BERKELEY HOT COMPOSTING METHOD & PRESERVING: THE ESSENTIAL INGREDIENTS

Alistair & Kate Punshon

Composting Introduction

What's Composting

Why compost ?

Difference between "cold composting" & "hot composting"

- cold composting: 6-12 months, doesn't kill plant diseases & seed > infects your soil, course compost produced
- hot composting : 14-21days, kills most plant diseases & seed> reduces garden seed bank. fine compost produced

Advantages of Hot Composting

Ready in 21 days

Kills plant disease – not heat-resistant virus e.g. tobacco mosaic virus

Kills most weeds & seed except oxalis bulbs, burr clover, marshmallow Amaranthus, 3 corner jack

Reduces collected material quickly

Produce compost continuously as required, save money

Higher nutrient level & good microbes compost returned to the soil

Adding compost to soil increases water retention approx. 1% compost in soil retains 50 litres of water per cubic metre soil

Great exercise

Location: Recycling Compound

Set-up an organised composting area in protected area

Composting bins x 3 : Bin size = Mim. 1 sq meter

Bulk storage bays x 2

Closeable bin - chook manure & straw

Closeable bin - food waste not suitable for worms

Worm farm – worm castings & worm wee

Closeable bin – weed tea

Chook pen – Henny Penny & Friends

Equipment

Composting bins

Dry storage area

Robust shredder

Misc. garden tools

Wide garden fork

Water/hose

Rake

Wheel burrow

Compost thermometer

Tarp, plastic sheet, old carpet

The How
Composting Materials & Carbon-Nitrogen Balance

Browns = High Carbon	C:N
Wood chips	400:01:00
Cardboard, shredded	350:01:00
Sawdust	325:01:00
Newspaper, shredded	175:01:00
Pine needles	80:01:00
Corn stalks	75:01:00
Straw	75:01:00
Leaves	60:01:00
Fruit waste	35:01:00
Peanut shells	35:01:00
Ashes, wood	25:01:00

Greens = High Nitrogen	C:N
Garden waste	30:01:00
Weeds	30:01:00
Green Wood	25:01:00
Hay	25:01:00
Vegetable scraps	25:01:00
Clover	23:01
Coffee grounds	20:01
Food waste	20:01
Grass clippings	20:01
Seaweed	19:01
Horse Manure	18:01
Cow Manure	16:01
Alfalfa	12:01
Chicken Manure	12:01
Pigeon Manure	10:01
Fish	7:01
Urine	1:01

Any material that has lived can be composted

What not to include: soil, ashes, manure from meat-eating animals

Activators: comfrey, nettles, yarrow, animal urine

The How: Day x Day

Day 1

Shred material directly into bin: alternating thin layers of "greens" & "browns".

Wet down layers very well progressively - rule of thumb, 1/3 green, 2/3 dry brown material, 20 litre manure

Day 5

Turn compost heap over, outside to inside, inside to outside (safety note: mask-up)

Day 6

Turn compost every 2nd day

Day 7 - Day 9 Max temp 55-65 degrees Celsius

Day 10 - Day 18

Continue to turn compost every 2nd day

Check the moisture content as you go

Key Points

C:N Ratio 25-30:1

Water ratio 50%

Build pile in one session

Turning technique

Turn every 2nd day from day 6

Sieve if you need a very fine compost - for example seed raising

Additional Resources

The Rapid Composting Method – Robert D Raabe, Berkley

http://vricsrapidcompost.PDF (ucdavis.edu)

Cooperative Extension University of California Division of Agriculture and Natural Resources Leaflet 21251

How to Make Compost in 18 Days Using the Berkeley Hot Composting Method

How to Make Compost in 18 Days Using the Berkeley Hot Composting Method – Deep Green Permaculture

Angelo Eliades is presenter, trainer and writer in the areas of sustainable gardening and permaculture

The Compost Book- David & Yvonne Taylor: New Holland Publishers

Gardening Composting- Tim Marshal: ABC Books

Preserving The Abundant Harvest
The Essential Ingredients

Preserving capture the best of seasonal produce, extending their use to enjoy later

Common preserving styles

- Chutney, Relish (*vinegar, sugar*)
- Pickled vegie & fruit (*vinegar, sugar* to balance acidity, sometimes salt to extract moisture
- Jam, jellies & marmalade (*sugar*)
- Sauerkraut, preserving under oil (*salt*)

Why important to know

- Understand how ingredient colour & flavour profile affects colour & flavour of preserve
- Evaluate recipes
- Develop own recipes

Vinegar Introduction

What is it : 2 stage fermentation process

- Stage 1 Raw material > yeasts convert sugar/starch into alcohol
- Stage 2 Alcohol converted to acetic acid = vinegar

Acetic acid content prevents growth of bacteria & mould

Must be at least **5% acetic acid**. Percentage varies - lower % compromises the safety of your preserves, keeping time

Most homemade vinegars don't achieve this level.

