Marjory loves playing, running, doing gymnastics, skateboarding, acquiring skills from the Paleolithic era (yes, she is part cavewoman), and experimenting with everything.

Tasha Greer is a regular contributor to The Grow Network and has cowritten several e-books with Marjory Wildcraft.

You can follow her **ABCs of Homesteading Series** on the *Mother Earth News* homesteading blog; read her **reLuxe renderings**; or find her at the Surry County, North Carolina, seasonal farmers’ markets, where she sells hand-processed duck, plants, herbs, and other edibles raised at the reLuxe Ranch.

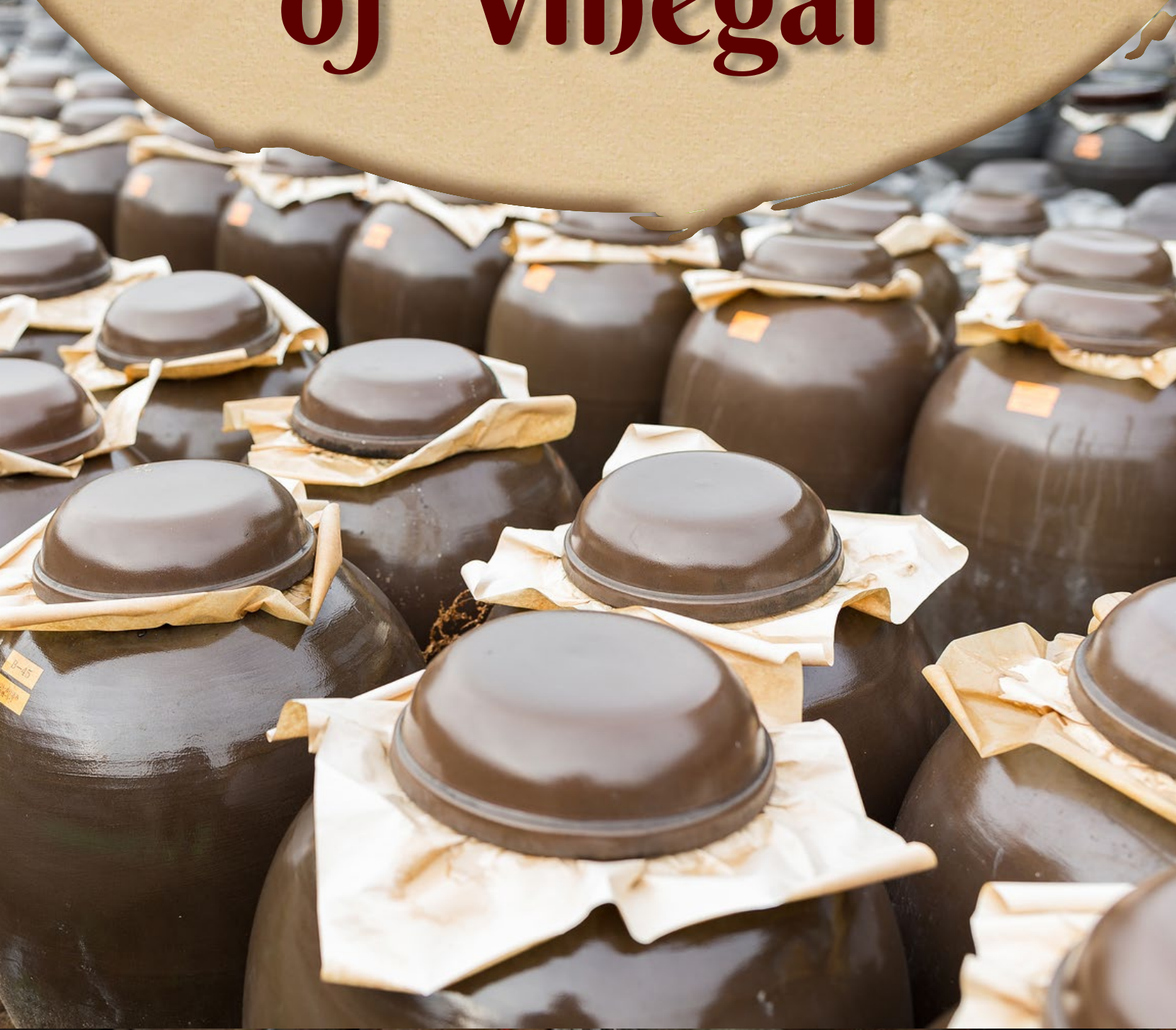
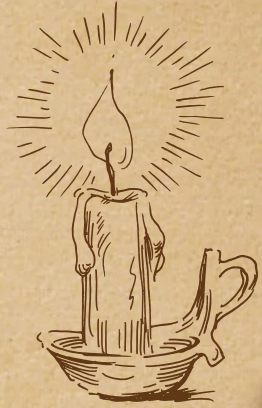


Table of Contents

The Mystery and History of Vinegar	7
Solving the Mystery	8
An Accidental Miracle	9
Ancient, But Mighty	9
A Sweet and Sour History	10
Resurrecting a Primal Past	11
From By-product to Bank	12
Reclaiming the Magic	12
Vinegar Basics: Alcohol	14
Vinegar and Alcohol: An Introduction	15
From Alcohol to Vinegar	18
Happy Yeast: 3 Essentials	21
Vinegar Basics: Acetic Acid	53
The Essentials of Acetobacter Health	54
Calculating Dilution Rates Without Calculus	56
Taste Profiles	58
Trouble Avoidance	61
The Mother of Vinegar	63
Vinegar Acidity	68
Acidity Testing	70
Aging and Acidity	79

Making Vinegar	81
Easy and Delicious	82
Choose Your Method	84
Recipes to Get You Started	87
Vinegar Eels	97
Notes on Bottling	98
Using Vinegar.	101
Growing Up With Vinegar	102
The ‘Mother’ of All Comebacks	103
The Global Benefits of Vinegar	103
Marjory’s Top Picks for Vinegar Use	104
Tasha’s Top Picks for Vinegar Use.	105
Additional Uses for Vinegar, by Category.	106
Vinegar for Herbal Extraction	117
Conclusion	119
Additional Vinegar Resources	120
The Grow Network Resources	121
Vinegar History and General Overview	122
How to Make Vinegar.	123
Vinegar Acidity	124
Alcohol-Making	125
Vinegar Uses	126
Books	127

The Mystery and History of Vinegar



To our ancient ancestors, the transformation of ripe fruit into vinegar was considered a marriage between human industriousness and the inexplicable intervention of the gods.

They could not see the microscopic organisms acting on the sugars in fruit causing them to ferment into alcohol.

Neither could they distinguish the different group of organisms that later converted the alcohol into acetic acid.

It must have seemed like magic.

Solving the Mystery



Incredibly, even though vinegar has been in use since before written history, the mystery behind the magic wasn't solved until 1857.

It was then that famed French chemist Louis Pasteur proposed the idea that microorganisms were responsible for the creation of fermented substances including wine, beer, and vinegar.

At the time, this idea was ridiculed by many because it was simply too impossible to believe.

(Incidentally, Louis was also famous for inventing the process of pasteurization used to kill microorganisms which is now so controversial among fermentation and raw milk-product aficionados.)

An Accidental Miracle



Vinegar, as we call it in English, is a translation of the French word *vinaigre*, meaning “sour wine.”

Most historical accounts of the origins of vinegar claim it was discovered by accident as a result of fruit juice or wine being kept too long.

Since vinegar is made by converting alcohol into acetic acid, many vinegar experts believe the history of vinegar must have paralleled the history of wine and beer making, which dates back 10,000 years or more.

How, or exactly when, sour wine was elevated to the status to “all-around useful household product” remains a bit of mystery. However, manual wine production was so labor intensive that humans living in ancient times probably discovered uses even for soured wine fairly quickly.

Ancient, But Mighty



Despite its mysterious origins, the renowned utility of vinegar as a preservative, condiment, and beneficial beverage has been determined, through testing of ancient containers, to predate written history.

Vinegar enthusiasts and historians have also discovered cultural references to the use of vinegar in every sophisticated society beginning with the Babylonians around 5000 BC.

Stories like the ones about Cleopatra using vinegar to dissolve pearls so she could win a bet about eating a fortune in a single meal and about Roman soldiers using it as a kind of prebattle steroid have served to further elevate the sour substance in our collective esteem.

Today, vinegar is more popular than ever as an indispensable staple in our kitchens, a cleaning supply in our cabinets, and a natural health remedy for our bodies.

Its popularity is growing as more and more homesteaders, preppers, foodies, and DIYers realize its utility in food preservation, herbal extraction, and flavor enhancing, as well as its benefits as a daily probiotic for building intestinal fortitude.

A Sweet and Sour History



Yet, the history of vinegar also aligns closely with another history—that of commercially produced, prepared foods—a subject often vilified by supporters of a less industrialized, de-centralized food practices.

Along with yeast-risen bread and alcohol, vinegar may be one of the earliest “processed” food products to be industrialized and removed from the realm of domestic production.

According to The Vinegar Institute, by about 3000 BC, the making of homemade vinegar was being phased out and, in 2000 BC, vinegar production was largely a commercial industry.

Lawrence Diggs (a.k.a. The Vinegar Man) at Vinegar Connoisseurs International confirms this supposition and adds that the commercial production of vinegar

probably happened coincidentally with the advent of a very large commercial brewing industry in ancient Babylonia.

Resurrecting a Primal Past



The act of reclaiming our ancestral knowledge and bringing vinegar production into our homes is not just a step back into the recent history of preindustrial times. We are literally connecting with a tradition that lost popularity, at the home scale, in an ancient Babylonian civilization that no longer exists.

By making vinegar at home, we're not just having a moment of nostalgia, but taking a time machine trip into a past that we have only read about in history books.

We are connecting with something ancient and primal.

Before you write this idea off as crazy, consider the following:

Perhaps the most fascinating bit of trivia about the mystery and history of vinegar is the fact that in 10,000 years, the fundamental process of making vinegar remains the same.

Yes, we've fancied it up a bit with the aid of pregrown microorganisms (often called "the mother of vinegar"), expedited fermentation and acetic acid production using deprivation and addition of oxygen at key points, and added the option of pasteurization to preserve vinegar at the desired taste and acid complex.

We've even copied nature and made synthetic vinegars.

From By-product to Bank



As of 2015 in the United States, vinegar production had become a \$493 million industry.

That's a long way from being a Babylonian by-product of beer production!

Currently, it enjoys status both as a necessary household staple, in the form of distilled white and apple cider vinegar, and as a luxury good, in the form of traditional Balsamic vinegar that's aged for 12, 25, or even 100 years and can cost \$75 to \$750 for a 3.4 ounce bottle.

As much as it has changed, it also has stayed very much the same—and that may be part of why home vinegar production has such an enduring allure.

The process of making vinegar is both timeless and transcendent.

Reclaiming the Magic



Big corporations may have remystified vinegar production with mega tanks and metal valves, temperature control, and oxygen manipulation.

Small production facilities may have refined and regulated procedures to guarantee more consistent results and better aging practices.

The Mystery and History of Vinegar

And scientists may have named and identified the forces working on the ingredients used in vinegar production.

Yet, at its core, vinegar production is still a marriage of human industriousness and awe-inspiring microscopic forces, without which the magic of making of real vinegar would not be possible.

Through this e-book, we invite you to begin your own vinegar-making experiments and engage in a process as old, or older, than civilized human history.

Vinegar Basics: Alcohol





Vinegar and Alcohol: An Introduction

Before we get into the nitty-gritty details of home vinegar production, let's cover some basic concepts.

First off, vinegar is simple to make.

Fill a mason jar with wine, cover it with a cloth or coffee filter, and let it sit for several months. Eventually, you'll have vinegar.

You may even end up with really good vinegar if you happen to have enough of the right kind of bacteria floating around your house.

So far, so good.

Vinegar: Creation vs. Production

The element to making vinegar that's a little more difficult is getting consistent results each time.

Homemade vinegar is more an act of creation than an act of production. Your results will vary by time of year, ingredients used, and even the bacteria on your skin as you handle your equipment.

Modern, industrial vinegar production, on the other hand, is all about strictly controlling the environmental conditions and types of yeast and bacteria that influence the vinegar outcome.

If you *really* want a certain taste complex, specific acidity levels, or to control the timing of production so you can use it on demand, then buy bottled vinegar from the professionals.

But honestly, why would anyone want to make grocery store vinegar at home?

The point is to make something completely different.

Standards—Not Standardization

Homemade vinegar is naturally healthy, uniquely delicious, and vitally alive!

So, let's be clear: This e-book is **not** about commercialized, standardized vinegar. It is about using your home environment, a few simple tools, easy-to-learn skills, and the application of time and magic to nurture something that will be entirely and fabulously yours.

You should treat this manual just like you would a small-batch, limited production, home-based hooch-making guide.

It is not a hoity-toity, high falutin' scientific guide that can only be read with the aid of a translator.

It's a down-home, get-'er-done, have-some-fun starting point to your own vinegar-making adventures.

The Fine Print

On the subject of hooch ... the production of vinegar is regulated by the same division of the US government that controls the production of whiskey and other spirits—the Alcohol and Tobacco Tax and Trade Bureau.

If you live in the US, vinegar-making is generally treated under the same regulations as wine or hard-cider making.

In a one-adult household, adults who are at least 21 years old can legally make up to 100 gallons of wine, vinegar, or a mix of the two for personal use. In a household with two or more adults, that number increases to 200 gallons.

Now, let's say you tried to sell your homemade vinegar at the local farmers' market without being a bonded wine producer.

Well, then it really would be hooch, and you'd be under arrest or heavily fined if caught.

State, county, and city regulations may vary, so we can't swear you're allowed to do this at home—you'll want to check your local laws.

But, at least, the US federal government still lets you.

Down the road, if you decide you want to make really fine vinegar—as in, vinegar made with fine spirits that you distilled yourself—then you'll absolutely want to check with your state authorities, as home distillation laws vary widely by state.

Now that we've cleared that up, let's cover some major concepts related to vinegar-making before we head into the kitchen.



From Alcohol to Vinegar

How many kinds of vinegar can you think of?

Apple cider?

White wine?

Raspberry?

Distilled white?

Champagne?

Sugar cane?

Sherry?

Rice?

Malt?

Red wine?

Balsamic?

Pineapple?

We bet you could think of many more.

And you'd be right, because according to the still useful and totally free handbook **Making Vinegar in the Home and on the Farm**, by Edwin LeFevre, issued by the USDA back in 1924:

"Anything may be used for making vinegar, so long as it contains enough sugar and is in no way objectionable."

—Edwin LeFevre

Making Vinegar in the Home and on the Farm (1924)

That's because anything marginally edible with enough natural sugar, or enough sugar added, can be converted into alcohol. And all vinegar is made by converting alcohol into acetic acid.

Where to Begin

No matter what kind of vinegar you make, you must start with alcohol to end up with vinegar.

The kind of alcohol you use will determine the kind of vinegar you make.

- 💧 Apple cider vinegar is made from hard apple cider.
- 💧 Red wine vinegar comes from red wine.
- 💧 Raspberry vinegar starts with raspberry wine.
- 💧 Distilled vinegar starts with distilled spirits.

And so on.

You Can Start at the Store ...

Some home vinegar-makers choose to start their vinegar adventures with ready-made alcohol because it is easier to work with and produces a more reliable result.

It's like building a shed with store-bought lumber. You still built the shed, even if you didn't cut your own trees or mill your own wood.

Right?

Using purchased or gifted alcohol is a perfectly respectable place to begin your vinegar journey.

... Or Start at the Storehouse

That said, it's also not too hard to start from total scratch and make your own alcohol.

This adds more steps, has more "rules" to follow, and introduces potential points of failure into the process.

By taking a few precautions and keeping an open mind about the outcome, you can make vinegar-worthy alcohol in your own kitchen without too much trouble.

