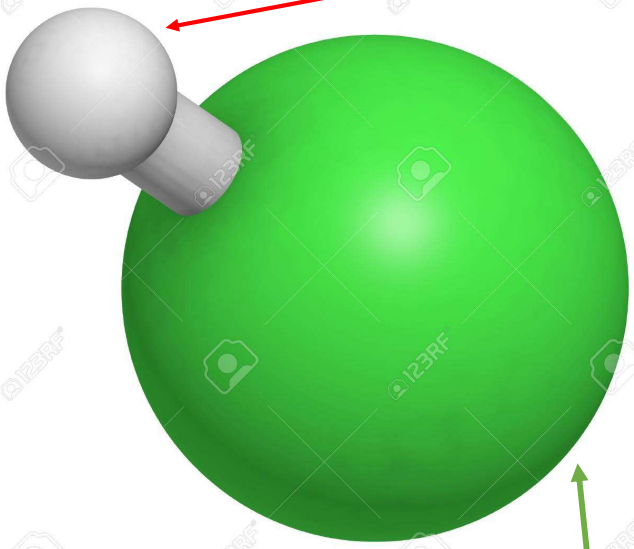
Wine Acid

The Nerd explanation

Have a nice trip!

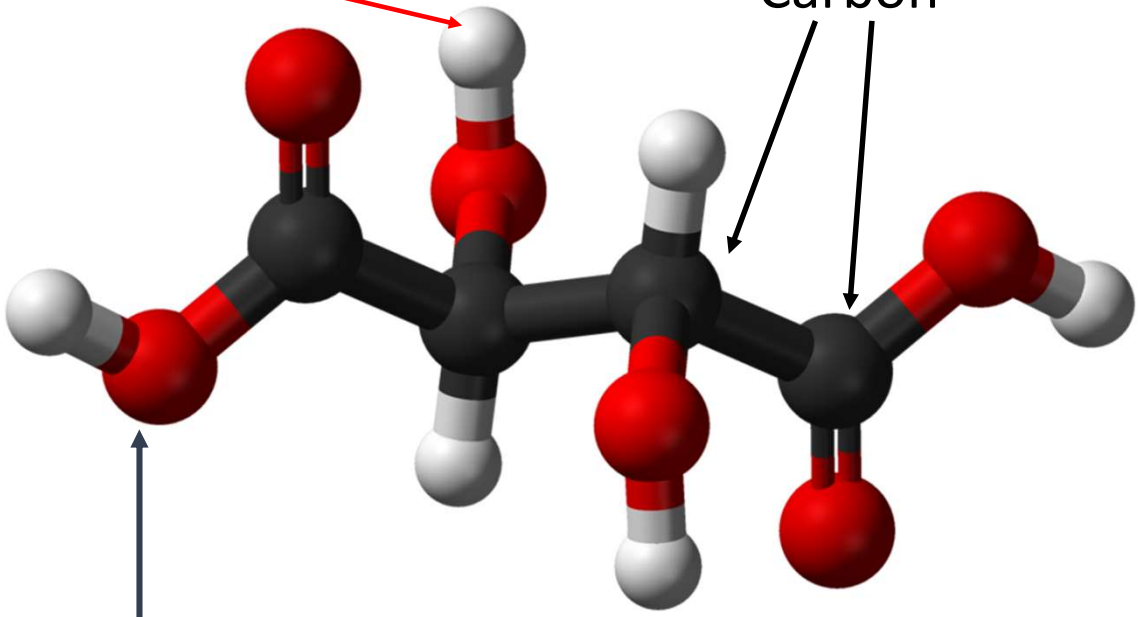


Hydrochloric Acid Molecule

INORGANIC ACID

Hydrogen

Chlorine



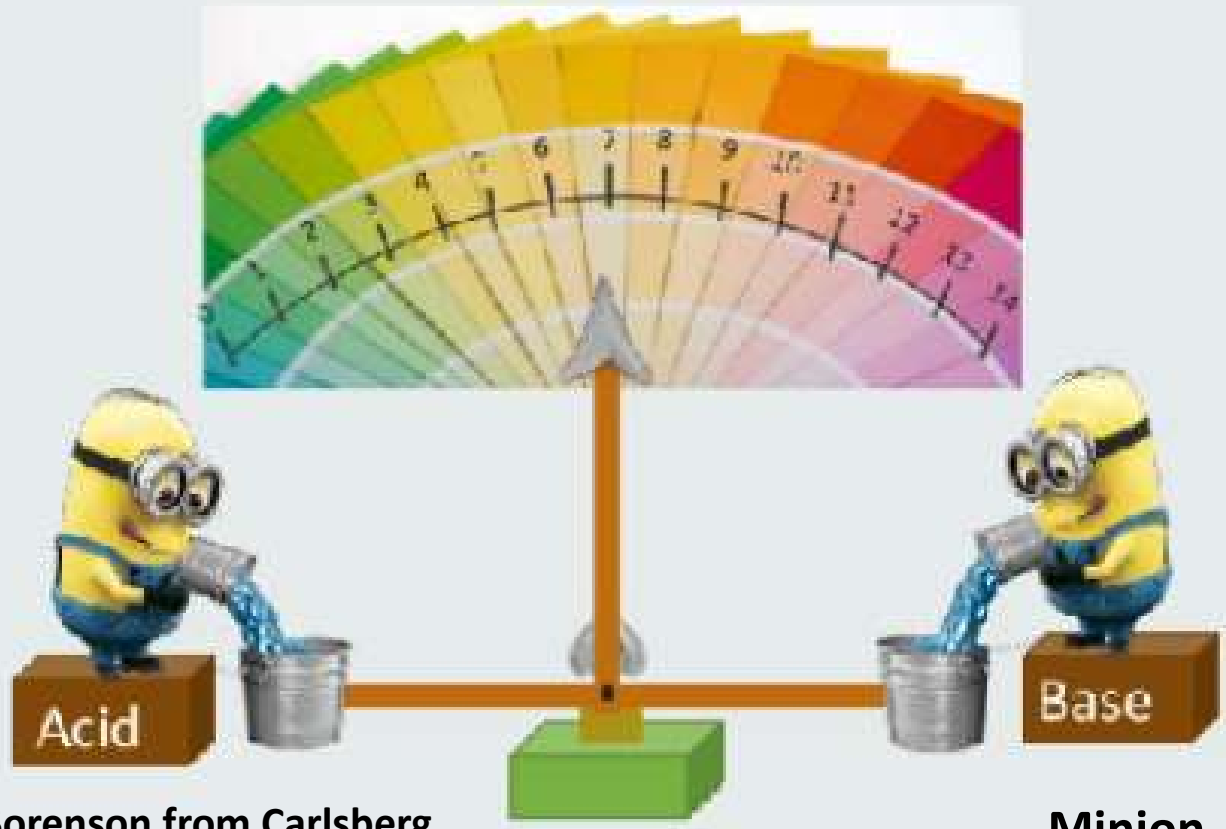
Carbon

Hydroxide (OH)

