

# **Making Your Own Wine**

**A Succinct Guide with hints and tips**

# Index

- Wine Making Stages
- Equipment/Hygiene
- Yeast and Fermentation
- Musts and Fermentation
- Sugar
- Acid
- Cellarcraft
- Recipe Design
- Faults and Cures

# Wine Making Stages

	Do	Don't
Recipe Formulation	Choose ingredients for style Include some grape content	Use too much sugar
Ingredient Selection	Use good quality Use ripe fruit Freeze fruit first if possible	Use damaged fruit Use juice from concentrate or juice drinks if possible
Preparation	Clean equipment well Sterilise ingredients Use pectolase with soft fruit	
Starting Fermentation	Get started quickly Use nutrient/have acid present Hold back some fruit	Add all sugar at once Use bakers yeast Leave fruit in too long
Monitoring Fermentation	Check progress regularly Use hydrometer	Let airlock dry out Ferment too fast/hot/in sun
Racking and Clearing	Rack off once ferment ends Use Campden with sorbate	Use mix of fining types Use filters unless essential
Storage and Maturation	Dark and cool Be prepared to wait a bit	Allow air in
Tasting and Adjustment	Acid and sugar easy to add Consider blending	Careful with de-acidifier

# EQUIPMENT/HYGIENE

## EQUIPMENT:

- Avoid keeping wine in polythene for long periods – polyethylene/polypropylene should be used
- Metals – Use aluminium, enamel and stainless steel for boiling only
- Fill airlock with glycerine/water mix to avoid evaporation

## HYGIENE:

Sulphite (Campden tablets) acts as antiseptic and antioxidant. Needs acid present. Solution of 2 oz/pint sterilises in a few minutes and can be kept for weeks if sealed. For the must use 1 Campden tablet/gallon, and add after racking to stabilise.

If using chlorine steriliser, rinse with hot water afterwards.

Boiling water is only a temporary steriliser – can be used for damaged fruit and vegetables, but can lead to pectin haze.

Sterilise corks in weak sulphite and soften by soaking in cold water/glycerine. Don't soak in boiling water.

## DEFENCE SYSTEMS:

- Acidification – discourages bacteria, aids activity of sulphite, aids fermentation
- Sulphiting – Kills bacteria, inhibits wild yeast, prevents oxidation, aids clarification
- Fermentation – alcohol is toxic to microorganisms, creates layer of carbon dioxide over must
- Airlock – Prevents contaminants entering, enhances alcohol production by keeping air out.

# YEAST CHARACTERISTICS

Yeast is a fungus that feeds on sugar and nutrients. It is present in the bloom of fruits, nectar of flowers, on grains and seeds, in soil and in the air.

Characteristics of yeast needed for Winemaking/fermentation:

- High alcohol tolerance
- Preserve/enhance bouquet
- Not impart off-flavours
- Settle rapidly to a firm deposit after fermentation
- Slow decomposition (autolysis) to avoid musty off-flavours
- Ferment between 15-25 deg C
- Some resistance to sulphur dioxide
- Long lifecycle
- Rapid respiration rate

Wild yeasts and bakers yeast have low alcohol tolerance, are difficult to clear and autolyse rapidly.

# Fermentation Process

Use starter to activate yeast to get fermentation going quickly. Use must, juice or water with sugar, acid and nutrient in warm place (20-25 deg C). Sterilise vessel and plug with cotton wool. Many of the modern dried wine yeasts work well if just sprinkled on the must.

Initially you want air present to get fermentation going. However alcohol is formed better in the absence of oxygen, which is why an air lock needs to be used once the fermentation has got going.

Yeasts are sensitive to heat, acid and light. Too much of any of these will reduce activity or kill yeast. However, some heat and acid are needed. The fermentation process generates some heat itself.

Need nutrient, especially for flower, vegetable or fruit juice wines. Vitamin B1 gives added boost for stuck ferments or high alcohol wines.

Sulphite stuns yeast cells, but will not immediately stop a vigorous ferment. Potassium sorbate kills them, but needs to be used with sulphite to avoid geranium bouquet and flavour!

# MUST PREPARATION

## **JUICE:**

Stone, crush and press fruit. Treat immediately with sulphite. Seal and leave for 24 hours – add yeast starter.

## **PULP:**

Stone and crush, cover with water and add sulphite or cover frozen fruit with boiling water and crush. Freezing improves juice extraction.