Add sweeting agent to balance and often herbs & spices

Synthetically produced or biologically made from almost any fermentable carbohydrate source, the type used influences colour, taste and preserving qualities

Vinegar Varieties

The chemistry of vinegar varieties

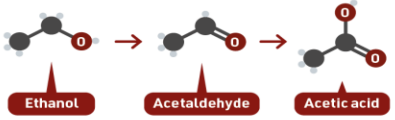
COMPOUND INTEREST

How is vinegar made?

Vinegar is produced by the two-stage fermentation of raw materials containing sugar or starch. In the first fermentation, yeasts convert sugar to alcohol (ethanol). In the second fermentation (acetification) ethanol is oxidised to acetic acid by acetic acid bacteria.

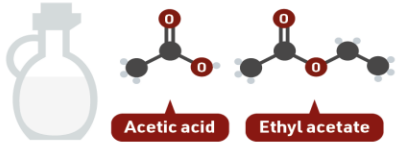
Acetification

KEY: Carbon Oxygen Nitrogen Hydrogen



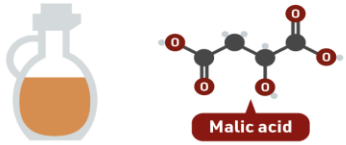
Acetic acid bacteria need oxygen to convert ethanol to acetic acid. In longer, traditional processes, the bacteria grow on the surface of the fermenting liquid. In industrial methods the bacteria are submerged, with oxygen pumped in.

Distilled vinegar



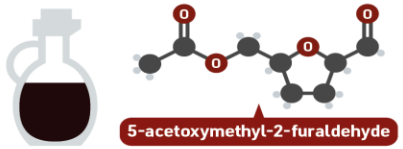
Distilled vinegar is not itself distilled, but produced from distilled alcohol, made from barley malt or corn. Like other vinegars, the main acid is acetic acid (5-8% by volume). Other compounds are limited compared to other vinegars, but include traces of ethyl acetate.

Apple cider vinegar



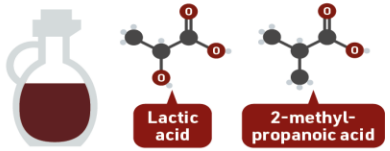
Apple cider vinegar is made from fermented apple juice. Like wine vinegar it contains other acids, such as malic acid from apples. Wine and cider also contain higher alcohols, such as propanol, which react to form additional acids and esters during vinegar production.

Balsamic vinegar



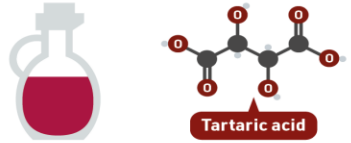
Traditional balsamic vinegar is made by converting sugars in cooked grape must to ethanol, oxidising to acetic acid, then ageing for at least 12 years. Researchers have identified 5-acetoxymethyl-2-furaldehyde as important to its long-lasting sweet taste.

Malt vinegar



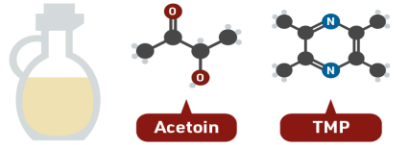
Malt vinegar is made from fermented malted barley – essentially unhopped beer. Malt vinegars don't contain tartaric or malic acids, but do contain small quantities of lactic acid. Branched chain compounds, like 2-methylpropanoic acid, contribute to its flavour and aroma.

Wine vinegars



Wine vinegars are produced by fermenting wine. The main acid is still acetic acid, but other acids from grapes, such as tartaric acid, are present in smaller amounts. Phenolic compounds are also present, both from the wine and from barrel ageing for some varieties.

Rice vinegar



Rice vinegar is made from fermented rice, and varies in colour from colourless to black. In some varieties, furfural and pyrzaines such as tetramethylpyrazine (TMP) contribute toast-like flavours. Buttery acetoin (3-hydroxy-2-butanone) is also present in many rice vinegars.

Common Preserving Vinegar

White Manufactured

- synthetically produced harsh flavour, cheap has no place when producing quality preserves.

White Wine Vinegar

- fermented white grapes, neutral colour & flavour It has a more delicate flavour than apple cider vinegar

Apple Cider Vinegar

- fermented apple cider, light to medium amber colour, flavour

Red Wine Vinegar

- fermented red grapes, red colour, more fruit flavour & aroma

Malt

- fermented barley, darkest colour & strongest flavour. Some brands include additional caramel colour.