In fact, if you've ever left a bowl of vine-ripened, homegrown tomatoes sitting on your counter too long in summer and noticed that musty-sweet stink emanating from the bowl, then you've already made alcohol at home.

(If you actually want to make tomato vinegar, you'll probably want to do it intentionally. Even though tomatoes readily make alcohol if left to their own devices, they don't make enough of it without added sugar to be good for vinegar. But, their tendency to turn mushy and get yeasty does give you a good idea of how to go about making alcohol.)



Happy Yeast: 3 Essentials

To make alcohol for vinegar at home, you need happy yeast. And to get happy yeast, you need to provide them with a comfortable place to grow, the right temperature and lighting conditions, and—of course—plenty of sustenance.

Habitat and Appetite

Happy yeast need lots of their favorite food—sugar!

Yeast are living fungi, and just like you and me, they need to eat well to thrive.

Also like us, they tend to do their best work when they have good habitat.

Secrets to Great Habitat

Many home vinegar-makers create habitat using a fruit “mash” by cubing, mincing, or actually mashing food and covering it with liquid.

Surface Area and Liquid

The goal in making your mash is to create a lot of surface area on your chosen food source for better oxygen exposure so you can attract yeast.

Aim for bits and pieces about an inch cubed or smaller.

You also want enough fluid to end up with a worthwhile amount of vinegar for your effort.

Although the amount of liquid you can add varies according to the amount of liquid in your food mash to begin with, a good general rule of thumb is to cover your mash with one to two inches of liquid.

For foods that don't naturally turn to juice, such as potato peels, a ratio of 1:1 (e.g., 4 cups potato peels to 4 cups water) works well.

With a good balance of sugar, solids, and liquid, your mushy mash makes a great place for those little yeasty beasties to hang their hat and take a load off while doing all that hard work of making alcohol for you.

Juice vs. Mash

You can also simply use juice to make alcohol.

This works best if your juice is fresh and unpasteurized.

However, there are a few instances when using a mash makes more sense:

- 💧 With food items that have a lot of flavor but not a lot of juice, or when you want to use food scraps like peels and rinds that would otherwise be waste products, employing a mash allows the flavors and sugars to be extracted from the firmer, less juicy parts during the conversion of sugars to alcohol.
- 💧 If you plan to rely on wild yeast (which we'll cover shortly), the mashed-up bits carry a lot of native yeast and make a great attractant for even more yeast when exposed to air over time.

Even when using juice as your main sugar and liquid source, adding some chunks of fresh food products can aid in vinegar production.

Feeding the Yeast

Depending on the types of fruits or vegetables used for the mash, you might need to add extra sugar to feed those hungry fungi.

Give Me Some Sugar!

Even foods with low sugar levels can make alcohol.

To ensure plenty of alcohol for acetic acid production (the second stage of vinegar-making), you really want to start with sugars by volume of 10–18 percent.

If you start in this range, your yeast will happily eat and magically excrete alcohol by volume of somewhere between 4–9 percent.

That happens to be about the perfect range of alcohol for happy *Acetobacter aceti*—the bacteria responsible for making acetic acid (and the subject of our next chapter).

Calculating Alcohol Output

The rule of thumb in alcohol production is that you will generally get about half of your sugars back as alcohol.

If you start with 10 percent sugar, then you'll end up with close to 5 percent alcohol.

Fermentation conditions, kinds of sugars, and other factors impact the actual percentage of alcohol. When you use simple vinegar-making techniques as opposed to more controlled fermentation procedures, you will probably get a little less than a 50 percent return on your sugar investment.

So, adding a little extra sugar is a good idea until you get the feel for how sugars impact your vinegar outcome.

Success Without Extra Sugar

In case you really can't stand the idea of adding processed sugar to make homemade vinegar, there are a two classic examples of fruits that are naturally sweet enough to make vinegar.

This is part of why they are favorites for home and commercial vinegar production.

Can you guess what they are?

Yep, you got it! Apples and grapes.

The Beauty of Apples



Apples are commonly used for vinegar because they tend to have at least 10 grams of sugar per each 100 grams of apples, according to the USDA.

(Note: The USDA uses metric units to measure sugar in food since they are more precise than ounces and more universally used among the scientific community. But 10 of 100 of anything is always 10 percent, so we'll use percentages a lot going forward.)

The actual sugar in apples varies by type grown, ripeness at harvest, and other factors like how recently it has rained, etc. Varieties harvested in late fall or early winter have significantly more sugar than summer varieties.

Summer-harvested varieties often don't have the necessary 10 percent of sugars for making yeast happy, so even some apple mashes may need supplemental sugar.

Apple peels also contain high levels of sugar, so it is perfectly acceptable to leave them in your mash.

Many people make apple cider vinegar with nothing more than peels and cores cut up and covered in water.

Covering your apple mash with water does dilute the sugars a bit, but the yeast tend to see the water like we see air. As long as there's not too much of it, it supports yeast activity without radically reducing sugar-to-alcohol conversion rates.

If you're concerned that the sugar content in your apple mash may be too low and don't want to add sugar, you can use sweet apple cider as your liquid to cover your mash and avoid dilution of the natural sugars.

Great Grapes!



Grapes are also frequently used for vinegar because, if picked at peak ripeness, they have upward of 15 percent sugars. They also have less pectin than apples, which means they break down into liquid more quickly, particularly when the skins are removed.

If you mash them well, you may not even need to add any water to cover the grapes during the initial fermentation process, as they provide their own liquid.

With less water, and higher initial sugar content, grapes are unlikely to need additional sugar to be transformed into vinegar.

However, the wine that's produced by fermented grapes sometimes has too much alcohol for vinegar-making.

You will come across wine vinegar recipes that call for adding water to your wine before adding your starter. This is a good practice if using professionally made wines that have alcohol levels above 12 percent.

However, you are less likely to run into the problem of having too much alcohol when fermenting at home since your conditions might not be as precisely suited to wine production.

Professional winemakers test grapes prior to harvest to ensure that grapes are picked at the height of sugar production, whereas your home grapes might not have peak sugar content.

Generally, with grape-based alcohol production at home, dilution is not necessary for vinegar-making.

However, if you prefer a mild vinegar, you can add a little water for good measure.

Like apple skins, yeasts love skins from sweet grapes, too.

But grape skins affect both the taste and color of wine.

- 💧 For red wine vinegar, use red-skinned grape varieties and leave the skins in.
- 💧 For white wine vinegar, use either red- or white-skinned grape varieties, but make sure to take all the skins out before fermenting.

You probably want to remove stems for either variety because they can bitter the batch. They influence the tannins in wine, resulting in a less-sweet taste that will carry over into your vinegar.

Sugar Requirements of Other Fruits

Sweet cherries, figs, persimmons, and prune-type plums also usually have enough natural sugars to ferment on their own.

Fruits like blueberries, pears, raspberries, and pineapple ride the line and usually require some additional sugar.

Strawberries and blackberries always require that sugar be added to initiate fermentation for vinegar-making.

Sugar: To Add or Not To Add

Previously, we said that vinegar can be made out of just about anything you can safely eat, as long as it's not offensive.

So, for example, if you want to make sweet potato vinegar, you absolutely can. You just need to figure out how much sugar to add for good fermentation.

And luckily, that's not difficult.

Determining Initial Sugar Content

At one time, the USDA produced a document called "**Sugar Content of Selected Foods: Individual and Total Sugars,**" which lists foods and their average sugar content. You can also find a more recent version at a non-USDA site [here](#).

The USDA actually stopped producing the tabular sugar data because sugar values are constantly changing. Specifically, the organization had issues keeping up with prepared products.

Even in the realm of raw fruits, though, values change a lot.

Today's average consumer has a more developed sweet tooth than consumers in the past, so even fruit tree and shrub varieties have been cultivated to match these preferences.

(Keep in mind, though, that sweeter tasting doesn't always mean more sugar. Sometimes it just means less acid.)

Regardless, it's easy to see why it might be hard to maintain a current sugar-content calculation for such a long list of food.

As an alternative to the consolidated list, the USDA now makes the most current information available by searching their online **Food Composition Table**. The list is really long, so you'll need to type in your food name followed by the word "raw" (e.g., "peaches raw") to limit your results.

USDA United States Department of Agriculture
Agricultural Research Service
USDA Food Composition Databases

NDL Home **Food Search** Nutrients List Ground Beef Calculator Documentation and Help Contact Us

Select Source: All Data Sources ... Enter one or more terms: peach raw Select Food Group: All food groups ... Select Manufacturer: [Empty] Go Reset

1 food found

NDB No.	Description	Food Group
09236	Peaches, yellow, raw	Fruits and Fruit Juices

Once you find your food item, click on it to see the details.

Locate the "Sugars, total" row and look over to the "Value per 100 g" column. The number in that column is your percentage of sugars estimate.

Nutrient	Unit	Value per 100 g
Proximates		
Water	g	88.87
Energy	kcal	39
Protein	g	0.91
Total lipid (fat)	g	0.25
Carbohydrate, by difference	g	9.54
Fiber, total dietary	g	1.5
Sugars, total	g	8.39

May the Froth Be With You

Given the constant changes in our food supply and all the variables that impact actual sugar in natural foods, these lists should be used as starting points only.

They can point you in the right direction on whether or not to add sugar and how much to add.

Ultimately, though, you will be guided by how much of a frothy mess yeasts make of your mash. If there's no or little mess, you might need to add more sugar (or you might need better fermentation conditions, which we'll cover shortly).

The First Rule of Vinegar-Making

After all that explanation, we have now come to the first rule of making vinegar from scratch at home.

Rule No. 1: When in doubt, add sugar.

A "quarter cup per quart"—as in a quarter cup of sugar per quart of water and mash or per quart of juice if working without mash—is an easy-to-remember rule of thumb for foods that are high in sugar, but maybe not quite high enough.

However, foods or juices that are less sweet to begin with need more added sugar.

Here are some more guidelines to help you figure out how much sugar is needed to avoid fermentation problems:*

Total Sugar Value (per 100 g)	Added Sugar Per Quart of Liquid
9–11 g	1/4 cup
6–9 g	1/3 cup
5–8 g	1/2 cup
0–4 g	2/3 cup

For example, pineapples have almost 10 g total sugars per 100 g, so you can use one quart of pineapple chunks, one quart of water, and 1/4 cup sugar in your vinegar mash.

Blackberries, depending on whether they are cultivated or wild, range from 3.88 g to 4.88 g total sugars per 100 g. So, with a quart of mashed blackberries, you would add a quart of water and 1/2 to 2/3 cup sugar.

(If your blackberries were super juicy after mashing, then you might need less than a quart of water since your berry mash contributes part of the quart of liquid represented in the chart. However, you would still add the same amount of sugar.)

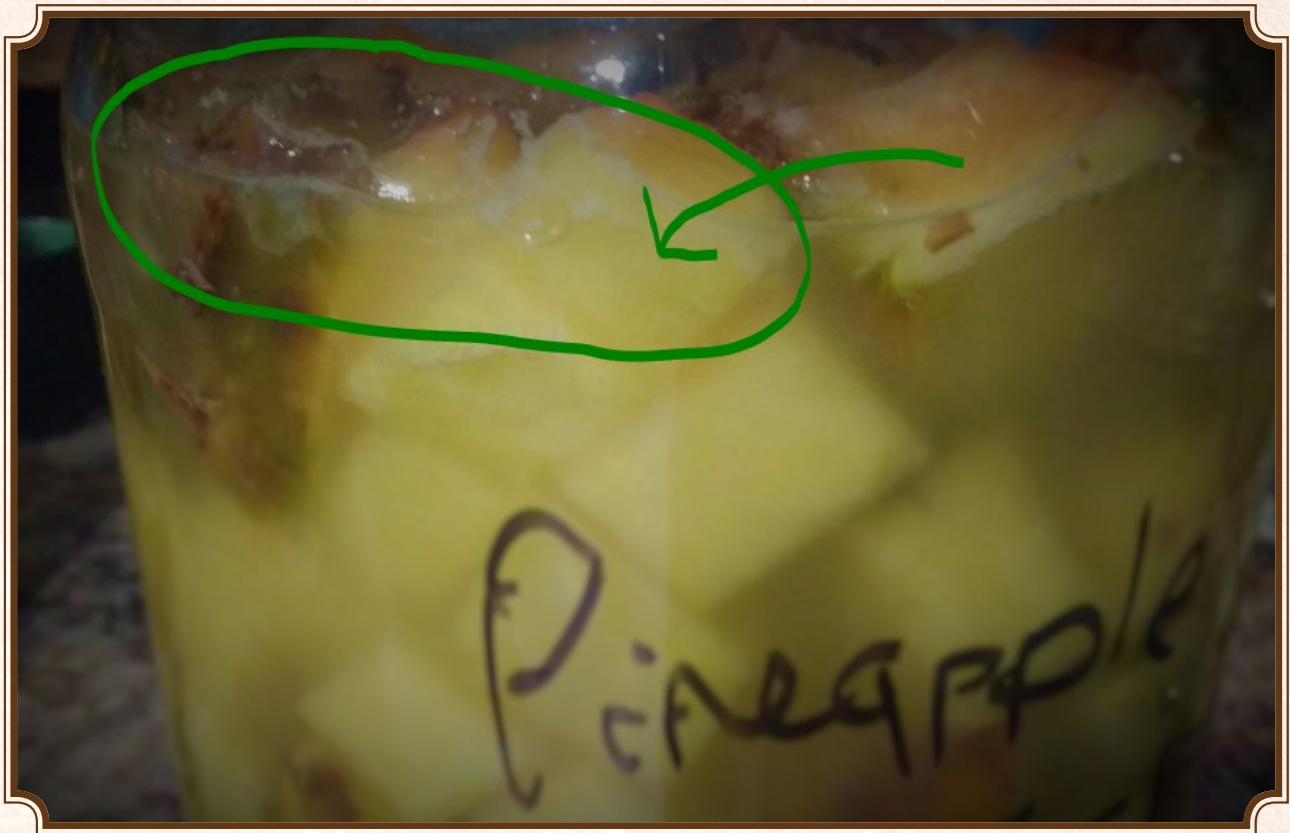
And remember, always mix sugar until it is completely dissolved in your mash.

* Since you will probably be working in small batches at home, we have based our sugar measurements on a quart of liquid. However, you can always scale this up for larger quantities of mash, such as when working with bushels of fruit.

When in Doubt, Guess!

Remember, these are guidelines and none of this information is going to be perfectly accurate, so just use your best guesstimate to get your mash started.

You should see small bubbles forming and collecting at the top of your mash within 24 hours. (Or, if you are using a closed container and an airlock—which we will cover shortly—you should see your airlock bubbling.)



If you don't, then add a bit more sugar to kick-start the process.

Be careful how much you put in, though.

For best home-fermentation results, many winemakers won't add more than 3/4 cup sugar to one quart water.

Experimenting With Different Sugars

When we talk about sugar, we don't automatically mean standard **white granulated sugar**.

You can use that, or you might prefer to opt for less processed varieties like **turbinado** and **demerara**.

You can also use **honey**.

Honey is a natural preservative because of its ability to deter bacteria.

However, if you've heard of mead, then you know that honey will become alcohol—which means it will also make vinegar. Honey requires a more careful fermentation process to produce sufficient alcohol by volume.

It also needs a little more time for fermentation.

And, since honey is only about 75 percent sugar, you need to use 25 percent more of it than you would granular sugar. For example, instead of 1/4 cup of sugar to a quart of water, you would want to shoot for 1/3 cup of honey.

All that said, if you plan to use honey as your sugar, you may want to do a little research on mead-making to get a good idea of how to work with honey.

With sugar contents similar to that of honey, **sorghum** and **molasses** also make good alternatives to granulated sugar if you increase the amount used by 25 percent. As a bonus, they are a little less finicky when it comes to producing the proper alcohol by volume, and they usually carry yeasts with them that can help speed fermentation.

Know the Rules/Break the Rules

There's always a bit of magic and mystery in the home fermentation process.