## **VEGETABLES/BANANAS:**

Boil vigorously in open pan for 10-30 minutes and strain liquid onto must.

## **FLOWERS:**

Add once ferment well underway to extract bouquet.

## **FRUIT:**

Use ripe, but not over-ripe fruit (contains high micro-organism population). Stone fruit contains high pectin levels. Always treat cool must with pectolase. Don't scrape fruit off the stone. If using fruit with low acid level, add acid at the start to assist fermentation.

# Managing the Fermentation

Break the cap daily to prevent growth of vinegar bacteria.  
Ferment out of direct sunlight and at a stable temperature. Long slow fermentation gives more alcohol, better nose and less acid.  
There is better colour extraction if not too much sugar is present.  
Press and strain into demijohn when colour extracted – max. 1 week.  
Rack heavy wines during ferment to supply oxygen to the yeast.

## **Stuck Ferments**

*Causes:* Excessive alcohol, sugar or sulphite. Low or high temperature. Lack of nutrient or acid.

*Cures:* Restart yeasts, B1 tablet, dilution.

## **Tannin**

Present in skins of red fruit and apples/pears, also elderberry juice.

- Assists clarification
- Provides astringency
- Improves keeping qualities

Decreases with storage - precipitates out/turns brown.

Can add tannin solution.

Fining removes some tannin.

# SUGARS

## HYDROMETER:

- Checks progress of fermentation
- Measures initial sugar content of must, from which alcohol can be calculated
- Provides indication of sweetness of finished wine

Calibrated normally at 60 or 65 deg F.

SG is weight of volume of liquid cf weight of equivalent volume of water.

SG of water = 1.00; SG of alcohol = 0.794.

1 kg of sugar occupies 560 ml of water. 1 kg sugar in 560 ml water gives 1.12 litres sugar syrup.

## SUGAR TYPES:

Glucose, Fructose, Starch, Sucrose, Maltose and Lactose are all sugars.

Fructose and Glucose are fermented with ease – fructose is twice as sweet.

Granulated, caster and Demerara/brown sugars are all the same substance – caster sugar dissolves more easily and brown sugars contain impurities and should only be used in robust or sweet wines.

Honey can be used in part or in full (Mead). 500 gm honey = 400 gm sugar; 500 gm raisins/sultanas = 300gm sugar; most fruit contains 8-10 % sugar.

Xylitol or glycerol can be used to sweeten the wine without re-fermentation.

## Fermentation

1lb sugar in gallon gives gravity 1036 and potential alcohol of about 5.5%.  
3lb sugar is about the maximum normal yeasts can ferment.

Percentage of alcohol is gravity drop/7.4. If gravity drops from 1080 to 990, then you have  $90/7.4 =$  just over 12 % alcohol

Process – Sucrose + water (in presence of acid) = glucose + fructose  
Glucose/fructose (in presence of yeast) = ethyl alcohol + carbon dioxide

## Finishing Gravity of Wine Styles

Judging levels of sweetness is all down to taste and it is an individual thing. The following table gives a rough guide as to the range of hydrometer readings applicable to wine styles, but it will depend upon fruit, acidity and alcohol so you need to adjust the sweetness in stages and taste the wine.

Style	Gravity
Dry	992 – 996
Medium Dry	999 – 1002
Medium	1008 - 1012
Medium Sweet	1015 – 1025
Sweet	1025 – 1035
After Dinner	1040 - 1060

# ACIDS

## PROPERTIES:

- Aid fermentation, preventing medicinal off flavours/bouquets
- Improve bouquet and flavour
- Strengthen activity of sulphite in inhibiting bacteria
- Enable longer maturation

## TYPES USED/PRESENT:

Citric Acid – found in blackcurrants, elderberries, raspberries, pears, strawberries, citrus fruits.

Good for fermentation, acts as antiseptic and prolongs maturation.

Malic Acid – found in apples, apricots, peaches, plums, rhubarb, sloes, unripe grapes  
Promotes rapid fermentation, develops bouquet and flavours.

Tartaric acid – ripe grapes.

Excess can be precipitated out by chilling; resistant to bacterial attack, stimulates glycerol formation, good for maturation.

Succinic and lactic acids are produced as fermentation by-products. Succinic acid provide tartness and promotes vinous character. Aids maturation.

Ascorbic acid (Vitamin C) is present in fruit, vegetables and honey. Can be used instead of sulphite as anti oxidant but does not inhibit bacterial spoilage. Can be used where secondary ferment wanted e.g. Sparkling wines.