Tartaric Acid Molecule

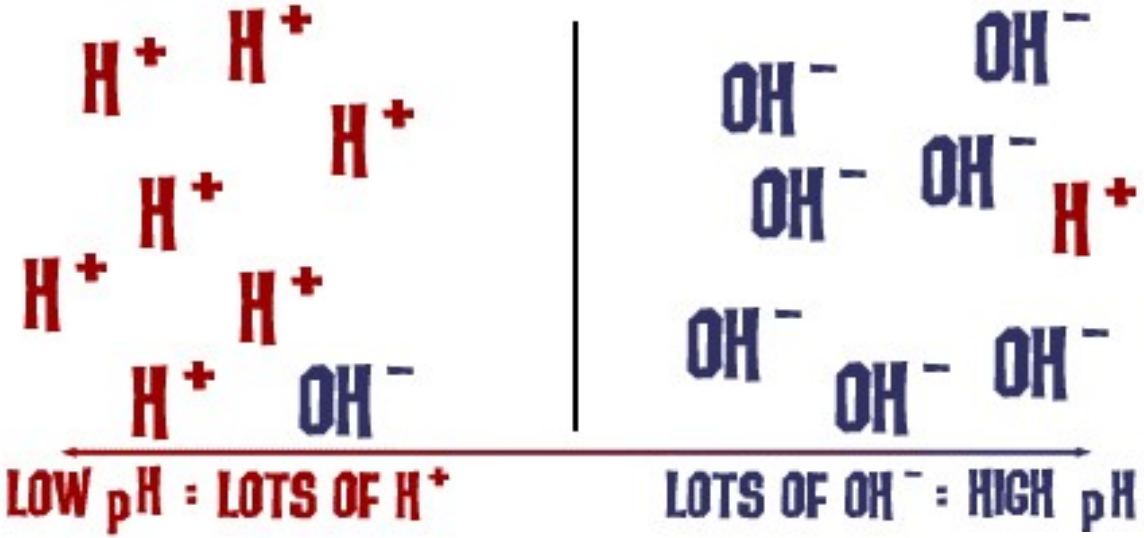
ORGANIC ACID


Hydrogen
ACID
BASE
WATER
ACIDIC
BASIC
Hydroxide



P.L. Sorenson from Carlsberg Laboratories in Sweden, 1909

Minion


H+ H+
H+
H+
H+ H+
H+ OH−
OH− OH−
OH− OH− H+
OH− OH− OH−
LOW pH : LOTS OF H+
LOTS OF OH− : HIGH pH


pH


HANNA
7.474
25.1
edge


HANNA
7.00
pH

pH	% molecular SO_2	Free SO_2 (mg/L) required for 0.6mg/L molecular SO_2	Free SO_2 (mg/L) required for 0.8mg/L molecular SO_2
2.90	7.5	8	11
2.95	6.6	9	12
3.00	6.1	10	13
3.05	5.3	11	15
3.10	4.9	12	16
3.15	4.3	14	19
3.20	3.9	15	21
3.25	3.4	18	23
3.30	3.1	19	26
3.35	2.7	22	29
3.40	2.5	24	32
3.45	2.2	27	37
3.50	2.0	30	40
3.55	1.8	33	46
3.60	1.6	38	50
3.65	1.4	43	57
3.70	1.3	46	63
3.75	1.1	55	72
3.80	1.0	60	79
3.85	0.9	67	91
3.90	0.8	75	99
3.95	0.7	86	114
4.00	0.6	100	125

pH represents how much acid is in a wine regardless of how strong it tastes, whereas a titration measures how strong that acid tastes.

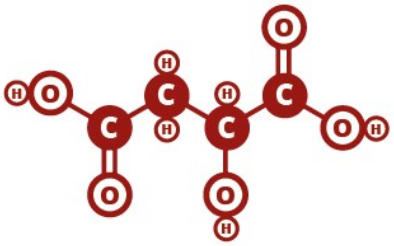
In Plain English: The Difference Between pH and Titratable Acidity In Wine, EC Kraus blog, June 5, 2018, Ed Kraus
https://blog.eckraus.com/difference-between-ph-and-titratable-acidity-in-wine

A GUIDE TO COMMON FRUIT ACIDS

Most people probably know that lemons and other citrus fruits contain citric acid – but it's just one of a number of different organic acids that can be found in fruits. Here we look at a number of the most common acids, and the various fruits that they are found in.

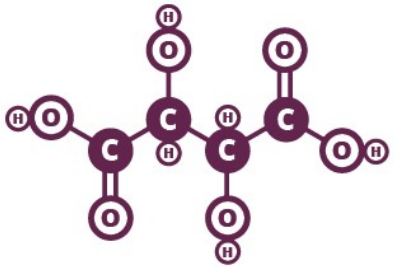
CITRIC ACID

The main acid in citrus fruits is, unsurprisingly, citric acid. Lemons and limes have particularly high levels of this compound. It is also the main acid in a number of berry fruits, including strawberries, raspberries and gooseberries.



MALIC ACID