The more vinegar you make, the more adept you'll become at making your

mash and figuring out how much liquid and sugar to add.

These sugar recommendations give you a good starting point—as long as you also abide by the next few rules of the process.

But once you have some experience, don't be afraid to follow your taste buds and intuition, as they are powerful tools in this kind of creative process.

Temperature and Light

Yeast are pretty picky about their ambient temperatures and lighting.

Some Like It Hot

They like it hot—or at least pretty darn warm.

Generally, yeast do their best work in ranges between 70–85°F.

They can withstand somewhat lower and higher temperatures, but they won't be happy about it and will show their displeasure by working very slowly each day.

This lengthens the fermentation process, and increases the risks that things will go wrong, such as nasty molds forming or yeasts dying prematurely.

Thriving in Shadows

Like most other fungi, yeast also thrive best in indirect light or dark conditions.

Some research suggests that direct sunlight inhibits yeasts' ability to take in oxygen, and can therefore result in premature death.

The Second Rule of Vinegar-Making

With this information in mind, here's your next rule.

**Rule No. 2:
Ferment your alcohol in a warm
(70–85°F) location out of direct sunlight.**

The top of your refrigerator is often a good spot for fermentation, as long as it is not right near a window.

This works for two reasons: ambient heat in your house will rise to the ceiling (near the top of the refrigerator), and your refrigerator motor generates additional heat.

So, even if you keep your house temperature at 65°F, this location has a microclimate perfect for fermentation.

Near, or above, your oven is also a good location since your oven is a heat mass that holds residual heat from your cooking activities.

Gas ovens or stoves with lit pilot lights always generate a little heat.

Vinegar Basics: Alcohol

If you have a continuously lit pilot, you can use your unheated oven or stove-top burners as an ideal fermentation location.



You know your home best, though, so just find a warm spot with indirect light and you'll be off to a good start.

Cultivated Yeast

There are several different ways to make vinegar.

The basic process is always the same:

1. Use sugar to feed yeast.
2. The yeast will then make alcohol.
3. Use the alcohol to feed bacteria.
4. The bacteria will then make acetic acid.

Through this process, food mash or juice, sugar, and liquid become vinegar.

But you also have a few choices along the way.

The first, as we've just covered, is what to make your mash with and how much and what kind of sugar to add.

Wild or Mild?



From there, you get to choose your yeast.

Do you want **wild yeast** or **cultivated yeast** to create your alcohol?

Wild yeasts are just that—the stuff that grows wild in your home and on your food.

The Special Needs of Cultivated Yeast

Cultivated yeasts were once wild yeasts. But, similar to what happens with plant cultivation, yeast users have isolated, saved, and reused the best yeasts for certain purposes with such regularity that the cultivated yeasts have evolved into something completely different than wild yeasts.

Cultivated yeasts are used to make alcohol with specific taste complexes.

For example, red wine yeast produces a different taste than champagne yeast.

These yeasts also work better when given the right medium.

Red wine yeasts work best with grapes that will be fermented with the skins on. Champagne yeasts work better with cider vinegars and light fruit vinegars such as raspberry or pear.

Preventing Unwanted Bacteria

Cultivated yeasts need more attention during fermentation.

For some fruits, pectic enzyme may be used before fermentation to help make the habitat more amenable to cultivated yeasts.

Special care is also taken to prevent non-preferred yeast and bacteria from joining the fermentation party. This is achieved using ingredients like campden tablets to kill native yeasts before adding preferred yeasts, such as champagne yeast for apple cider vinegar production.

Minimizing oxygen input is another method alcohol makers use to inhibit wild yeasts and bacteria.

(Almost) Surviving in a Vacuum

Yeasts need some oxygen to work.

They effectively breath oxygen and exhale carbon dioxide like we do.

However, cultivated yeast can get by on much less oxygen than wild yeast, as can the bacteria that convert sugar to alcohol and alcohol to acetic acid.

By fermenting in closed containers—such as buckets with airtight lids that use airlocks to allow carbon dioxide to escape—winemakers give cultivated yeasts a much better chance at beating out wild yeast that might try to occupy the same space.

You can either make or buy airlocks.

They can be created simply by inserting one end of a plastic tube into a hole in your bucket lid, sealing up the hole with duct tape, and submerging the other end of the plastic tube in a separate container of water. The water in the second container will prevent oxygen from entering the tube and going back to the bucket, while still allowing the carbon dioxide to release.



Purchased airlock devices, found online for only a few dollars, perform the same task as the tube and water glass method, just in a more compact way.

Make sure to add water to your airlock before you close your lid.

Stirring Things Up

Even when using closed containers, stirring the mash daily is necessary to prevent mold from spoiling your batch.

When you open the container to stir, it adds new airflow.

It also disrupts yeast activity. However, after a few swirls with a big spoon, the lid goes back on, the yeast calm down, and they go back to work.

There is always a risk that wild yeasts will join the party when you stir.

But, generally, if the cultivated yeasts have a good head start in ideal conditions, they can keep wild yeasts at bay.

Keeping It Clean

Sterilization of equipment is also important for minimizing risks of bacterial and yeast contamination when working with cultivated yeast.

- 💧 A simple solution of **one tablespoon bleach to one gallon of water** can be used as a sterilizing dip for your equipment.
- 💧 Alternatively, you can buy **no-rinse disinfectant powders** from wine- and beer-making supply shops.

- 💧 For most household sterilizing, vinegar is a go-to disinfectant. But **this is the one time you absolutely don't want to use vinegar!** Keep vinegar far away from your fermentation equipment and the location where you will be fermenting to avoid having acetic acid production begin until after you have finished making wine, cider, or beer.

The Fermentation Timeline

When working with cultivated yeasts, **initial fermentation takes about 4–7 days**, depending on temperature, vivacity of yeast, and the amount of sugar in your mash.

Within a few hours of putting your lid on your mash, **your airlock should go crazy with bubbles at first** (about once every 30 seconds) and then slow down over the next few days.

If it stops bubbling before four days pass, you might want to add more sugar just to make sure you get enough alcohol. If it never starts, you either need warmer fermentation conditions or more sugar.

Adjust either or both, until your airlock starts hopping.

When the airlock stops bubbling at between 4–7 days, fermentation is complete.

Following Fermentation

After fermentation, decant the alcoholic beverage, transferring the liquid to a clean container, but leaving as much of the mash in the original container as possible.

Then, store the liquid in a glass carboy with an airlock for a while.

This gives the yeast a chance to do cleanup work, making alcohol from any sugars they may have missed during their initial fermentation frenzy.

This also lets sediment settle and taste and aroma develop.

The amount of secondary fermentation needed depends on a number of factors, but it can be days to weeks—even months if you also bottle age.

For More Fermentation Information ...

This is a very basic overview of fermentation.

You can get a lot more (and better) information on winemaking from web retailers of home winemaking supplies.

Down the road, if you want to take your vinegar production to the next level, you may want to spend a little time reading up on winemaking, including using tools like hydrometers to test for specific gravity as a way of determining your sugar and alcohol levels during the process.

This is not necessary for vinegar-making, but it's pretty fascinating stuff.

And, if you get really good at winemaking, you may want to wow your friends and family by offering “before and after” bottles of both wine and vinegar to help build their appreciation for the process.

When all of this is behind you and you have some fabulous and even drinkable wine, then you move on to the next step of creating the perfect environment

for your *Acetobacter aceti*—those fabulous little bacteria that convert alcohol to acetic acid.

Or, you can skip all that and make what we like to call “easy vinegar.”

Easy Vinegar

Easy vinegar (EV) relies on wild yeasts.

Wild yeasts are durable suckers that don't need quite so much nurturing.

If you've followed our Rule No. 1 and Rule No. 2, then wild yeast are likely to come. And the really cool thing about wild yeast is that they don't mind working right alongside your vinegar bacteria.

When yeast and bacteria work together, it speeds up vinegar-making.

An 'Easy' Recipe for Success

Generally, EV recipes are not quite as “fine” as winemaking recipes.

They usually result in less alcohol production during initial fermentation, which means less acetic acid production.

However, they can still be plenty strong and contain all the tasty and healthy properties that you want in homemade vinegar.

The really big benefit of EV recipes is that you can get all the ingredients you need from your own garden or local grocery store. And other than making a mash and daily stirring, you can just let them do their thing.

EV recipes always look something like this:

- 🔥 Cut up or mash your fruit (or rinds and peels).
- 🔥 Cover your mash in some quantity of sugar water.
- 🔥 Add some raw apple cider vinegar as a starter or a vinegar mother. (Sometimes this step is left out entirely—more on that in the next chapter.)
- 🔥 Cover with a cheesecloth, store in a warm spot with indirect light, and stir daily for two to four weeks until your mix tastes like vinegar.
- 🔥 Strain the fruit solids, bottle the vinegar, and either use it or store it in a cool, dark spot.

Choosing the Right Container

When using EV recipes, always start your process in nonreactive containers, since acetic acid conversation will begin before you strain your fruits.

Glass, stainless steel, food-grade plastic, pottery, and pleasant-tasting woods (e.g., oak barrels) can all fare well in direct contact with acetic acid.

Other metals and plastics that are not food grade can have caustic reactions when kept in contact with acetic acid. That can affect taste, potentially put unwanted additives in your vinegar, and destroy your containers.



The Benefits of EV

- 💧 EV recipes are a **great use of “waste products”** from other processes, such as apple peels and cores not used in your apple pie.
- 💧 You also get to **reap the rewards for your efforts sooner.**
- 💧 And, as a beginner, you probably want to **try a couple different vinegar experiments at once** to get a good feel for the process and have some fun.
- 💧 You can **make vinegar out of just about any scraps of fruits and vegetables** you have using EV recipes that will help you become an experienced vinegar-maker in no time.

Now, we doubt your broccoli and cabbage stalks mixed with sugar water will make the tastiest vinegar ever, but they still might make great window cleaner.

So go ahead and give them a try.

Also, if you will have a lot of different vinegar experiments going at once, make sure to label your jars with marker, sticky notes, or scrap paper to help you stay organized.

Avoid Kaboom!

If you make your own alcohol for vinegar production, regardless of whether you go EV or cultivated, you always need a carbon dioxide release valve during fermentation.

For EV recipes, covering your open containers with fabric or paper coffee filters lets air in and out so there is no risk of carbon dioxide buildup. For cultivated yeast-style vinegar, using an airlock is a must.

The Third Rule of Vinegar-Making

So, we have now arrived at our third rule.

**Rule No. 3:
Always let carbon dioxide
escape during fermentation.**

Now, this isn't really a book about making alcohol, except for the purposes of making vinegar.

But if you ever get really good at fermentation and want to make fancy champagne or sparkling cider vinegar, you may actually break Rule No. 3 during the fermentation process.

However, you're on your own to figure out how to safely achieve carbonation without exploding a glass bottle in your kitchen. (It happens. Really.)

Avoiding Common Pitfalls

We've covered a lot in this chapter, and there's more good stuff to come.

But before we move on to talk about acetic acid production, we want to leave you with a few parting advisements to help you avoid some common pitfalls.

Store-Bought Juice

Some people who prefer not to buy alcohol like to start with bottled juice.

There are certainly recipes out there that use bottle juice as a main ingredient, and we'll even give you one to try in a later chapter.

However, almost all bottled juice has been pasteurized.

This is done specifically to prevent fermentation and vinegar-making from occurring after bottling.

Any pasteurized juice you start with will be completely lacking the yeasts and bacteria necessary to make vinegar.

Once you open the juice and expose it to air for a while, those yeasts and bacteria will come back.

But it might take longer than it does when you use EV recipes and make a mash.

You can also increase your chances of success by adding a fresh mash to your pasteurized juice. For example, if you start with bottled apple juice, throw in a couple of cut-up apples just for kicks.

Mash Maintenance

Your mash, which makes a great host for yeast and bacteria, is also a potential breeding ground for nonpreferred microorganisms.

Stirring daily will help prevent mold and other less delicious stuff from taking up residence in your mash.

Also, when following the rules mentioned earlier in this chapter, it takes about two to four weeks for both alcohol fermentation and acetic acid conversion to take place.

Once the process is complete, your mash becomes a hazard to the taste and quality of your raw vinegar.

The Downside of Live Vinegar

Canned vinegar products such as pickles are effectively pasteurized during water-bath canning, so that the vinegar is no longer “live.” That’s why it keeps food fresh rather than continuing to make more vinegar.

Live vinegar is still full of active, working microorganisms that will continue to break down food parts as long as they remain in contact.

If left too long, these organisms and their acetic acid by-product can break food down to the point where it is no longer edible or safe.

For example, your vinegar might turn overly bitter, or you might even end up with unwanted toxins, such as the trace amounts of cyanide in apple seeds.

From about two weeks on, make sure to taste your vinegar every couple days.

When it tastes acidic enough to you, strain the liquid from the mash and give the mash to your chickens or put it in the compost pile.

A Strain on Development

Some easy vinegar recipes will include instructions to strain your mash at some point before two weeks pass, and then cover the vinegar again for a couple more weeks to allow for full acetic acid development.

This also works fine, and it does help avoid problems that might arise from leaving your mash too long.

However, the one downside is that a lot of the bacteria needed in the second phase of vinegar production might get strained off in your mash.

There will still be lots of good guys left, and they will eventually reproduce and increase their population again.

But straining before the acetic acid transformation is complete can slow down the process.

When to Add the 'Mother'

To overcome this issue, many EV recipes will have you add your apple cider vinegar or vinegar mother after you strain your mash.

This puts back all those strained-off bacteria that left in the mash and gets you back on track for speedy vinegar production.

As a rule of thumb, if your mash wants to mold or has an inkling of a funky smell (that doesn't seem like it would be tasty in vinegar), then strain sooner rather than later.

You can do this any time after fermentation has finished (usually between four and seven days).

And if your mashless mix does not seem to be tasting acidic within a few days of straining, then add some raw vinegar to your batch to up your bacteria content.

Choosing Your Strainer

As far as straining, use whatever you've got that works.

- 💧 You might use a colander first to strain off large chunks in the mash, and then run the liquid through a permanent-coffee filter basket to remove smaller particles.
- 💧 You can also use a cheesecloth or cloth napkin.
- 💧 Some sediment is fine, so don't worry if you aren't able to get every sand-sized bit of mash out of your mix.



If your liquid mash has not become acidic in four weeks, something likely went wrong.

You might not have added enough sugar or provided warm enough fermentation conditions.

Without the creation of alcohol and acetic acid, your mash is just unpreserved food that has been exposed to air for the last month.

It's still worthy of the compost pile, but maybe not the chickens at that point.

Alcohol Content of Vinegar

Just one more word of caution about alcohol before we move on.

Some people are concerned about the potential for alcohol to remain in vinegar after acetic acid production ceases.

Residual alcohol should be minimal in vinegar.

But even in professional production, there can be trace amounts of alcohol in vinegar. So for people with serious concerns about alcohol consumption, avoiding homemade vinegar is the safest way to go.

Also, when tasting your vinegar recipes during the transformation process, it will almost certainly contain alcohol.

Taste responsibly.

Vinegar Basics: Acetic Acid



Now that you know a little bit about making alcohol for the first stage of vinegar-making, it's time to learn about the second stage.

Just as you needed those little yeasty beasties to convert sugar to alcohol, you are going to need some microscopic helpers to convert alcohol into acetic acid.

These new helpers come in the form of a bacteria called *Acetobacter aceti*.

Most bacteria can't live in acetic acid, which is why vinegar is so useful as a food preservative and cleaning product.

But these *Acetobacter aceti* have the unique ability to convert alcohol into acetic acid and then continue to survive in the acidic environment created.

The Essentials of *Acetobacter* Health



Like yeast, *Acetobacter aceti* have a few environmental requirements to achieve peak performance.

Provide a Good Food Source

The first you already know from the previous chapter:

These bacteria need a good food supply in the form of alcohol by volume (ABV) of 4–12 percent.