## **Acidity Measurement/Calculation**

Acidity is expressed as ppt of sulphuric or tartaric acid. The NGWBJ handbook uses tartaric.

Can be measured by titration with sodium hydroxide and phenolphthalein, but this is not very accurate for red wines, or during fermentation.

Normal acid ranges are 4.5 – 9 ppt tartaric.

Calculation:

500 gm fruit = 1 ppt

1 tsp tartaric acid = 1 ppt

1-2 ppt produced in fermentation – more fermentation, more acid

1 litre grape/apple juice = 1.4 ppt

500 ml grape conc = 1-1.5 ppt

## **Adjusting acidity**

- Dilution
- Using precipitated chalk (calcium carbonate) Don't use too much.
- Masking with sugar
- Precipitate tartaric acid through chilling
- Blending
- Sodium/potassium bicarbonate (at most 3 tsp per gallon)
- Maturation
- Secondary fermentation - malolactic

# CELLARCRAFT

## **Racking and Clarification**

Racking prevents yeast autolysis, aids clarification.

First racking normally at end of fermentation, but may be beneficial earlier if there is a lot of debris (e.g. after dinner wines).

Best to always use pectic enzyme at start of ferment – improves juice extraction and prevents pectin hazes.

Finings – bentonite or 2 part best. Don't overfine or mix finings.

Filter only as last resort – exposes wine to oxygen, add sulphite first.

## **Stabilising**

Dry wines should be OK if not bottled too soon and kept in right conditions.

For sweet wines, use potassium sorbate – use with sulphite to avoid geranium.

Blending wines may lead to re-fermentation and/or sediment.

## **Storage/Maturation**

Store in dark and at 10-15 deg C ideally.

Wines high in acid, alcohol and tannin tend to last longest. Acid, tannin and sugar will decrease with age.

Larger volumes mature more slowly.

Store corked bottles on their sides, and screwcaps standing up. Screwcap bottles once opened do not seal completely – use cling film/rubber band.

# RECIPE DESIGN

## WHY BOTHER:

- Use up ingredients
- Make to your own taste (or someone else's)
- Experimenting keeps you on your toes

## COMPONENTS:

<b>FLAVOUR</b>	Compatibility, Balance, Avoid excessive quantities of strong flavours particularly in table wines. Blend of ingredients produces best results
<b>BOUQUET</b>	Flowers or small quantities of high bouquet fruits such as guava, raspberries, loganberries or blackcurrants
<b>BODY</b>	Bananas, Rosehips, Dried Fruit or Grape Concentrate, Grains.
<b>VINOSITY</b>	Grape juice, Grape concentrate, Sultanas or Raisins
<b>ACIDITY</b>	Avoid excesses of high acid fruit. Add to vegetable, flower recipes in particular.
<b>ALCOHOL</b>	Sugar content according to style of wine. Take into account ingredients
<b>TANNIN</b>	Avoid high quantities of tannic ingredients. Boiling elderberries reduces the tannin content

## WINE STYLES/SUGGESTED QUANTITIES

WINE STYLE	GRAPE CONC	DRIED GRAPE	BOUQUET
APERITIF	350 ml	375 gm	250 gm
TABLE	250 ml	250 gm	175 gm
DESSERT	500 ml	750 gm	375 gm
SOCIAL	400 ml	500 gm	300 gm

## APPROXIMATE QUANTITIES BY STYLE

WINE STYLE	Primary Fruits	Bananas	Sugar	Grape Source 1	Grape Source 2
APERITIF	Variable	-	1.1-1.4 kg	Conc	Sultanas
TABLE	1.5 kg	250-375 gm	0.9-1.1 kg	Juice	Conc
DESSERT	3-4 kg	1 kg	1.4-1.6 kg	Raisins	Conc
SOCIAL	2-3 kg	500-750 gm	1.1-1.25 kg	Conc	Sultanas

## **OTHER INGREDIENT TYPES**

### **Cordials**

- May contain artificial flavourings
- Need to boil off sulphite
- Usually high in acid and sugar

### **Fruit Juices**

- Good for table wines and aperitifs
- For strong flavoured juices, no more than 1 litre
- Apple Juice is a good addition to other fruit juices – neutral flavour and provides body. Use not from concentrate.