Specialty Vinegars

Rice Wine Vinegar

- fermented rice as base

Chinese Black Vinegar

- fermented black sticky rice, or combination of sorghum and/or wheat, black, complex malty & faintly sweet flavour

Sherry Vinegar

- fermented sherry wine base, rich, complex flavour, expensive

Organic Apple Cider

- fermented apple cider, contains mother, heat destroys culture

Balsamic Vinegar

- fermented concentrated grape juice, aged in barrels, distinctive rich colour & taste, expensive, synthetic/ lower grade versions available

Sherry & Balsamic Vinegar

- often combined with white, red or apple cider vinegar to add more complex distinctive flavour in small batch artisanal products.

Less than **5% acetic acid**, reduced storage time, must be eaten quickly.

Preserving Sugar

White Sugar

- Sugar cane or sugar beet, **highly refined**, moisture, minerals and colour & flavour compounds removed.

Raw Sugar

- light brown colour, slightly granulated, **not as refined** as white sugar

Light Brown & Dark Brown Sugar

- white sugar with varying amounts of **molasses added**. The greater the molasses content, darker & moister sugar

Demerara Sugar

- sugar cane with **minimal processing,** leaves some naturally occurring molasses, course structure, a light brown colour, mellow caramel flavour, named after the old sugarcane region of Demerara, now known as Guyana in South America

Muscovado Sugar

- sugar cane, **not refined**, uses natural process free from harmful chemicals, a stronger butterscotch flavour, often used to make other types of sugar, available in light & dark version

Which vinegar & sugar should I use?

Light coloured vinegars & sugars

- don't mask fruit colour & flavour
- light-coloured vibrant preserve
- Fruit/vegetable flavour comes through

Your preserve, your choice

Which vinegar & sugar should I use?

Dark coloured vinegars & sugars

- darker, richer more complex flavour
- more intense underlying caramel/molasses flavour
- dark, sultry preserve

Dark sugar not suitable for jams & jellies

Your preserve, your choice

Salt - Where does it come from?

Location, type of processing = different types of salt, different flavour & saltiness

Flavour enhancer, a household cleaner and even a beauty product

& as a preservative

Salt Types/Categories

General Cooking Salt

- used in food preparation, flavour enhancer
- may contain iodine & anti-caking agents – makes cloudy brine
- Texture - fine, rock & kosher salt

Table or Finishing Salt

- highly refine, all impurities removed
- most contain iodine & anti-caking agents
- coloured salts - Pink Himalayan Salt, Black Salt, Smoked Salt, Seasoned (herbs/spices)
- Different textures, flaky, Fleur de Sel

Pickling/Preserving Salt

- pure salt—sodium chloride (NaCl)–nothing added
- easy to find, & dissolve, keeps brine clear, more accurate measuring if recipe state pickling/preserving salt
- often not labelled as such- check label- cooking salt, no iodine, no anticaking agents

Type of Salt Matters

Anti-caking agents produces a cloud brine

Coloured salt change colour of your preserve

"Lite Salt" – ok for quick pickles, definitely not for fermented pickle recipes

Salt varieties have different shapes & sizes, so volume measure don't work – use gm measures

Salt varieties different levels of saltiness – trial & error

Substitutions: Adjust measure

Advantages of Preserving

ECONOMICAL SEASONAL GARDEN/BUY = MORE ECONOMICAL, BETTER QUALITY, COLOUR, FLAVOUR,

PERSONALIZED ADJUST THE FLAVOURS

HEALTHY REDUCE ARTIFICIAL COLOURING, FLAVOURINGS & PRESERVATIVES

MORE SUSTAINABLE & REDUCE FOOD MILES BUYING SEASONAL AND LOCAL = SUPPORTING COMMUNITY, COMPOST FOOD WASTE

GREAT THANK- YOU OR CARE GIFT PERFECT EXPRESSION THAT YOU CARE & ECONOMICAL

HOBBY & SMALL ARTISANAL BUSINESS FOR FUN OR MONEY – YOUR CHOICE

BRINGS PEOPLE TOGETHER. SHARE LOAD, COST & HAVE FUN. E.G. STRAWBERRY PICKING, PASSATA.

Additional Resources

Rootsrecipesandreasons website – preserving recipes
https://www.rootsrecipesandreasons.com.au/

The Making of Chutney – information on types of vinegars and sugar
https://www.rootsrecipesandreasons.com.au/reasons/the-making-of-chutney

What Makes Jam, Jelly and Marmalade Set – understanding sugar, pectin and fruit acids
https://www.rootsrecipesandreasons.com.au/reasons/what-makes-jam-jelly-and-marmalade-set