Some strains of *Acetobacter* can perform with alcohol percentages up to around 22 percent, but there are greater risks for vinegar failure with higher ABVs.

We're not sure whether this is because the bacteria work themselves to death or because of the excess acid. Either way, you can avoid stressing out your little vinegar-making buddies by giving them the optimal ABV range.

These bacteria can also work with less alcohol, but the acetic acid production would be very low.

If you are making your own alcohol, you may not know the exact ABV percentage. But if you followed the sugar and fermentation guidelines in the previous chapter, and nothing went noticeably wrong, you'll likely be within range.

If you are using easy vinegar recipes, you just have to trust that you got there.

The Fourth Rule of Vinegar-Making

That said, here's our fourth rule of making vinegar—and the first to deal with acetic acid production.

Rule No. 4:
Start with alcohol by volume of 4–12%.
Or, use plenty of sugar if making easy vinegar.

Calculating Dilution Rates Without Calculus



If you are using legally sold alcohol, you can find the ABV somewhere on the label.

For example, if you have a bottle of wine with 15 percent alcohol, you will likely want to dilute it to make a less stressful work environment for your bacteria.

You can figure out your exact dilution rate using calculus.

OR, you can use the handy chart we made for you, which we've included on the next page.

The chart covers common wine, fortified wine, and hard liquor ABV ranges.

It also gives you options for diluting to 7 percent or 10 percent ABV.

If you want to get the most bang for your buck, then dilute to 7 percent, similar to what you get when making vinegar with late-harvested apples.

If you want to make really fine vinegar that you can age for more than six months to develop flavor and mellow the acids, then aim for 10 percent.

When using premade alcohol rather than EV recipes, you will most likely want to use a starter culture.

We'll cover starter cultures in detail shortly.

But, because the starter culture will also dilute your ABV, we recommend targeting at least a 7 percent ABV when diluting premade alcohol.

How do I use this chart?

- Step 1:** Find the starting ABV on your bottle and locate that percentage in the starting ABV column. (If your wine has 14.5 percent ABV, you can round to either 14 or 15 percent.)
- Step 2:** Follow that figure over to the dilution factor for either 7 or 10 percent. So, using the example of the wine with 14.5 percent ABV, if we rounded up to 15 percent, we'd get dilution factor of 1.1 for 7 percent and 0.5 for 10 percent.
- Step 3:** Once you have your dilution factor, multiply that number by the amount of alcohol you have. For example, if our full bottle of wine is 750 ml and we want to dilute it to 7 percent, we will multiply 750 by 1.1 to get 825 ml ($750 \times 1.1 = 825$).
- Step 4:** Dilute your alcohol with the amount of water you determined in Step 3. In our example, we would add our bottle of wine and 825 ml of water to our container. This means that, after dilution, we would have 1575 ml of potential vinegar. (Some will evaporate during the transformation, but that will get you over two wine bottles worth of the good stuff.)

Dilution Rates Cheat Chart

Starting ABV	Dilution Factor for 7% ABV	Dilution Factor for 10% ABV
45%	5.3	3.5
40%	4.7	3.0
35%	4.0	2.5
30%	3.3	2.0
25%	2.6	1.5
20%	1.9	1.0
15%	1.1	0.5
14%	1.0	0.4
13%	0.9	0.3
12%	0.7	0.2
11%	0.6	0.1
10%	0.4	0.0

Now, let's say we want to create a more gourmet vinegar and we want to dilute our bottle of wine to a final ABV of 10 percent. We'll multiply 750 ml by 0.5 to get 375 ml of water ($750 \times 0.5 = 375$). Then, based on that calculation, we'd combine our bottle of wine with an additional 375 ml of water to achieve 1125 ml of liquid that will eventually become vinegar—or about a bottle and a half.

What if I need a really specific dilution rate?

If you want more specific dilution rates, then you can also use free online dilution calculators such as the one available at [Distilling-Fermenting-Seminars](#).

What do I do if the alcohol has a low ABV?

For alcohol with ABV below 10 percent, no dilution is necessary.

Most of your ciders, beers, and many non-grape-based wines fall into this category.

However, there are a few outliers:

- Some high-gravity beers have greater than 10 percent alcohol.
- Meads can range from 8 to 20 percent ABV or more.
- Light beers occasionally have less than 4 percent ABV.

So, be sure to check your ABV on any kind of premade alcohol to confirm suitability for vinegar-making and determine if dilution is necessary.

Taste Profiles



We have already covered the fact that you can make vinegar out of just about anything edible as long as it has enough sugar to make alcohol.

But that doesn't necessarily mean all of your experiments will taste equally great.

The flavor of your base ingredients will play a big role in the flavor of your resulting vinegar—and not always in predictable ways.

Although vinegar is only “legally” considered vinegar if it contains at least 3.5 percent acetic acid, there's a lot more to vinegar than that. Trace minerals and flavor complexes carried from the original mash or alcohol products will determine whether a vinegar is delicious to you or not.

If at First You Don't Succeed ...

Sometimes, unexpected flavors are revealed as a by-product of acetic acid production.

Therefore, we encourage you to try a variety of food items and flavors in your vinegar experiments.

You'll be surprised at what works and what doesn't.

Some things that are delicious to begin with, like chocolate, taste terrible as vinegar. But other unusual ingredients, like whey—the liquid extracted from milk during cheese production—can make a real vinegar treat.

Remember, even if your vinegar doesn't make the salad dressing cut, it can still have utility as a cleaning product or for other purposes.

Taking Risks With Taste

Many of our vinegar taste preferences are simply cultural, so don't be afraid to branch out.

- 💧 **Rice vinegar**, used in Asian cooking, is made from rice wine (a.k.a. sake) and has a very mild, pleasing flavor that pairs well with pungent tastes like ginger. It makes great salad dressing and brings out the flavor in plain or sushi-quality rice.

- 💧 **Wine vinegars**, which are most common in areas of Europe with strong wine cultures like France and Italy, are fabulous for meat marinades, dipping sauces, and salad dressings.
- 💧 In the United Kingdom, **malt vinegar** is made from beer and is very popular as a condiment for pub style fish and chips.
- 💧 Countries with tropical climates make mild **pineapple vinegar** that is delicious in fruit salads, refreshing in health drinks, and a magnifier of other flavors in stews.
- 💧 **Apple cider vinegar** is common in the United States because we have an abundance of apples growing in many parts of the country. It works great in soups, canning, and making cheese at home.

Variety With Varietals

Even when using wine or cider to make vinegar, the kind of apples or grapes used can have a big impact on vinegar flavor.

While working on this e-book, Tasha was able to conduct a few vinegar taste experiments using an array of wines from Round Peak Vineyard in Mount Airy, North Carolina.

She found that the initial flavor of the wine made a very big difference in the final outcome of the vinegar.

- 💧 Round Peak's **Italian-style wines** with Nebbiolo and Montepulciano grapes made for a more tart and aromatic vinegar.
- 💧 **Heavier wines** with Cabernet Sauvignon and Petit Verdot grapes in the blends made richer, more meaty vinegars that seemed more suitable for aging.

- 💧 The **sweet wines** from Round Peak's other label, Skull Camp, are wines with residual sugars (e.g., sugars not converted to alcohol).
 - 💧 They worked a little like easy vinegar recipes in that the sugars in the wine went through a short fermentation process, bubbling a little, before the *Acetobacter* started their work.
 - 💧 It took a few extra days for sweet wines to begin tasting acidic.
 - 💧 The sweetness in the wine did not carry through to the vinegar, but the lighter body of the sweet wines did make the resulting vinegar lighter in mouth feel and texture.

If you get an opportunity to make vinegar with different wines, it's a fun experiment and tasting experience that really gives you an appreciation for the complexity of vinegar.



Trouble Avoidance

Besides problems with fermentation, covered in the previous chapter, there are two fairly common culprits behind vinegar batches gone bad: chlorine and sulfites.

- 💧 **Chlorine** usually comes by way of city tap water.
- 💧 **Sulfites** are present in most wines and are used, in part, as a vinegar inhibitor during the winemaking process.

Dispersing the Troublemakers

The way to prevent both of these unwanted ingredients from spoiling your batch is to expose them to air for 24 hours or more to allow the sulfites and chlorine to disperse.

Unless your wine is labeled as "no detectable sulfites" or you are using a source of water that is chlorine-free, like well water or distilled water, let your wines and tap water air out in wide-mouthed containers, covered with a cloth or filter, for at least a day before use.

If your wine has been open for a while, the sulfites may have already dissipated and Acetobacter may have moved in.

Airing on the Side of Caution

If you air your water and wine together, the chlorine in the water may destroy the Acetobacter already at work. For best results, we recommend airing wine and water separately before combining them to start making vinegar.

Also, if you are making wine at home, know that Acetobacter are very opportunistic bacteria.

If they get near an open bottle of alcohol in those 4 to 12 percent ABV ranges, they will call their friends and have a party.

For the well-being of any alcohol you want to remain alcohol, store your vinegar (and batches in process) away from any alcohol-making activities or open bottles you are still planning on drinking.

The Mother of Vinegar



Now that you have a good background in crafting, selecting, and diluting alcohol for making vinegar, it's time to talk about the **Mother of Vinegar**.

She is so all-powerful in the vinegar world that sometimes she's just called "Mother."

Some revere her greatness so much that, rather than speak her name, they call her "starter" or "starter culture."

The thing about Mother is that she's all around us—in the air, on the fruits and vegetables we bring home from the grocery store or in from our yards, lingering around the corks of open wine bottles.

She's omnipresent.

Sometimes, she takes the physical form of a beautiful, blobulous disk that grows thicker for a time, then begins to multiply, making mini-replicas of itself.

Sometimes she hides in the molecules of unpasteurized vinegar and in the sediment that settles at the bottom of bottles.

The only place that is safe from her is found in those bottles of pasteurized vinegar you find on grocery store shelves. (Sometimes, those bottles even contain a motherless synthetic variety of something that doesn't even deserve the name vinegar. Egads!)

And Now Back to Our Regularly Scheduled Programming ...

Yes, that was us having a little fun at the idea of vinegar having a mother.

Really, though, it's a good way to think about it.

Those little *Acetobacter* are responsible for creating the acetic acid that turns a mushy mash, some sugar, and time into a universally useful substance.

They are, effectively, the mother of vinegar.

In ancient times, the production of vinegar might have seemed as miraculous as birth.

Now that Louis Pasteur and countless other scientists who came after him have helped identify the source of acetic acid production in vinegar, we understand that when we say "mother," or any variation thereof, we're really talking about acetic acid-producing bacteria.

Maternal Proof

When you get a critical mass of those little bacteria together in one container, they can sometimes join forces and take on a more solid form.

This is what is commonly meant when people say “mother” in relation to vinegar.

A mother that floats on the surface of your vinegar batches is visual proof that you have lots of Acetobacter making acetic acid.

But a visible mother is not necessary to make vinegar.

Acetobacter can be present in sufficient numbers even when you can't see them.

Any properly stored, unpasteurized vinegar will have *Acetobacter aceti* in it.

If you don't have any vinegar-making friends who can give you a mother, or you don't want to order one from the Internet, then you just need to get your hands on some raw vinegar.

Bragg's Apple Cider Vinegar, marked “with the mother,” is a common brand that's available in most grocery stores. It works well as a vinegar starter.

But, if you live near a health or gourmet food store, they may carry other varieties, including raw white and red wine vinegar.

Creating Your Own Mother

Alternately, you can create the right conditions for *Acetobacter* to find your offering and move in.

As with alcohol fermentation, the *Acetobacter* will always show up.

The question is whether they will arrive before or after other uninvited guests who may want to come and spoil the party.

If you want to up your odds of *Acetobacter* arriving before any competition, choose fruits that discolor quickly when cut. Apples, pears, and pineapples are wonderful *Acetobacter* attractants and make good choices if you want to try making vinegar without starter.

Keep in mind that additional sugar is still usually needed for good fermentation of pears, pineapples, and summer-harvested apples.

Choosing the Right Strain

Similar to the cultivated yeast we covered in the previous chapter, there are many different kinds of *Acetobacter aceti*.

Some strains produce better results in certain mediums.

For example, if you look up vinegar mothers on the Internet, you'll see some designated as red wine mothers, some as white wine mothers, and others designated for additional uses.

These bacteria have been adapted for best use in certain alcohols and will produce more reliable flavors and results if allowed to do their thing in their preferred food source.

Yet, they would rather eat something than nothing at all.

So, you can also break the rules, put apple cider vinegar mother in red wine if you want to, and still get a great result. (In fact, if you like really tangy, tart vinegar, apple cider vinegar starter and full-bodied red wines are a perfect combo.)

Saving Your Culture

After you've made your own vinegar, you can save your own culture to use for your next batches.

Even a few tablespoons of starter culture will help kickstart any sized batch.

However, for best results, adding 25 percent either of your original liquid volume in EV recipes or of your starting undiluted alcohol amount to your next batch is a good rule of thumb. For example, if you were using 750 ml of wine to start vinegar, then using approximately 188 ml of starter will load your batch up with ready-to-work Acetobacter.

If you are covering your apple mash with two quarts of water, then using a pint of starter culture will really speed things up and ensure great acetic acid production.

Another Use for SCOBYs

Both of us also like to use our kombucha SCOBYs to make vinegar.

Kombucha SCOBYs make both **acetic acid** and **gluconic acid**.

The gluconic acid is what gives kombucha a flavor that is so different from vinegar.

However, if you leave your SCOBY in your kombucha mix too long, or use it intentionally to make vinegar, the acetic acid production becomes more dominant.

Using a SCOBY with diluted red wine makes standard red wine vinegar taste a little more balsamic-like without needing to go through all the work of barrel aging.

Be warned, though—once you use a SCOBY for vinegar, it won't work well for kombucha.

Now that you've got a handle on starter cultures and mothers, let's talk about acidity.

Vinegar Acidity



As acids go, acetic acid is pretty mild.

- 💧 It does rate a Safety Data Sheet and a **CDC/NIOSH Pocket Guide to Chemical Hazards page**.
- 💧 Some agricultural extension offices have concerns about recommending the use of concentrated vinegar (i.e., 11 percent acetic acid) as an organic weed killer. This is because current labels do not provide the

mandatory safe handling instructions people need to follow when using it as an herbicide or pesticide.

- 💧 And some people are more sensitive to acetic acid than others.

Acidity of Common Premade Vinegars

- 💧 **Grocery store vinegar** is usually between 4 and 7 percent acidity, and the amount of acidity is marked on the label.
- 💧 Mild vinegars like **rice wine vinegar** tend to have acidity of less than 5 percent.
- 💧 **Distilled white and cider vinegars** are generally diluted to exactly 5 percent.
- 💧 **Wine vinegars** like sherry, Champagne, red wine, and white wine are usually around 6 to 7 percent.
- 💧 **Discount vinegars**, regardless of style, are often diluted to lower levels of acidity and are therefore not always good discounts if you need the acidity for canning or cleaning fluid.

Acidity of Homemade Vinegars

Homemade vinegars, though, are in a whole different category.

They can run the acidity gamut from very low to much greater acidity than grocery store varieties.

Processes used, fermentation conditions, amount of Acetobacter, aging times, and many other factors all play roles in creating the final acidity levels.

Sampling Safely

Given all the unknowns in home vinegar-making, extra caution to prevent discomfort as a result of inhalation, skin contact, or tongue burn (from oversampling) of homemade vinegar is advisable.

Dilution with pure water may also be needed to make your vinegar palatable or useful as a salad dressing without causing lettuce burn.

When tasting vinegar, let your nose be your guide.

If your nose tingles from acidic sensation before you even get your cheesecloth off to start your sampling, use caution! Consider diluting before tasting, just in case.

You know you are working with acid, so just use your noggin and you won't get burned.

Acidity Testing



For all of us DIY types who want to be able to use our homemade vinegar for activities like canning, the natural next question is, “How do I figure out my acidity level?”