### **Canned/bottled fruit**

- Use 3 tins for light wine
- Be careful about sugar and additive content of syrups
- Best if in grape or fruit juice

### **Dried Fruit**

- Equivalent to 4 times the weight of fresh fruit
- Wash in hot water to remove sulphite
- Often caramelised or dark in colour. Limited suitability for table wines

# BODY IN WINES

Ingredient	Aperitif	Table	Social	Dessert
Grape Concentrate	350 ml	250 ml	400 ml	500 ml
Dried Fruit (Sultanas, Raisins, Currants)	375 gm	250 gm	500 gm	750 gm
Apples, Pears, Rhubarb	375 gm	500 gm	1 kg	1.25 kg
Apricots, Plums, Gooseberries, Blackberries, Strawberries	500 gm	375 gm	625 gm	750 gm
Elderberries, Damsons, Sloes, Oranges, Peaches, Figs, Dates	250 gm	175 gmz	300 gm	375 gm
Vegetables	375 gm	250 gm	500 gm	750 gm

Quantity is per 4.5 l of wine – for one fifth of ingredient weight (exc concentrate/dried fruit  
Additional Body can be added by simmering bananas in water for 30 mins and using gravy

## INGREDIENT AROMAS

Ingredient	Aroma Intensity	WINE TYPE								
		DWT	MWT	SWT	MDRO	DRT	MS	WD	RD	AP
Apple	Med	**	**	**	**	*	**	*		**
Apricot	Med-High		*	**			*	**		
Banana	Med – High			**				*		
Bilberry	Low – Med				*	**	**		**	
Blackberry	Med-High				*	**	**		**	*
Blackcurrant	Med				*	*			*	
Cherry	Low-Med				*	*	**		**	
Damson	Med					*	**		**	
Dandelion	Low		*	*						*
Elderberry	Low-Med				*	**	**		**	
Elderflower	High	*	*	*				*		
Gooseberry	Med	**	**	**	*		*	**		*
Grains	Low		*	*				*		
Grape	Med	**	**	**	**	**	**	**	**	**
Grapefruit	Med-High									**
Greengage	Low-Med		*	**			**	**		
Lemon	Med-High			*				*		**
Loganberry	High					*	*		*	
Orange	Med-High			*				*		**
Peach	Med-High	*	**	**	*		**	**		
Pear	Low-Med	*	*	*		*	*	*	*	
Pineapple	Low-Med	*	**	**			*	*		
Plum	Med		*	**			**	*	**	
Quince	Med-High	*	*	*				*		*
Raspberry	High					*	*		*	
Redcurrant	Low-Med				*		*		*	
Rhubarb	Low-Med	*	**	**				*		
Rose Petal	Med-High	*	*	*	*		*	*		
Sloe	Med					**	*		*	
Strawberry	Med				*		*		*	
Vegetables	Low		*	*						

