

UC Cooperative Extension Cottage Foods

# Vinegar



# Vinegar

- Vinegar has been used for thousands of years. It has been used as a medicine, cooking additive, corrosive agent, as a preservative, and as a herbicide for killing weeds.
- Vinegar can be defined as a condiment made from various sugary and starchy materials by alcoholic and subsequent acetic acid fermentation

*More commonly... vinegar is an alcoholic liquid that has been allowed to sour.*



# Product Possibilities

## Allowable vinegar based products under the Cottage Food Law include:

- Processing wine or other alcohol products into vinegar
- Fermentation of fruits/grains into vinegar by yeast fermentation and acetic acid fermentation

*Flavored vinegars with spices, fresh or dried herbs, fruits, or spices are **NOT** Allowed under the Cottage Food Law*



# Market Outlook

- Vinegar fits into a niche market, as many consumers and chefs have come to value the variety of flavors that vinegars can add to foods and dishes.
- Under ideal conditions, vinegar can be stored for 6-8 months which can extend the season of less available products.



# Vinegar

## There are several types of vinegars:

**Balsamic** - is brown in color with a sweet-sour flavor. It is made from the white trebbiano or lambrusco grapes and aged in barrels of various woods. Some gourmet Balsamic vinegars are over 100 years old.

**Champagne** - has no bubbles. It's made from a dry white wine made from Chardonnay or Pinot Noir grapes (both of which are used to make Champagne).

**Cider** - is made from apples and is the most popular vinegar used for cooking in the United States.

**Distilled** - is made from distilled grain alcohol and is usually colorless. It is best used for pickling.



# Vinegar

## There are several types of vinegars:

**Malt** - is made from fermented barley and grain mash, and flavored with woods such as beech or birch. It has a hearty flavor and is often served with fish and chips.

**Rice** - has been made by the Chinese for over 5,000 years. There are three kinds of rice wine vinegar: red (used as a dip for foods and as a condiment in soups), white (used mostly in sweet and sour dishes), and black (common in stir-fries and dressings).

**Sherry** - is made from sherry wine aged under the full heat of the sun in wooden barrels and has a nutty-sweet taste.

**Wine** - can be made from white, red, or rose wine. These vinegars make the best salad dressings.



# Processing Vinegar

- The transformation of wine or fruit juice to vinegar is a chemical process in which ethyl alcohol is converted to acetic acid.
- The process involves a bacteria called *Acetobacter* (a.k.a. the vinegar bacteria) to convert ethyl alcohol ( $C_2H_5OH$ ) into acetic acid ( $CH_3CO_2H$ ) by oxidation.



# The Manufacturing Process

- Historically, several processes have been employed to make vinegar.
  - Slow or natural process: vats of cider are allowed to sit open at room temperature. During a period of several months, the fruit juices ferment into alcohol and then oxidize into acetic acid.
  - Continuous or French Orleans process: Fruit juice is periodically added to small batches of vinegar and stored. As the fresh juice sours, it is skimmed off the top.
- Both the slow and continuous methods require several months to produce vinegar.
- In the modern commercial production of vinegar, the generator method and the submerged fermentation method are used. These methods are based on the goal of infusing as much oxygen as possible into the alcohol product to speed up the acetic acid fermentation process.





# New Orleans Method

One of the best ways to get started at home

- Involves creating the ideal conditions for the vinegar bacteria to make vinegar (provide them with food (wine), air, and a dark, warm environment).

Getting Started

- ***Start with clean equipment***
  - There will be a full-scale war going on in your vinegar and the more you wipe out the bad bacteria the better the good bacteria will do in your vinegar, the better chance the bacteria have of making good vinegar for you.
- ***Avoid the use of sulfites.*** They are used to reduce the activity of vinegar bacteria. So if you are making wine for vinegar making, don't use any sulfites.
  - If you buy wine for vinegar making, test for sulfites. There are kits available. Wine for vinegar should contain 20 parts per million or less of free SO<sub>2</sub>.



# New Orleans Method

## Getting Started - *Making Wine Vinegar*

### Equipment:

- Wine (9-10% alcohol), if higher dilute with distilled water
- Container for fermentation; options include wood barrels, glass carboys, ceramic pots, stainless steel.
- Container for aging; same options as above
- Vinegar starter kit (bacteria)
- Funnel
- Bottles for packaging, storing, and further aging
- Labels



# Making Wine Vinegar

## Getting Started

- Utensils – use glass, stainless steel, enamel.
- Sanitize – everything that will touch vinegar should be sanitized.
- Fill sterilized containers about 2/3 full with wine.
- Add bacteria cultures .
  - called mother of vinegar



# Making Wine Vinegar

- Cover container with a cloth to keep out insects, dirt and other debris, while allowing air to freely reach the stock.
- Two factors require special attention when making vinegar:
  - Oxygen supply
  - Temperature  
(80F is ideal, range 60-85F)



# Formation of the film

- After some time an acetic acid film called “mother” will form.
- It should not be disturbed.
- It often becomes heavy enough, to fall in such case remove it and discard.



# Vinegar

- Living bacteria are in the liquid.
- They can be used to start the new batch of vinegar so it is not necessary to purchase new starter bacteria.
- Full fermentation will take 3-4 weeks
- To be legal, vinegars in U.S. must contain a minimum of 4% acetic acid.



# Preserving Vinegar

- Filter vinegar through a layer of cheese cloth to remove formed film-mother of vinegar, before pasteurization.
- Heat vinegar to 140°F, then pour into sterilized bottles.
- Bottle and place in hot water bath at 140°F for at least 30 minutes. Temperature should not exceed 160°F.
- Stored vinegar will stay in excellent condition when pasteurized.



# Aging Vinegar

- Vinegar has a strong, sharp bite when it is just made.
- It becomes mellow when aged.
- It usually lasts 6 months or longer when stored at cool, steady temperature (50-60°F).
- This undisturbed rest allows suspended solids to fall, making the vinegar clear and bright.
- Once vinegar is ready it should be kept away from oxygen, for acetic acid could be converted into water and carbon dioxide.





# Containers

- Glass bottles are available in many sizes, shapes and designs.
- Marketing considerations may be relevant when selecting the container.
- Select and prepare containers first.
  - Use only glass jars or bottles that are free of cracks or nicks and can be sealed with a screw-band lid, cap or cork.



# Resources

- Making Cider Vinegar at Home – Ohio State University  
<http://ohioline.osu.edu/hyg-fact/5000/pdf/5346.pdf>
- Vinegar Making - Mississippi State University, Department of Food Science Nutrition and Health Promotion  
[http://silvalab.fsnhp.msstate.edu/vinegar\\_lactic.pdf](http://silvalab.fsnhp.msstate.edu/vinegar_lactic.pdf)
- Vinegar Fermentation - Louisiana State University  
[http://etd.lsu.edu/docs/available/etd-11092005-152334/unrestricted/Tan\\_thesis.pdf](http://etd.lsu.edu/docs/available/etd-11092005-152334/unrestricted/Tan_thesis.pdf)



# Acknowledgments



Partially funded by a California Department of Food and Agriculture Specialty Crop Block Grant