Unfortunately, the answer is not that simple.

There are a couple inexpensive tests that can point you in the right direction for some vinegars.

But testing acidity with enough accuracy to use your vinegar for potentially dangerous activities requires expensive equipment and very careful procedures.

Here's a rundown of some commonly suggested tests and our take on their utility.

pH Rolls or Strips

For testing the pH of pale-colored vinegars such as apple cider vinegar, you can purchase pH paper from beer-making and winemaking supply stores or from Amazon.com.

For less than 10 dollars, you can get 100 or more test papers.

How to Test

Performing the test is simple:

- 💧 Spoon out a little of your vinegar mix into a small dish
- 💧 Press your pH strip in to your fluid, then remove the strip.
- 💧 Wait 15 seconds.
- 💧 Compare the color outcome on your pH strip to the decoder on your package.
- 💧 Voilà, you have a pH reading!

Unfortunately, these strips do not work well with colored vinegars, such as those made from red wine or berries.

The color of the vinegar influences the color of the pH strip, making it impossible to accurately compare the strip color to the pH color decoder.

Concerns About Accuracy

The biggest problem we have with these strips is they are not very accurate.

Bragg's Apple Cider Vinegar, labeled as having 5 percent acidity, showed a pH level of 2.8–3.2 using different strips from the same container.

For safe canning, you need a pH of 4.7 or below, so theoretically, a reading this low puts you in range for canning.

However, further testing showed that pineapple mash still in the alcohol fermentation stage of vinegar production also read as 3.2, as did cheap white wine.

This is because alcohols and fruits also contain acids.

For example, wines have tartaric, malic, and citric acids, while apple cider has citric and malic acid.

Unfortunately, the pH level does not guarantee that you have vinegar—it just tells you acid is present in your liquid.



Overall, given the potential for inaccuracy, we personally would not rely on pH strips for something as risky as canning.

But for light-colored vinegars, it can help you figure out if you should dilute with water to lower acidity.

Titration Tests

In terms of accuracy, titration tests are the next step up from pH strips.

You can buy economy titration test kits from homebrew suppliers for just over \$10.

How to Test

Once you have your titration kit, the basic procedure is as follows:

- 🔴 Mix 2 ml vinegar, 20 ml unchlorinated water, and 3 drops of the indicator liquid from the kit.
- 🔴 After making your mix, slowly add the sodium hydroxide solution (also called the standard base solution) to your vinegar mix. Do this 1 ml at a time while simultaneously stirring and watching for color changes.
- 🔴 As soon as there is a slight color change, stop adding the base solution and multiply the number of ml you added by 0.6 to determine your acetic acid percentage.

(For more detailed instructions on this procedure, check out this article on [“How to Safely Use Homemade Vinegar in Pickling.”](#))



Tips for Testing

The kit includes a syringe that will likely hold 20 ml of liquid.

To easily figure out how many milliliters of standard base solution you used, fill your syringe to a set level.

The article referenced above recommends using 10 ml of standard base liquid to start. But since home vinegar can have acidity levels well above 6 percent, we recommend filling your syringe to 15 ml to avoid the need to refill mid-test.

This way, if you have 4 ml of base left in the syringe when the color changed, you know you can calculate that $15 - 11 = 4$ ml of base used.

The standard base milliliters used multiplied by 0.6 gets you an acidity estimate of 6.6 percent.

Controlling the Color

We discovered in our own testing that the color change is extremely subtle.

The first few times we ran the test, we couldn't even tell that the color had changed.

Finally, we set up a "control." (That's a fancy way of saying that we made two white ceramic dishes with the same mix of vinegar, water, and indicator liquid.)

Then, we only added the standard base solution to one of the dishes.

By keeping one container of the original mix as a color guide, it then became possible to see when the color changed slightly.

Without this control, we could not tell at all.

Test Results

With Bragg's vinegar, we know it has 5 percent acidity, since that is what is written on the bottle.

Theoretically, we should have noticed the color change when about 8.5 ml of standard base solution had been added.

However, with the color change being so minor, it did not appear to change until about 9.5 ml of standard base solution had been added.

Multiplying that figure by 0.6, the acidity came out to 5.7 percent.

We performed a similar test with store-bought balsamic vinegar.

Due to the darker color of the vinegar, it took 11 ml of standard base liquid before the color change was perceptible. This would suggest an acidity of 6.6 percent, although the bottle indicated 6 percent.

Finally, convinced that the test worked, we tried it on some homemade pineapple vinegar in process.

The color changed at about 6 ml of standard base liquid, indicating our acetic acid level was 3.6 percent, which is about what we expected.

Using white ceramic bowls and keeping a control sample of the diluted vinegar solution as a reminder of the original color, we were able to see the subtle change of color that indicated the acetic acid level.



Balsamic at 11 ml Base

Balsamic Control

ACV at 9.5 ml Base

ACV Control

Conclusion

With careful testing, and using a control vinegar as a color-change indicator, titration testing is an affordable and fairly easy method to estimate your at-home vinegar acidity levels.

However, we recommend you become comfortable with the testing procedure before you rely on it. Also, if there is any doubt as to the acidity of your vinegar, do not use it for risky activities like canning to preserve food.

pH Meters

At 150 dollars for a decent meter and 500 dollars for a good one, a pH meter is a really expensive option for determining acidity in at-home vinegar production.

However, if you have future plans to become a certified acidified food producer so you can sell canned goods or jams and jellies at your local farmer's market, then you are probably going to need a good pH meter anyway.

Or, if you already have one, using a pH meter instead of titration testing can be useful.

Otherwise, it's hard to justify the cost of this option, or the ongoing investment of time and energy required for maintenance and calibration.

If you are interested in learning more, you can get a good overview in the article **"pH Meters and Home Canning"** on the Healthy Canning blog.

Hydrometers

If you are a home brewer or winemaker crafting your own alcohol for vinegar production, feel free to use all of your related gadgets to aid in vinegar production.

Hydrometer meter readings taken before and after initial fermentation can help you estimate your alcohol percentage, which can then be used to give you an idea of how acidic your vinegar will ultimately be.

You can make vinegar with alcohol levels in the 3 to 4 percent range, but generally, the more alcohol you start with, the more acetic acid you end up with.

Wines with 12 to 14 percent alcohol have the potential to make vinegars with a lower pH (higher acidity) than cider or beer.

However, keep in mind that many other factors impact the production of acetic acid, as well, including the quality and number of Acetobacter acting on the alcohol.

The Tests of Taste and Time

Tom Burford, author of *Apples of North America*, tells a tale of a neighbor farmer who was renowned for his acid-tasting abilities. This neighbor was called to test a vinegar for acidity—and even proclaimed it a particular percentage after having performed no other test but taste.

Mr. Burford own preferred method of determining acidity involves the test of time and pH strips.

Using a specific mix of Horse Apple and Calville Blanc d'Hiver (a classic French dessert apple), he first ferments his sweet cider into apple cider over a period of several weeks.

Then, he allows acetic acid conversion to occur.

If temperatures are between 70–80°F, you can expect about 1 percent acetic acid production per week. If your temperatures are cooler, then vinegar production could take months to reach optimal acidity.

For confirmation of results provided by the tests of taste or time, Mr. Burford recommends confirmation with the use of pH strips.

While the combination of taste, time, and pH strips does give you more confidence about your acidity than using any one of these methods individually, we still think these measures are best used for deciding when to bottle, rather than for determining acidity.



Aging and Acidity

If you've ever had an aged balsamic vinegar that poured like syrup and tasted like candy, then you know the benefits of aging vinegar.

Aged vinegars are not normally diluted to reduce acidity.

Instead, the starting acidity is allowed to mellow over time.

Traditional balsamic vinegars can be aged for 12, 25, or even 100 years.

In traditional balsamic-vinegar aging, a series of different types of wood barrels are used to influence the flavor of the end product. During barrel transfers, vinegar is also consolidated or moved to a smaller barrel so that the barrel is completely full when the next aging period starts.



Too much air is the enemy of good balsamic, and as evaporation happens, topping of the aging vessel is necessary to prevent excess air from spoiling the batch.

Using a multi-barrel aging process for homemade vinegar would take more time and effort than most of us are probably willing to spend. But we can still learn a few things from the professionals to make fine-aged vinegar with less trouble at home.

- 💧 For best aging results, start with vinegar that has a high level of acidity. Wine vinegars made with 10 to 12 percent ABV tend to be the easiest to successfully age.
- 💧 Bottle your vinegar in dark bottles, filled to the rim, and store in a cool location (dark basements or food cellars are ideal).
- 💧 Check the bottles periodically for evaporation. If your bottle necks are only partially full, then consolidate to top off bottles or downsize your bottles.
- 💧 You might want to age for about six months to start. Then, after that, sample your vinegar every couple of months to check the progress.
- 💧 Use whenever the vinegar tastes delicious to you.

Keep in mind that your everyday balsamic vinegar—the kind you can buy at the grocery store for under 10 dollars—is not a long-aged vinegar.

It is a white wine reduction made into vinegar, diluted to about 6 to 7 percent acidity.

To increase the sweetness and enhance the color, additives such as corn syrup, sugar, or other caramelized sweeteners are often used.

We've covered alcohol and acidity. Now, it's time to make vinegar!

Making Vinegar



Easy and Delicious



If you read the last two chapters, you already know how to make your own vinegar. As we assured you at the outset, making vinegar is not difficult.

It has been done intentionally and accidentally for over 10,000 years using very limited technological resources and in less than ideal sanitary conditions.

A Happy Accident

In fact, my first experience making vinegar was an accident.

I let a batch of kombucha sit too long.

Those little *Acetobacter* buddies we've been talking about worked overtime to make a lot of acetic acid.

And, when I tasted the result, it was so potent, fruity, and delicious, I was hooked.

I've been making my own vinegar for eight years now for the health benefits and because I love the way it tastes.

The Beauty of Homemade

Homemade vinegar is nothing like the store-bought stuff.

It takes a little time, adherence (intentionally or accidentally) to a few simple rules, and respect for the forces at work in the process.

You can work from recipes to get more precise flavor outcomes, or just experiment with whatever food scraps you prefer and sufficient sugar to make your own recipes.

Trust me, it's pretty hard to mess up vinegar.

Well, if you leave the fruit in there for too long without straining it—yikes, you'll want to throw out the whole batch.

But believe me, you'll know when its bad.

So, taste your batches regularly and strain your solids when you achieve your desired acidity. Otherwise, just have fun.

7 Tips for Success

Here's a quick summary of some things to keep in mind as you get started.

- 💧 **Basic hygiene**, such as starting with clean containers and using a clean cloth or new coffee filter to cover your vinegar batch, is about all you need to make easy vinegar.
- 💧 If you plan to make alcohol using cultivated yeasts, then you also want to **consider sterilizing your equipment** with a mix of one tablespoon bleach to one gallon of water to prevent contamination from native yeasts and bacteria.

- 💧 **Use containers that are non-reactive with acetic acid:** glass, stainless steel, food-grade plastic, pottery, and pleasant-tasting woods (e.g., oak barrels) are good choices.
- 💧 **Remember to provide ideal habitat, and to satisfy those enormous yeasty appetites.** Sufficient sugar and liquid, tasty mash, proper fermentation conditions (very warm, with indirect light), and daily stirring to prevent mold are important for the alcohol production part of vinegar-making.
- 💧 **Avoid the “kaboom!”** that comes from putting carbon dioxide under pressure by using airlocks or covering containers with cloth or filters.
- 💧 **Begin tasting your vinegar at around two weeks and strain solids when it tastes ready.** The straining must take place at some point between two and four weeks.
- 💧 **Bottle your vinegar and allow it to age** and mellow in cool, dark conditions, sampling regularly until it tastes ready for use.

Choose Your Method



We have covered several different methods for making vinegar in the previous chapters.

Now it's time for you to pick the one you'll use for your own vinegar-making adventures.

We've summarized them below, ordered from easiest to most involved:

1. The Forget-About-It Method

1. Pour wine in a wide-mouthed jar.
2. Cover the jar with a cheesecloth or coffee filter.
3. Store it in a warm location with indirect light.
4. Wait several months for it to become vinegar.

2. The Think-About-It-Then-Forget-About-It Method

1. Pour premade alcohol into a wide-mouthed jar.
2. Dilute it to alcohol by volume of around 7 to 12 percent to create ideal conditions for acetic acid production. (The Cheat Chart on page 57 can help with this math.)
3. Add live starter culture/mother.
4. Cover with a cheesecloth or coffee filter.
5. Store in a warm location with indirect light.
6. Wait for a few months for your mix to become vinegar.

3. The Think-About-It-Daily Method

1. Create a mash of edible stuff with a sugar content of about 10 to 18 percent. You can start with fruits such as sweet grapes or late-harvested apples that already contain enough natural sugar to achieve this sugar content. Or, if your initial material isn't sweet enough already, you can add enough sugar to get there.
2. Put the mash in a wide-mouthed container, then cover with liquid.

3. Place in a really warm location to promote good fermentation.
4. Stir daily to prevent mold.
5. Taste periodically to see if it is vinegar.
6. When it tastes like vinegar to you, strain the liquid from your mash and bottle and begin using.

Option 3.1

Follow all the same steps, but use juice with sufficient sugar and skip the mash.

You also don't need to strain it unless you want to remove the mother and any sediment that may form during the process.

(We rate this option more difficult only because it seems to take longer than when you have a mash, and you may have more problems with fermentation. To help with this, you can also add a starter culture or mother to your juice.)

Option 3.2

Follow all the same steps, but add starter culture or a mother to your mash along with your liquid and (if necessary) sugar.

4. The Think-About-It-Well-In-Advance Method

1. Ferment your alcohol using traditional alcohol-making techniques such as using yeast cultures, pectic enzyme, campden tablets, and oxygen-controlled environments (e.g., closed containers with airlocks to release carbon dioxide).
2. After alcohol is made, strained, bottled and aged, use the same process as for either of the alcohol-based options above.

Recipes to Get You Started



There are literally thousands of vinegar recipes on the Internet.

When you start wading through them, you'll see a lot of overlap, or slight variations such as adding spices to your vinegar mix or different amounts of sugar.

We're including some basic recipes here to get you started.

But we encourage you to browse the Internet and experiment with whatever recipes speak to you.

So many of the recipes out there also come with stories of how people learned to make vinegar, the benefits they received from using it, and how it fits into family traditions that it makes you realize vinegar-making is about so much more than salad dressing.

Of course, you also now have the information and skills to make your own recipes using what you have available.

The Grand Gourmet Vinegar

- 💧 Using Red or White Wine
- 💧 With or Without Starter Culture
- 💧 Methods 1 or 2

This recipe relies on the use of bottled wine with around 13 to 15 percent alcohol by volume (ABV) and the use of a red or white wine strain of starter culture.

You can buy containers of starter culture specifically developed to work best with red or white wine.

Winemaking supply stores often carry these, or you can pick them up through web retailers. A good search term to use to find retailers is “wine mother of vinegar.”

Alternately, you can check with gourmet or health food stores or farmers’ markets to find unpasteurized bottled red or white wine vinegar.

Most of the wine vinegars you find at the normal grocery stores have been pasteurized to lengthen their shelf life, so make sure the bottle you buy for this purpose is specifically marked with terms like “with the mother of vinegar” or “raw, unfiltered.”