DWT = Dry white table

MWT = Medium White Table

SWT = Sweet White Table

MDRO = Medium Dry Rose

DRT = Dry Red Table

MS = Medium Social

WD = White Dessert

RD = Red Dessert

AP = Aperitif

\* = minor ingredient

\*\* = major ingredient

## ***FAULTS AND CURES***

<b>Fault</b>	<b>Cause/Prevention</b>	<b>Detection</b>	<b>Cure /Comment</b>
Acetaldehyde	Formed during fermentation – oxidation product of ethyl alcohol.	Sharp, penetrating odour – greenish	Acceptable in small quantities in Sherry/Madeira
Acetification	Acetobacter attacks alcohol and oxidises it to acetic acid and ethyl acetate via acetaldehyde. Exclude air and sterilise equipment. Use good fruit. Avoid high temperature ferment/low alcohol.	Vinegar smell and taste. Sour acid taint. Possible peardrops – ethyl acetate. Oily film on surface.	None. Could try sulphiting and then re-fermentation, if fermentation not complete. Otherwise you have wine vinegar!
Amyl acetate	Ester formed from amyl alcohol and acetic acid. Lack of nitrogen leading to de-animation. Adequate nutrients in must.	Pear drops/nail varnish if pronounced.	None
Bacteria – Acetobacter (cocci) or lactobacilli	Need air. Inhibited by sulphite, acid, heat or alcohol. Can cause malolactic fermentation – ruins sweet wines.	Test for bacterial haze by boiling or adding sulphite – will clear.	Bacterial haze – sulphite. Fine filter
Bitterness	Epsom salts, quinine, excess tannin. Avoid pith, stems, stalks, stones and pips. Remove sediment.	Astringency is dryness in mouth caused by tannins. Aftertaste on back of tongue. Almond flavour.	Treat excess tannin with gelatine
Caramel/Cooked	Brown sugar, treacle, raisins, inferior grape conc or heating sweet wines.	Toffee odour/flavour	None
Cheesy	Lactobacilli	Savoury, meaty or cheesy flavour	Sulphite might work
Chill haze	Insoluble proteins formed when chilled	Haze clears to some extent when warmed.	Sulphite, fine, filter
Cork	Impurity, infection, disintegration of cork	Bitter, mouldy, woody flavour	None
Diacetyl	Produced by certain types of yeast/bacteria. Sulphite prevents.	Butterscotch or buttery smell, bitter taste	Further ferment
Ester	Formed by reaction between acid/alcohol. Ethyl acetate indicates acetification..	Boiled Sweets?	
Flowers of wine (Candida Mycoderma)	Wild yeast attacks wine and converts alcohol to carbon dioxide and water. Caused if wine lacks acidity and alcohol.	Powdery white film on surface – breaks up when moved.	Treat with sulphite, rack or filter
Geranium	Action of lactic acid bacteria on sorbic acid. Use sulphite before sorbate.	Smell	Sulphite wears off if wine is exposed to air, so if keeping a wine for show recycling, add a pinch of sulphite.
Pectin haze	Avoid cooking fruit. Use pectolytic enzyme. Don't squeeze pulp. Wash skins of fruit	Mix with meths – globules form	Pectolytic enzyme
Starch Haze	Unripe fruit, overboiled veg, cereals. Parsnips need frost.	Iodine test – blue/black colour	Amylase – converts to maltose and dextrin

<b>Fault</b>	<b>Cause/Prevention</b>	<b>Detection</b>	<b>Cure</b>
Protein haze	Bentonite in must. Smooth ferment.	After bottling	Bentonite
Gum Haze	Soak plums in hot water		None
Hydrogen Sulphide	Hot ferment or excessive sulphite in the must.	Bad eggs	Sulphiting and racking. Aerating or copper.
Maderised	Heated and oxidised – over oxidation in old wines. Left in sun, dried fruit, oxidised grape conc.	Brown colour. Cooked taste. Woody	None
Mouse	Yeast infection or lactic acid bacteria. Poor hygiene. Low acid. Failure to rack.	Aftertaste. Add bicarbonate to confirm or rub on hand.	Sulphite, racking and leaving sometimes clears in part.
Oxidation	Oxygen reacts with alcohols to form aldehydes. Exposure to air, lack of sulphite, repeated racking.	Smell of acetaldehyde (sherry). Tastes flat and green.	Re-ferment if not too bad. Slow oxidation acceptable in red wines.
Peppery	Bacterial decomposition of glycerol		May disappear with age
Ropiness	Bacterial disease – lactic acid.	Viscous, oily with jelly like rope or clots	Sulphite, aerate and rack, or pasteurise. Fine and use quickly.
Tourne disease	Bacterial disease (lactic acid) converts sugar into mannitol. Occurs in sweet wines, low in alcohol and acid.	Flat and sour – bitter taste. Silky sheen when swirled	Dose with tannin and sulphite, fine and filter (if not too far gone)
Moulds	Poor fruit, lack of sulphite, exposure to air.	Bitter taint	Sulphite, but throw away if bitter
Infection	Inadequate sterilisation. Delay in starting ferment. Allowing too much air exposure		
Decayed vegetation	Resting on pulp too long		Rack, aerate and sulphite.
Green/woody	High levels of malic acid. Caused by unripe fruit, stems and stalks.	Excess acidity, sour.	Fine with gelatine?
Medicinal	Insufficient acid/nutrients in the must.	Flat taste, soft, flabby and insipid.	Add malic acid and try sweetening with fruit juice or concentrate
Metallic	Use of non stainless steel	Low alcohol. Metal flavour, hazes or darkening when exposed to air.	Citric acid clears iron. Fine with gelatine, filter
Rubbery	Organic compounds of sulphur		Sometimes disappears with age
Autolysis	Decomposition of dead yeast cells. Delay in racking.	Marmite, musty bqt & flavour	None
Sulphur	Excess sulphite.	On nose, catches in throat.	Shake well and leave.
Yeastiness	May be caused by use of old or inferior yeast. Use of bentonite in the must helps prevent this.	Addition of bentonite should remove the worst.	Keep yeast in a cool place (I use the fridge)