Malic acid is the main acid in most stone fruits such as cherries, apricots, peaches, and nectarines. It's also found in high amounts in apples, and in lower amounts in bananas. Though watermelons have a low acid content, their principal acid is also malic acid.

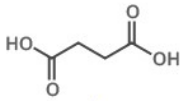


TARTARIC ACID

Tartaric acid is the principal acid in fewer fruits than citric and malic acid. However, it is the main acid in grapes, which also contain malic acid. Red grapes have higher levels of tartaric acid. The main acid of avocado and tamarind is also tartaric acid.

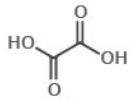
OTHER ORGANIC ACIDS

Citric, malic, and tartaric acids are not the only organic acids present in fruit – a number of other acids are also present, albeit in significantly smaller quantities. To the right, a small selection of these compounds are shown, along with a brief note of some of the fruits in which they're often found.



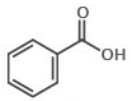
SUCCINIC ACID

Apples and some berries



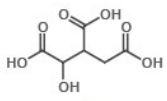
OXALIC ACID

Small amounts in berries



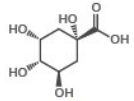
BENZOIC ACID

Present in cranberries



ISOCITRIC ACID

Present in blackberries



QUINIC ACID

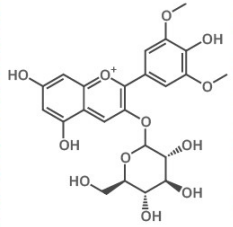
Plums & kiwifruit

THE CHEMISTRY OF WINE

86%	12%	1%	0.4%	0.1%	0.5%
WATER	ETHANOL	GLYCEROL	ORGANIC ACIDS	TANNINS & PHENOLICS	OTHER COMPOUNDS

NOTE THAT THESE FIGURES ARE FOR AN AVERAGE COMPOSITION - EXACT PERCENTAGES WILL VARY DEPENDING ON THE PARTICULAR WINE

ANTHOCYANINS

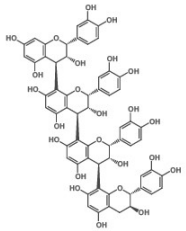


MALVIDIN-3-GLUCOSIDE

Anthocyanins are found in the skin of grapes. As soon as the grapes are crushed, they can react with other chemicals in wine to produce polymeric pigments. Anthocyanins on their own are also coloured, but the colour varies depending on pH.