Ingredients

Here’s what you’ll need for this recipe:

- 💧 16 ounces red or white wine with 13 to 15 percent ABV
- 💧 8 ounces distilled or unchlorinated water
- 💧 8 ounces mother of vinegar (or skip the mother if you prefer to use naturally occurring Acetobacter)
- 💧 Wide-mouthed container large enough to hold at least 48 ounces of liquid
- 💧 Cheesecloth or coffee filter, plus twine or rubber band for use in covering your container

Directions

- 1. Air Out Your Wine:** Unless your wine is specifically labeled “sulfite free” or “no detectable sulfites,” open your bottle and pour it into a wide-mouthed container at least 24 hours before you plan to start your vinegar.
- 2. Air Out Your Water:** If you are on city water or use a water filtration system in your home, you may have some form of chlorine or other bacteria inhibitor in your water that may interfere with the performance of the *Acetobacter aceti*. For best results, use distilled water or air out your tap water in a separate container for the same period of time as your wine.
- 3. While Airing, Cover to Keep It Clean:** To prevent insect or other large particle contamination, keep your wine and/or water covered with cheesecloth or a coffee filter during this aeration period.
- 4. Choose the Right Culture:** You can use white wine vinegar mother with red wine, and vice versa (though a red wine mother in white wine will change the color). But for best results, try to find the mother or culture that has been developed for use in your color of wine.
 - 💧 Option No. 1—Use Raw Vinegar in a Pinch:** Also, in a pinch, you can use apple cider vinegar starter that is available from commercial grocery stores, such as the commonly available Bragg’s variety of vinegar. The taste of the apple cider vinegar will influence the taste of your wine vinegar, but the result is still quite delicious.
 - 💧 Option No. 2—Use a Kombucha Mother:** If you want to try something really crazy, you can also use a kombucha mother as a substitute for a vinegar mother in this recipe. The mother sinks and doesn’t float in this concentration of alcohol, and they aren’t likely to produce “babies” even though they still seem to be alive. But, for reasons we haven’t fully figured out, they contribute a sweet, musky flavor to wine vinegars that is completely different from what you get when using vinegar starters. They also seem to speed up the process, making exceptionally tasty vinegar in just one to two months rather than six or more.
- 5. Mix Your Ingredients:** Once you have assembled your ingredients, mix your wine, water and starter in your container.
- 6. Cover and Secure:** Cover the mouth of your container with your cheesecloth or filter, and secure using your twine or rubber band.

- 7. Store and Let Sit:** Place in a warm location with indirect light and allow to sit undisturbed for several months.
- 8. Taste, Strain, and Bottle:** You can periodically taste the batch. When it tastes good to you, strain out any visible “mothers” that have formed and bottle the liquid to use in your next batch. Vinegar with live cultures stores best in cool, dark locations or in your refrigerator.

Tips on Aging: Give It Several Months

Many people will allow this recipe to sit for six months to fully develop flavors. Then, they'll bottle it and allow it to mellow for several more months before using it.

But, some of us find it hard to wait that long since it tastes so good.

You will have good acetic acid production by around two months, but you may also still have unconverted alcohol.

If you can wait the full six months, your patience will be well rewarded.

Tips on Aging: Choose the Right Container

Despite being one of the easiest home vinegar recipes, this variation makes really fancy vinegar if you use good wine to begin with and let it age properly.

Your finished and bottled vinegar will make a perfect gift for any gourmet cooks you know.

So, if you do plan to make a long-aged variety, you may want to consider choosing a dark container for better aging.

Small wooden casks or barrels or even brown glass are good choices to ensure better aging results, since loss of quality can sometimes occur with too much light exposure.

Also, since the finished product of this recipe takes so long to make and works great for salads, marinades, and fancy gift-giving, you may want to increase the recipe and aim for a larger batch such as a year's supply to make the wait worth your while.



Saving Wine

If you are a wine drinker, note that 16 ounces is only 473 ml, and your standard wine bottle is 750 ml. So, you can **either drink part of your bottle**, or you can **collect portions of unfinished bottles** until you have enough for the necessary 473 ml.

Famous Chef Alice Waters **saves her leftover wine in sealed containers for up to a year** before she puts them in her vinegar barrel and adds starter culture.

The key to storing leftover wine for later use in vinegar is to minimize exposure to oxygen so that it doesn't start making vinegar before you want it to.

If you save one-third of a wine bottle of wine, the other two-thirds of that bottle is filled with air and will quickly begin converting to vinegar if left to its own devices.

But if you **use a vacuum pump** to reduce oxygen or instead **transfer your wine to a container that just fits your quantity** of wine, it will keep longer.

Avoid excessively aerating the wine when transferring to another container. Do this by using a funnel and pouring slowly and directly into the narrow part of the funnel.

Also **opt for narrow-mouthed jars** instead of wide, if possible. I like to save my dessert-wine bottles or well-washed condiment bottles for this purpose.

Pineapple Vinegar

- 💧 Using Mash
- 💧 With or Without Starter Culture
- 💧 Methods 3 or 3.2

Acetobacter love pineapple, so this is a good recipe to try without starter culture. But it also works great with unpasteurized apple cider vinegar as a starter culture. This makes a mild vinegar, like a fruity variation of rice wine.

It goes really well in fruit salads and, much like apple cider vinegar does, adds some nice fruity balance when used in soups and stews.

It works great as a pork marinade, too.

Ingredients

Here's what you'll need for this recipe:

- 💧 About 4 cups fresh pineapple rind and center, chopped into 1/2 inch cubes
- 💧 1 quart distilled or unchlorinated water
- 💧 1/4 cup sugar of your choosing (or add 2/3 cup of honey, molasses, or sorghum)
- 💧 8 ounces mother of vinegar (or skip the mother if you prefer to use naturally occurring Acetobacter)
- 💧 Optional: Add a couple of whole cloves and a star anise to give this a fun flavor twist
- 💧 Wide-mouthed container large enough to hold at least 48 ounces of liquid
- 💧 Cheesecloth or coffee filter, plus twine or rubber band for use in covering your container

Directions

1. In a wide-mouthed container, combine your ingredients.
2. Cover with the cheesecloth or coffee filter and secure your cover with the twine or rubber band.

3. Place in a really warm location to promote good fermentation.
4. Stir daily.
5. Taste periodically, beginning after about two weeks, to see if it has turned into vinegar yet.
6. When it tastes like vinegar to you, strain the liquid from your mash.
7. Bottle and begin using.

Depending on your fermentation conditions, this recipe usually takes about three to four weeks to finish.

As American as Apple Pie Vinegar

- 💧 Using Apple Cider
- 💧 With or Without Mash
- 💧 With or Without Starter Culture
- 💧 Method 3.1

This recipe comes from one of our wonderful TGN contributors, Holly Williams Urbach, from her post [“How to Make Homemade Apple Cider Vinegar—With 29 Uses.”](#) This is about as easy as vinegar gets.

Ingredients

Here's what you'll need for this recipe:

- 💧 Any large vessel of glass or pottery (avoid plastic or metal)
- 💧 Cheesecloth or coffee filter, plus twine or rubber band for use in covering your container
- 💧 A big bottle of apple cider (or two quarts apple parts covered with two quarts water and—if needed—sugar)
- 💧 Optional: Apple cider vinegar starter culture/mother
- 💧 Optional: Chopped apple cores and peels

Directions

1. Sterilize a big glass jar.
2. Pour the cider in and cover the mouth of the jar with cheesecloth or a filter, securing it in place with twine or a strong rubber band.
3. Place the jar in a warm, dark place and allow it to ferment. (Holly places it in the cabinet above her stove.)
4. It can take between two to four weeks on average to complete the fermentation process. You can begin tasting your fermenting apple cider after a few days and throughout the process until you are satisfied with the quality of your vinegar.
5. Once it's ready, put the vinegar into bottles or jars.

Holly says this vinegar will store indefinitely in the refrigerator.

Tips and Tricks

- 💧 **Why This Works:** This recipe doesn't have a mash, so it's a little trickier to make happy yeast without habitat. But store bought ciders usually have excessive amounts of sugar that make fermentation possible even with less-than-ideal yeast conditions. Fermenting in a cabinet over a heavily used stove also creates very warm fermentation conditions to aid with fermentation.
- 💧 **Using a Starter:** If you want to speed up the fermentation process and get better yeast and bacteria production, you can add some apple cider vinegar starter (i.e., raw apple cider) to this recipe. Multiply your amount of cider by 25 percent to figure out how much starter to use. For example, if you have 32 ounces of cider, then use 8 ounces of apple cider vinegar starter.
- 💧 **Using Fresh Apples:** If you want to skip the store-bought cider and instead use fresh apples, you can use this easy vinegar recipe variation.
 - 💧 Cover two quarts of chopped and mashed apple peels, cores, and fruit with about two quarts of unchlorinated water.
 - 💧 If there's a chance your apples might not have enough sugar (i.e., summer apples), then also add 1/4 cup sugar for every quart of over water. Alternately, you can cover the apple mash with cider for extra potency.

What a Whey With Vinegar

- 💧 With or Without Yeasts or Starter Culture
- 💧 Method 4

For all you cheesemakers (or wannabes) out there looking for something cool to do with your leftover whey, why not make vinegar?

Tasha has a herd of dairy goats, so this is one of her favorite recipes.

Whey has about 5 percent sugar, so you will need to add supplemental sugar.

You can make whey vinegar without special yeasts and cultures, but it takes a long time.

For best results, we recommend that you use winemaker fermentation techniques before adding your vinegar mother or starter culture.

However, since whey has low natural sugars, it doesn't tend to attract as many wild yeasts as fruit does. So, you don't normally need to use campden tablets to suppress wild yeast prior to adding your cultivated yeast.

That makes whey a good option for your first time making wine to use for vinegar production.

Ingredients

Here's what you'll need for this recipe:

- 💧 Mason jar with airlock lid (Amazon.com has tons of different varieties) or DIY airlock
- 💧 1-1/2 cups whey
- 💧 1/2 to 2/3 cup sugar (your choice depending on how acidic you want this to be)
- 💧 1/4 teaspoon wine yeast (Montrachet or Champagne work best, but any will do)
- 💧 Thermometer
- 💧 White wine mother of vinegar or other starter culture
- 💧 Cheesecloth or coffee filter, plus twine or rubber band

Directions

1. Mix the whey, sugar, and yeast in your mason jar.
2. Stir well and cover with an airlock lid. (Be sure to add water to your airlock before closing the lid.)
3. If you have a location for fermentation that is 80 to 90 degrees F, then put your jar there.
4. If not, heat your oven to 90 degrees F. You may need to put your oven on warm, use a household thermometer to check the temperature, and turn it off when it hits 90 degrees F. Then, put your mason jar and airlock in your oven and leave it there, undisturbed, for 24 to 48 hours. This helps kickstart fermentation, because whey is a little hard to get going.
5. Once your whey is fermenting, which you can tell because your air lock will be bubbling pretty regularly. You can either keep your whey mix in your oven or move it to a warm indoor spot in your house (at least 70 degrees F).
6. It will take four to seven days for your whey to ferment. Your airlock should keep bubbling for several days. If it doesn't, you may need warmer temperatures, so repeat the oven trick or find a warmer fermentation location.
7. When your airlock stops bubbling, at some point after four days, remove the airlock lid.
8. Add your vinegar starter culture and cover your jar with a cheesecloth or filter. You can use twine, a rubber band, or a mason jar band to hold your cloth or filter in place.
9. Since there is no mash in this recipe, you do not need to stir your batch daily. However, you will want to taste it once per week and stir it at that point.
10. Whey vinegar has a much milder taste than wine or cider vinegars, so it may take eight weeks or longer before you begin to taste vinegar-like acidity in your batch. Just keep tasting. (It's pretty delicious even before it tastes super vinegary, so tasting regularly is kind of a treat.)
11. When the whey vinegar tastes great to you, run it through a fine sieve or paper filter. Permanent coffee filter baskets also work well for this purpose.
12. Then, bottle it, and either enjoy immediately or age for even better flavor a few months down the road.

This recipe takes a while, but is worth the wait.

Tips and Tricks

- 💧 During vinegar production, any residual curds from your cheesemaking will rise to the top of the jar.
 - 💧 Tasha just leaves them, since the Acetobacter seem to see them the same way they do a fruit mash. She simply strains them out before bottling.
 - 💧 But, if they bother you, you can skim them with a spoon as needed.
 - 💧 This may slow down acidification, though, since the mother also rises to the top and may be removed with the curds.
- 💧 If you want to have a little fun with this recipe, you can also add a fruit mash to the mix.
 - 💧 Raspberries, currents, and cranberries offer a nice tart contrast to the natural sweetness of whey.
 - 💧 If you make a fruit mash, you will want to strain it at about four weeks and then continue to let the whey acidify without the mash after that.



Vinegar Eels

When you are perusing the web for cool stuff on vinegar, you might come across postings on vinegar eels.

First off, these eels are pretty small and are usually hard to see unless you are looking for them (or you have tons of them).

They are also not eels. They're nematodes.

We know that not everyone is going to be thrilled by the idea of little worm-like creatures swimming around in their vinegar batches.

But, let's take a minute to recall that the only reason vinegar gets made at all is because other little creatures—namely, yeast and bacteria—live in your vinegar.

And, if that thought worries you, then step back even further and think about the fact that billions of bacteria and microscopic organisms live in your bowels and on your skin.

Vinegar eels are harmless to ingest. In fact, some people actively cultivate them to feed to fish.

If you've had raw vinegar before, you've probably eaten them already.

There is also some pretty convincing research out there that suggests vinegar eels are likely beneficial to the vinegar-making process.

Our best advice is, don't panic if you get them—and feed them to your fish or even your chickens if you prefer not to eat them yourself.



Notes on Bottling

Although vinegar is a preservative and can be aged for a hundred years or more in the right circumstances, it can also decline in quality if stored in less ideal conditions.

Your standard raw vinegar bottle is small in size and has a very narrow opening.

This is intentional, because the small mouth opening limits excessive airflow, which can be detrimental to vinegar. Also, the small size helps ensure that the vinegar is used up quickly, before it has a chance to lose many of its beneficial properties.

For small batches that will be used quickly, you can reuse your old store-bought bottles of vinegar for short-term storage.

Pint-sized canning jars will also work.

If it takes you a while to get through a small bottle of vinegar, though, you may also want to consider storing your vinegar in the refrigerator to preserve quality.

If you plan to age your vinegar or use it over a longer period of time, you will want to store your vinegar in a dark location or use dark colored bottles to prevent over exposure to damaging light.

Wine bottles or dark-colored liquor bottles work well for this purpose.

Storage Containers and Labeling 101

This photo shows a few different bottle styles for use, from left to right, in short-term to long-term storage.

- 💧 **Mason jars** work for small quantities that will be used quickly.
- 💧 **Darker glass bottles** can be used for medium-term bottling. The middle bottle is a gin bottle, painted with chalkboard paint to make labeling and reusing the bottle easy.
- 💧 The last bottle is a **stoneware bottle** and is the best of the group for long-term aging.

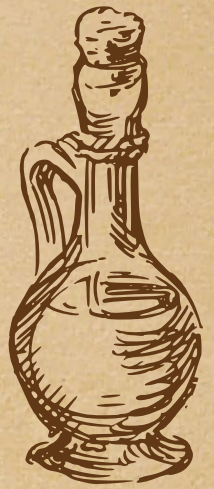


TIP: If you don't want to ruin your collectible stoneware or pottery bottles by writing or painting on them, you can **make a bottleneck label in less than a minute.**

- 💧 We used an old business card, a strip of packing tape that is about three times the length of the business card, and a coffee bag tie to make a homemade label.
- 💧 Write the type of vinegar on the blank side of the card and place it face down on the tape strip.
- 💧 Position the coffee bag tie like a purse handle.
- 💧 Fold the other sides of the tape over the tie and business card. The tape makes the label pretty waterproof and the “purse handle” can be draped over narrow-necked bottles.



Using Vinegar



The popularity and utility of vinegar seemed to wane for a while as cheap, pasteurized, commercial vinegars began to dominate the grocery store shelves.

But these products just don't pack the power punch of vital vinegars you make at home, or even of some store-bought varieties like Bragg's that keep the live cultures intact when bottling.

Growing Up With Vinegar



Luckily, many of us remember our parents using raw vinegars.

Tasha's dad, who was a bit of a natural health activist during her youth, made her take a tablespoon of raw apple cider vinegar every morning and evening to promote general good health.

Marjory's mom always insisted on "live" apple cider vinegars for salad dressings and general use. She said if it didn't have the "mother" in it, then it would be too harsh and acidic.

Unfortunately, Marjory got away from taking her mom's advice for many years and never really liked vinegar-based dressings.

Then, as she became more active in the homegrown food movement and began looking for alternatives to traditional medicine to keep her family healthy, she came back to her mother's wisdom.

She began making her own vinegars at home.

After tasting her own homemade vinegar and experiencing the health benefits firsthand, it's become something she makes and uses regularly for a variety of purposes.

The 'Mother' of All Comebacks



It took us a while to get back on track with the wisdom of our parents and of the generations before. Now, though, live-culture vinegar is making a comeback in homes around the country and the globe.

The incredible benefits of vinegar are being rediscovered, and more and more uses are being added to the list.

Thanks to the Internet, recipes and methods of use are being shared at a remarkable rate.

It's pretty awesome not only to see this vital substance, with origins that predate written human history, surviving the test of time, but also to see so many of us bringing production back into our homes and increasing our self-sufficiency through its use.

The Global Benefits of Vinegar



As many of you know, our tagline at TGN is "Homegrown Food on Every Table."

This is more than just a mantra for us.

It's a way of life.

We are working hard to empower people to play an active role in their own food supplies in order to promote health, food security, respect for nature, and equal access to clean food around the world.

Vinegar may have negligible calories, but the facts that it can be made from peelings and parts that would otherwise be waste products, makes other food tastier, and can contribute toward a healthier home makes it an important part of a homegrown food supply.

Marjory's Top Picks for Vinegar Use



- 💧 **Bone Broth Additive:** Add about two tablespoons per gallon of water when making bone broth. The vinegar helps leach minerals out the bones. Just be careful not to add too much or it will dominate the flavor of the broth.
- 💧 **Chemistry:** I am currently looking into more “homestead chemistry,” and having an acid around is useful. For example, combined with fire, vinegar can be used to break rocks. (Hannibal used this technique in 216 BC to cross the Alps.)
- 💧 **Cleaning Solution:** Use a mixture of vinegar and water for wiping down surfaces and cleaning up around the house. Although it's challenging to know the exact acidity level in home vinegar, one part water to one part vinegar usually works well for general cleaning and a slighter lower dilution rate is good for deeper sanitizing. As with any new cleaning products, try a test patch on an out-of-the-way surface to make sure there is no reaction. (Some manufactured furniture requires special products to prevent damage.)

- 💧 **Explosions:** I've got kids, and reacting baking soda with vinegar to simulate volcanoes is great fun! Mix a few tablespoons of baking soda with about 2/3 cup of water. Then, add about one cup of vinegar to the mix. You can add food color or washable paints for color if you want. Keep in mind that this gets messy, so do it in a big washable container or in an approved splatter zone.
- 💧 **Hair Rinse:** Vinegar makes a great hair rinse and a wonderful sensory experience if you add some rosemary to your hair rinse bottle.
- 💧 **Salad Dressing:** Mix it with your favorite high-quality oils (like pecan, avocado, or olive), salt, pepper, chopped garlic cloves, and whatever other seasonings you like. Make up a big batch and keep it in a jar so it's ready whenever you need it. Store at room temperature, out of direct sunlight, for up to two months (though it never lasts that long in my house!), and shake well before each use.

Tasha's Top Picks for Vinegar Use



- 💧 **Healthful Hydration:** I work outside most of the time, so I add a splash of vinegar to my own water pretty regularly to replenish electrolytes and stay hydrated.
- 💧 **Infusions:** Cover a bowl of dried fruits (cranberries, currents, raisins, figs, cherries, etc.) in your favorite vinegar until the liquid is absorbed by the fruit. Then, mince your vinegar-infused fruits and spread them over goat cheese. Serve with your favorite bread for a simple, delicious, and healthy appetizer.

- 💧 **Livestock Immunity Boost:** I save my refrigerator pickle vinegar to give to my ducks, goats, and chickens whenever temperatures fall below freezing. A few tablespoons in their water bucket gives them an immunity boost and a little extra zing to help them through weather cold spells.
- 💧 **Marinade:** Vinegar is a great flash meat marinade. If you forgot to marinate your duck breast or rabbit the night before, mix some good red or white wine vinegar with olive oil, salt, pepper, and garlic. Rub it into your meat. Leave it for 15 minutes or longer, then cook.
- 💧 **Mold Killer:** We live in the humid South and keep our windows open most of the year. So, we always end up with mold around our window sills. I spray those spores with straight, undiluted apple cider or white wine vinegar. Then, I wipe them down with a wash cloth to keep the mold from spreading around the house.

Additional Uses for Vinegar, by Category



Our favorite uses for vinegar just skim the surface of all of the ways this potent liquid can benefit your home, your family, your yard, and even your pets.

Because, as with all things, the more you practice making raw vinegar, the better you'll get at it.

So, just in case your first few batches aren't quite salad worthy, you can still put them to use in a variety of other ways.

Read on for several dozen more ideas, broken down by category.

We've pulled the following from posts by authors on The Grow Network blog, as well as from online sources like [The Vinegar Institute's Uses and Tips page](#). (Note that most of the references to uses for apple cider vinegar (ACV) come from Holly Urbach Williams' TGN blog post "[How to Make Homemade Apple Cider Vinegar—With 29 Uses](#)."

Automotive

- 💧 To **remove bumper-sticker residue**, try cleaning with vinegar. Wipe the surface repeatedly with distilled white vinegar until it is soaked. In a few minutes, it should peel off easily. Test on a small, hidden area of the car to ensure there will be no damage to the paint.
- 💧 Wipe car windows the night before a freeze with a solution of one part water to three parts distilled white vinegar to **prevent frost on windows**.

Cleaning and Sanitizing

- 💧 **Clean and deodorize** after pet (and toddler!) potty accidents by spraying the carpet with a solution of half ACV and half water. First, blot up any liquid. Then, soak carpet with the vinegar water. After five minutes, blot the area thoroughly and allow to dry. Once dry, there should be no odor.
- 💧 Use a solution of one part ACV to eight parts water to **clean glass and mirrors**.
- 💧 **Make cleaning solutions using two different recipes.**
- 💧 **Disinfect your cutting board.**
- 💧 **Use it as a rinse aid for dishes.**

- 💧 Use vinegar to **clean your coffee maker**. [Click here](#) for detailed how-to instructions and a rundown of why it's important to use vinegar to clean your coffee maker.
- 💧 To **wash no-wax floors**, add 1/2 cup of distilled white vinegar to a half-gallon of warm water.
- 💧 **Remove water or alcohol marks on wood** by rubbing with a mixture of equal parts distilled white vinegar and olive oil. Rub with the grain and polish for the best results.
- 💧 Freeze a vinegar-water mix in ice cube trays to **run through your garbage disposal to clean it**.
- 💧 Boil a solution of 1/4 cup of distilled white vinegar and 1 cup of water in the microwave to **loosen splattered-on food** and deodorize it.
- 💧 **Deodorize your kitchen drain** by pouring a cup of distilled white vinegar down the drain once a week. Let stand 30 minutes and then flush with cold water.
- 💧 Cleaning with vinegar **helps your brass, copper, and pewter shine**. Dissolve one teaspoon of salt in one cup of distilled white vinegar and stir in flour until it becomes a paste. Apply paste to the metal, and let it stand for about 15 minutes. Rinse with clean warm water and polish until dry.
- 💧 **Ant invasions** can sometimes be deterred by washing countertops, cabinets, and floors with distilled white vinegar.
- 💧 **Get rid of fruit flies** in your kitchen by placing a bowl filled with 1/2 quart water, two tablespoons sugar, two tablespoons ACV, and a couple of drops of dish soap to attract the fruit flies.
- 💧 **Get rid of refrigerator smells**. Place one cup ACV in a glass and set in the fridge. Within two days, any odor is gone!

- 💧 **Remove corrosion from shower heads or faucets** by soaking them in distilled white vinegar overnight. Accomplish this easily by saturating a terrycloth towel in vinegar and wrapping it around the showerhead or faucet.
- 💧 It is easy to **take out the heavy, stale smell often found in lunch boxes**. Dampen a piece of fresh bread with distilled white vinegar and leave it in the lunch box overnight.
- 💧 Wash fireplaces with a 50/50 ratio of water and vinegar to **remove the blackened soot on glass front doors**.

Cooking

- 💧 When you can't **get the last bit of mayonnaise or salad dressing out of the jar**, try dribbling a little of your favorite vinegar into it, then put the cap on tightly and shake well. You'll be amazed at how much you've been wasting.
- 💧 **Try soaking fish in vinegar and water before cooking it**. It will be sweeter, be more tender, and hold its shape better. When boiling or poaching fish, a tablespoon of vinegar added to the water will keep it from crumbling so easily.
- 💧 When boiling an egg and it has cracked, a little vinegar in the water will **keep the egg white from running out**.
- 💧 **Make an aromatic rose spritz for salads**.
- 💧 A teaspoon of distilled white or apple cider vinegar added to the water in which you boil potatoes will keep them nice and white. You can **keep peeled potatoes from turning dark** by covering them with water and adding two teaspoons of vinegar.

- 💧 **Freshen up slightly wilted vegetables** by soaking them in cold water and vinegar.
- 💧 Add two tablespoons of distilled white vinegar to one pint of water and use the solution to **wash fresh fruits and vegetables**. Then, rinse them thoroughly. Research has shown that vinegar helps kill bacteria on fruits and vegetables.
- 💧 Before frying doughnuts, add 1/2 teaspoon of vinegar to hot oil to **prevent doughnuts soaking up extra grease**. Use caution when adding the vinegar to the hot oil.
- 💧 **Remove fruit or berry stains from your hands** by cleaning them with vinegar.
- 💧 To **get rid of cooking smells**, simmer a small pot of vinegar and water solution.
- 💧 For **fluffy egg whites**, soak a paper towel with one to two tablespoons of distilled white vinegar. Wipe the mixing bowl and beaters or whisk with the vinegar-soaked paper towel, then dry with a cloth or paper towel prior to whipping egg whites.
- 💧 For fluffier and **great-tasting rice**, add a teaspoon of distilled white vinegar to the boiling water before adding rice. Rice will be easier to spoon and less sticky.
- 💧 To **make naked eggs**, place eggs in a container so the eggs are not touching. Add enough vinegar to cover the eggs. Cover the container, put in the refrigerator, and let the eggs sit in the vinegar for 24 hours. Use a large spoon to scoop the eggs out of the container. Be careful—since the eggshell has been dissolving, the egg membrane may be the only thing holding the egg together. Carefully dump out the vinegar. Put the eggs back in the container and cover them with fresh vinegar. Leave the eggs in the refrigerator for another 24 hours. Scoop the eggs out again and rinse them carefully. If any of the membranes have broken, throw those eggs away. When you're done, you'll have an egg without a shell.

Disease Treatment and Prevention

- Take a tablespoonful of ACV daily in eight ounces of water as a **preventative against colds and flu**.
- Take a tablespoonful of ACV in eight ounces of water several times a day when **battling diarrhea or gastroenteritis** (also known as stomach flu). This same dosage can help **reduce joint pain** and is safer than taking anti-inflammatory medicines.
- To **clear up respiratory congestion**, inhale a vapor mist from a steaming pot containing water and several spoonfuls of vinegar.
- To **treat toenail fungus**, soak toes in a solution of vinegar and water—using one part vinegar to two parts water—for 15 minutes per day.
- For **arthritis relief**, mix 1/2 teaspoon of ACV, 1/2 teaspoon honey, and one teaspoon of orange-flavored Knox gelatin in a glass of water.

General Household Uses

- Use vinegar to **prepare hard-to-paint surfaces** such as metal or plastic.
- If you have a worn DVD that has begun to stick or suffers from the occasional freeze-frame, wipe it down with distilled white vinegar applied to a soft cloth. Ensure the DVD is completely dry before reinserting in the DVD player. (This only **works on DVDs that are scratched or dirty** through normal wear.)
- For **coloring Easter eggs**, mix one teaspoon of vinegar with each 1/2 cup of hot water, then add food coloring. (Check egg-coloring booklets or the food-dye box for specific directions.) Vinegar keeps the food dyes bright and prevents streaky, uneven colors.

- 💧 To **make berry ink**, fill a strainer with 1/2 cup berries (blueberries, cherries, blackberries, strawberries, elderberries, raspberries, etc.) and hold it over a bowl. Using the rounded back of a wooden spoon, crush the berries against the strainer so that the berry juice strains into the bowl. Keep adding berries until most of their juice has been strained out and only pulp remains. Add 1/2 teaspoon salt and 1/2 teaspoon vinegar to the berry juice. The vinegar helps the ink retain its color, and the salt keeps it from getting too moldy. If the berry ink is too thick, add a tablespoon of water. Store in a baby food jar. Only make a small amount of berry ink at a time and, when not in use, keep it tightly covered.

Laundry

- 💧 **Remove deodorant and antiperspirant stains** from clothing by lightly rubbing them with distilled white vinegar and laundering as usual.
- 💧 After a hem or seam is removed, there are often unsightly holes left in the fabric. **Remove these holes in the hem** by placing a cloth, moistened with distilled white vinegar, under the fabric and ironing.
- 💧 **Clean leather articles** with a mixture of distilled white vinegar and linseed oil. Rub the mixture into the leather and then polish with a soft cloth.
- 💧 Lightly rub distilled white vinegar on **fabric that has been slightly scorched**. Wipe with a clean cloth.
- 💧 When you are color dyeing, add about a cupful of distilled white vinegar to the last rinse water to **help set the color**.
- 💧 **Unclog a steam iron** by pouring equal amounts of distilled white vinegar and water into the iron's water chamber. Set the iron in an upright position, turn the setting to Steam, and leave it on for five minutes. Then, unplug the iron and allow to cool. Any loose particles should come out when you empty the water.

- 💧 To **clean a scorched iron plate**, heat equal parts distilled white vinegar and salt in a small pan. Rub the solution on the cooled iron surface to remove dark or burned stains.
- 💧 Adding 1/2 cup of ACV to the last rinse cycle of your wash load will help to **soften clothes, control static cling, reduce lint buildup, and keep pet hair from sticking to clothes**.
- 💧 ACV can help **remove stubborn stains** such as coffee and tea. Soak the stain in a solution of 1/3 cup vinegar to 2/3 cup of water. After soaking, hang items out in the sun until they're dry. Full-strength vinegar can even remove stubborn mildew stains from clothing.
- 💧 Use a mixture of 50 percent vinegar to 50 percent water to **treat stained clothing** before washing it. Keep a spray bottle of this solution near the washer.

Pet Care

- 💧 ACV can help **restore proper pH to your dog's system**. If your dog is itchy, scratches constantly, is losing fur, or is stinky, adding a teaspoon to his or her food twice a day can help relieve the misery. You can increase to a tablespoonful a day if you are not seeing results at a lower dosage.
- 💧 ACV is also useful for **preventing ear infections in dogs**. Apply a few drops inside your dog's ears following a bath.
- 💧 Spraying your dog after a bath with a 50/50 vinegar-water mixture and allowing him or her to air dry can help **kill fleas, ticks, and ringworm**.
- 💧 Adding one teaspoon of ACV to your dog's drinking water can help **reduce or eliminate the tear stains that light-colored pets often get by their eyes**.

- 💧 ACV added to a dog's water can help to **eliminate urinary problems**.
 - 💧 ACV used in a 50/50 vinegar-water mixture can be **applied to cats with pink eye to clear the infection**.
 - 💧 ACV in a 50/50 vinegar-water solution can be wiped on a cat's paws and applied to its neck to **combat the urinary tract infections that cats seem to be prone to**. Adding ACV to a cat's water can treat the UTI, but cats can be finicky about the way their food and water taste and they may avoid drinking the water. Applying the mixture to the paws makes them ingest it as they clean their paws. Do this twice a day for best results.
 - 💧 ACV can be used to **treat horses who have urinary tract stones** by adding between 1/2 cup and one cup of vinegar to six gallons of water.
 - 💧 **Treat hoof rot** by soaking your horse's hooves in ACV two to three times a day.
 - 💧 **Treat your horse's dry skin and dandruff** by adding up to 1/2 cup ACV to your horse's feed daily.
- 💧 Adding ACV to your horse's feed and water can help **combat fly problems**.
- 💧 ACV is effective in **relieving painful joints in horses**. Add up to 1/2 cup to your horse's feed daily.

Skin and Hair

- 💧 **Treat sunburn** by soaking a washcloth in undiluted ACV and applying directly to the burned area. Let the dampened cloth lie on the skin for 5–10 minutes.
- 💧 ACV is a great **hair conditioner, detangler, and frizz reducer**. It also helps **control dry, itchy scalp** due to its antifungal and antibacterial

properties. Mix it with water in a 1:1 ratio and keep it in an old shampoo or conditioner bottle. Apply to hair and allow to sit for a couple of minutes, then rinse.

- 💧 ACV can be used as a **face wash**. Mix one tablespoonful of vinegar with a cup of water and apply to facial skin using a cotton ball. This solution is naturally antibacterial and deep-cleans pores. Follow with a moisturizer suited to your skin type.
- 💧 To **soothe a bee or jellyfish sting**, douse with vinegar. It will soothe irritation and relieve itching.
- 💧 To **relieve dry and itchy skin**, add two tablespoons of vinegar to your bath water.
- 💧 To **treat skin burns**, apply ice-cold vinegar right away for fast relief. It will prevent burn blisters.
- 💧 To **stop itching**, apply a paste made from vinegar and cornstarch. Repeat the application until the itch disappears.
- 💧 As a **wart remover**, mix lukewarm water with a cup of distilled white vinegar. Immerse the area with the wart and soak for 20 minutes every day until the wart disappears.
- 💧 As a **bug spray**, combine equal amounts of water, distilled white vinegar, and liquid dish soap in a spray bottle. Use on skin as needed.

Yard and Garden

- 💧 In hard-water areas, add a cup of vinegar to a gallon of tap water for **watering acid-loving plants** like rhododendrons, gardenias, or azaleas. The vinegar will release iron in the soil for the plants to use.

Using Vinegar

💧 Rinse your hands liberally with distilled white vinegar after working with garden lime to **avoid rough and flaking skin**. You can also **remove excess lime from plant pots** before reusing them by rinsing with vinegar.

💧 **Keep flowers fresh longer.** Add two tablespoons sugar and two tablespoons white vinegar to a one-quart vase of water. Trim stems and change water every five days.

💧 **Explore using it as a raccoon deterrent.**

💧 **Disinfect for your fruit tree-pruning equipment.**

💧 **Use it as a weed killer.**

💧 **Test the alkalinity in your soil** using vinegar and baking soda.
[Click here for more details.](#)

This list ought to keep you busy for a while—that is, if you don't just eat all of your vinegar first!

Vinegar for Herbal Extraction



In his book **The Modern Herbal Dispensatory: A Medicine-Making Guide**, **Thomas Easley**, director of the Eclectic School of Herbal Medicine in Lowgap, North Carolina, offers the following information on using vinegars in herbal medicine:

An herbal extract made with vinegar is usually known as an herbal vinegar or acid tincture.

This method is most commonly used with culinary herbs for use in cooking or as a salad dressing, although some medicinal plants have also been made into acid tinctures.

There are two applications where vinegar is very effective:

- ◆ *It is excellent at extracting minerals from herbs that contain calcium and other alkaline minerals.*
- ◆ *It is useful for extracting aromatic and pungent herbs, as when making fire cider.*

Garden-grown vegetables and herbs like kale, collards, chard, beet greens, dill, basil, marjoram, thyme, oregano, mint, sage, parsley, and rosemary are good choices for use in vinegar tinctures due to their flavor and calcium content.

Common “weeds” such as dandelion, yellow dock, chickweed, lamb’s quarters, purslane, plantain, and red clover can also be made into vinegar tinctures.

Four Thieves Tonic

Fire cider, depending on its strength and the herbs used, can be either a medicinal tonic or a tasty beverage.

*As an immune booster,
Four Thieves Tonic is Marjory's go-to.*

The process is simple. You can check out the how-to video [here](#).

You can make Four Thieves Tonic with store-bought raw vinegar.

But, it is even better using your homemade vinegar to extract mineral and medicinal properties from pungent herbs and savories.



These might include garlic, hot peppers, juniper berries, rosemary, ginger, horseradish root, mint, coriander, cloves, and black pepper.

Also, the same basic techniques used to make Four Thieves Tonic can be used for other herbal flavor extractions. These can be used in salad dressings and as dipping sauces for vegetables or even to make aromatic cleaning sprays.

Tarragon, aromatic edible flowers, chives, and other herbs are tasty—and they also make a beautiful bottle display for your home or as gifts for friends and family.



Conclusion

We hope this e-book has given you the information you need to feel confident making your own vinegar from whatever edible supplies you have available at home.

Vinegar is so versatile and good for you that just by producing this one product, you can improve your self-sufficiency in caring for home, health, and animal.

It also increases your enjoyment of homemade foods.

Also, May is National Vinegar Month. Remember to celebrate your yeasty beasties and bacteria buddies by sharing your knowledge and love of vinegar with others.

For more information on other areas related to producing your own food and medicine, be sure to hop over to [The Grow Network's website](http://www.TheGrowNetwork.com).

Additional Vinegar Resources



We perused thousands of helpful websites and academic texts and studies while researching this e-book.

In addition to the resources referenced in the text of this e-book, we thought it would be helpful to include a summarized list of web links and books we found useful in our studies.

The Grow Network Resources

- 🌐 <http://thegrownetwork.com/four-thieves-tonic>
- 🌐 <http://thegrownetwork.com/non-toxic-weed-killer-pantry>
- 🌐 <http://thegrownetwork.com/how-to-make-homemade-apple-cider-vinegar-with-29-uses>
- 🌐 <http://thegrownetwork.com/turn-your-apple-harvest-into-homemade-apple-cider-vinegar>
- 🌐 <http://thegrownetwork.com/care-cutting-boards>
- 🌐 <http://thegrownetwork.com/how-to-clean-your-whole-home-with-simple-ingredients-from-your-pantry>
- 🌐 <http://thegrownetwork.com/making-vinegar>
- 🌐 <http://thegrownetwork.com/hand-washing-vs-the-dishwasher-which-is-better>
- 🌐 <http://thegrownetwork.com/12-uses-for-rose-petals-from-the-kitchen-to-the-boudoir>
- 🌐 <http://thegrownetwork.com/a-whole-litter-of-raccoon-solutions>
- 🌐 <http://thegrownetwork.com/fruit-tree-pruning-off-grid-tool-care-tip>

Vinegar History and General Overview

- 🌐 <http://humantouchofchemistry.com/know-how-vinegar-came-into-existence.htm>
- 🌐 <http://versatilevinegar.org/vinegar-lore>
- 🌐 <https://en.wikipedia.org/wiki/Vinegar>
- 🌐 <http://www.apple-cider-vinegar-benefits.com/vinegar-history.html>
- 🌐 <http://www.newworldencyclopedia.org/entry/Vinegar>
- 🌐 https://en.wikipedia.org/wiki/Louis_Pasteur
- 🌐 <http://www.faqs.org/health/bios/83/Louis-Pasteur.html>
- 🌐 <https://www.statista.com/statistics/417672/us-dollar-sales-of-oil-and-vinegar-by-segment>
- 🌐 <https://digital.library.unt.edu/ark:/67531/metadc9160/m1/4>
- 🌐 <http://www.seriousseats.com/2014/05/everything-you-need-to-know-guide-to-balsamic-vinegar.html>
- 🌐 <http://ucfoodsafety.ucdavis.edu/files/192137.pdf>
- 🌐 <http://www.madehow.com/Volume-7/Vinegar.html>
- 🌐 <http://theepicentre.com/ingredient/a-guide-to-vinegars>
- 🌐 <http://www.differencebetween.com/difference-between-bacteria-and-vs-yeast>
- 🌐 <https://www.boundless.com/microbiology/textbooks/boundless-microbiology-textbook/industrial-microbiology-17/the-microbiology-of-food-201/vinegar-1009-5924>
- 🌐 <http://ucfoodsafety.ucdavis.edu/files/192136.pdf>

How to Make Vinegar

- 🌐 <https://digital.library.unt.edu/ark:/67531/metadc9160/m1/4>
- 🌐 <https://naldc.nal.usda.gov/naldc/download.xhtml?id=ORC00000397&content=PDF>
- 🌐 <http://www.popsci.com/diy/article/2008-12/making-vinegar-home>
- 🌐 <http://www.vinegarman.com/page23/#1>
- 🌐 <http://lovelovething.com/pineapple-vinegar>
- 🌐 <https://www.fermentedfoodlab.com/how-to-make-raw-pineapple-vinegar>
- 🌐 <https://www.mountainfeed.com/blogs/learn/41176641-understanding-and-making-your-own-vinegar>
- 🌐 <http://phickle.com/wine-vinegar-how-to>
- 🌐 <http://www.mommypotamus.com/how-to-make-apple-cider-vinegar>
- 🌐 <http://ucfoodsafety.ucdavis.edu/files/192135.pdf>
- 🌐 <http://www.washingtonpost.com/wp-dyn/content/story/2009/01/06/ST2009010601526.html>
- 🌐 <http://www.offthegridnews.com/off-grid-foods/making-vinegar-from-scratch>
- 🌐 <http://thestonesoup.com/blog/2015/02/how-to-make-wine-vinegar>
- 🌐 http://www.motherearthnews.com/real-food/fermenting/peach-vinegar-zbcz1508?newsletter=1&spot=headline&utm_source=WhatCountsEmail&utm_medium=email&utm_campaign=MEN%20FP%20eNews%201-17-17&utm_term=MEN_FP_eNews&wcsid=D3AA759DE3578508A0A1A7D493FB44E82D6639A2F39C6BD6

Additional Vinegar Resources

- 🌐 <https://holybasil.wordpress.com/2008/01/26/word-to-your-mother>
- 🌐 http://www.distilling-fermenting-seminars.com/en/distilling-alcohol-at-home-courses-books-supplies-to-make-spirits/calculators-to-make-your-own-alcohol-and-spirits-by-yourself/diluting-alcohol-and-spirits-after-home-distilling/?focus=1&alc_c_ist=13&alc_c_soll=7&alc_v_ist=0.75&alc_v_soll=1.50#ankorContentHeader
- 🌐 <http://goodeggssfbay.tumblr.com/post/33388413550/from-alices-green-kitchen-making-your-own>
- 🌐 <http://www.motherearthnews.com/real-food/fermenting/make-vinegar-at-home-zmrz14fmzmat>
- 🌐 <http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.2003.tb00610.x/pdf>
- 🌐 <https://www.cdc.gov/niosh/npg/npgd0002.html>

Vinegar Acidity

- 🌐 <http://www.culturesforhealth.com/learn/kombucha/testing-acidity-strength-vinegar>
- 🌐 <https://www.thespruce.com/safely-use-homemade-vinegar-in-pickling-1327746>
- 🌐 <http://www.healthycanning.com/ph-meters-and-home-canning>
- 🌐 <http://www.titrations.info/acid-base-titration-acetic-acid-in-vinegar>
- 🌐 <http://www.kbcc.cuny.edu/academicDepartments/PHYSCI/PL/chm111/Documents/Vinegar.pdf>
- 🌐 https://foodsafety.wisc.edu/business_food/files/approximate_ph.pdf
- 🌐 <http://depts.washington.edu/chem/facilserv/lecturedemo/pHofAceticAcid-UWDept.ofChemistry.html>

- 🌐 <http://www.phmeters.com/>
- 🌐 https://saylordotorg.github.io/text_introductory-chemistry/s16-06-the-ph-scale.html
- 🌐 <https://www.fda.gov/Food/FoodborneIllnessContaminants/CausesOfIllnessBadBugBook/ucm122561.htm>
- 🌐 <https://www.ams.usda.gov/sites/default/files/media/TechnicalProceduresManual%5B1%5D.pdf>
- 🌐 https://oregonstate.edu/dept/nursery-weeds/weedspeciespage/acetic_acid_factsheet.pdf
- 🌐 <https://necfe.foodscience.cals.cornell.edu/acid-and-acidified-foods>

Alcohol-Making

- 🌐 <http://winemaking.jackkeller.net/sugar.asp>
- 🌐 <http://www.megaheart.com/pdf/added sugars.pdf>
- 🌐 <https://www.ars.usda.gov/northeast-area/beltsville-md/beltsville-human-nutrition-research-center/nutrient-data-laboratory/docs/usda-database-for-the-added-sugars-content-of-selected-foods-release-1>
- 🌐 <http://homebrew.stackexchange.com/questions/3271/whats-the-difference-between-yeast-and-bacteria>
- 🌐 <http://www.wine-searcher.com/m/2015/04/what-s-the-big-deal-about-stems>
- 🌐 <http://www.eckraus.com/wine-making-for-beginners>
- 🌐 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3876234>
- 🌐 <http://www.walkersfruitbasket.com/Frequently%20Asked%20Questions.html>
- 🌐 <http://www.scottlab.com/uploads/documents/technical-documents/849/Delteil%20The%20Diverse%20Functions%20of%20Oxygen.web.pdf>

- 🌐 http://www.grapestompers.com/articles/chaptalize_wine.htm
- 🌐 <http://www.honeyflowfarm.com/Winemaking-Information/sugar-addition-chart.html>

Vinegar Uses

- 🌐 <http://chestofbooks.com/food/recipes/Meals-2/How-To-Make-Vinegar.html>
- 🌐 <https://blog.mountainroseherbs.com/fire-cider>
- 🌐 <http://preparednessmama.com/testing-your-soil-ph-without-a-kit>
- 🌐 http://www.motherearthnews.com/natural-health/12-uses-for-apple-cider-vinegar-zbcz1611?newsletter=1&spot=headline&utm_source=WhatCountsEmail&utm_medium=email&utm_campaign=MEN%20H&E%201.23.17&utm_term=MEN_HE_eNews&wcsid=D3AA759DE35785086DDB81DFA2FE725324F0CA1621C26C02
- 🌐 http://www.motherearthliving.com/cooking-methods/a-taste-for-tarragon?newsletter=1&spot=headline&utm_source=WhatCountsEmail&utm_medium=email&utm_campaign=MEL%20Weekly%20eNews%2002.16.17&utm_term=MEL_Weekly_eNews&wcsid=D3AA759DE3578508DD86711C99EC081AAE8739B8C7CA9CCD
- 🌐 <http://www.holisticwisdom.org/hwpages/herbalvinegars.htm>
- 🌐 http://www.huffingtonpost.com/2014/09/29/how-to-clean-coffee-maker_n_5861026.html
- 🌐 <http://www.globalhealingcenter.com/natural-health/foods-high-in-calcium>
- 🌐 <http://versatilevinegar.org/uses-tips>
- 🌐 <https://firecider.com>

Books

- 📖 *Burford, Tom. Apples of North America. Timber Press Inc., 2013.*
- 📖 *Easley, Thomas and Home, Steven. The Modern Herbal Dispensatory: A Medicine-Making Guide. North Atlantic Books, 2016.*
- 📖 *Katz, Sandor Ellix. The Art of Fermentation: An In-depth Exploration of Essential Concepts and Processes From Around the World. Chelsea Green Publishing, 2012.*
- 📖 *Katz, Sandor Ellix. Wild Fermentation: The Flavor, Nutrition, and Craft of Live-Culture Foods. Chelsea Green Publishing, 2003.*
- 📖 *Mansfield, Scott. Strong Waters: A Simple Guide to Making Beer, Wine, Cider and Other Spirited Beverages at Home. The Experiment LLC, 2010.*

© The Grow Network Inc.