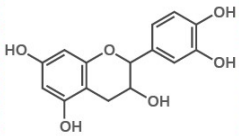
OVER 1000 DIFFERENT COMPOUNDS

TANNINS



Tannins are polymers of other chemicals within wine. Condensed tannins are polymers of flavan-3-ols, and give red wine its astringency, causing a dry feeling in the mouth after drinking. Changes in tannin structure over time are an important factor in wine aging.

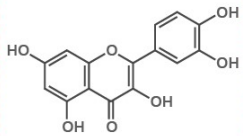
FLAVAN-3-OLS



CATECHIN

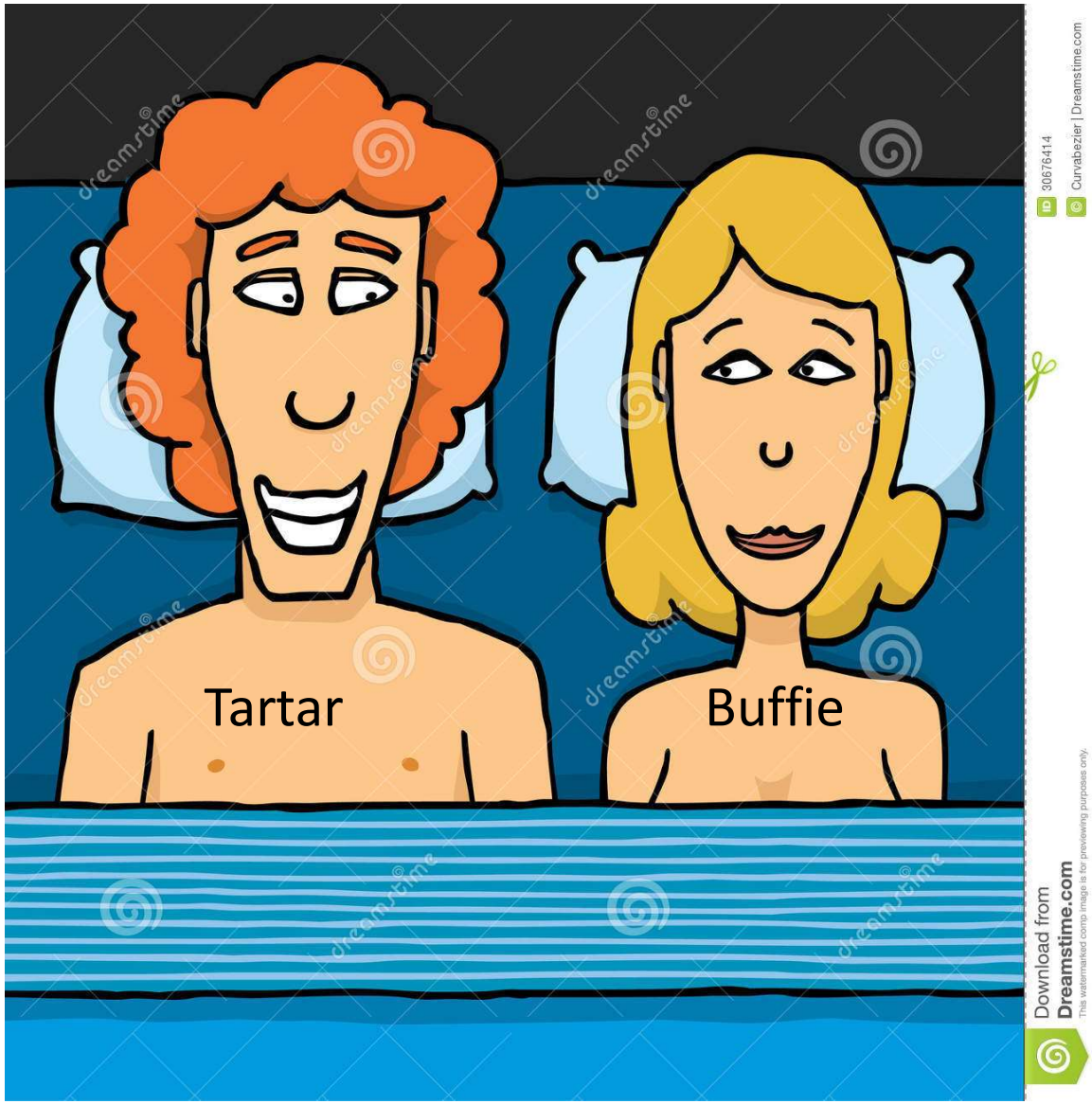
Flavan-3-ols originate in the seeds of grapes, and are known for their bitterness. In red wine, the amount present can reach up to 800 milligrams per litre. 20 milligrams per litre is the amount required in order for a bitter taste to be imparted.

FLAVONOLS



QUERCETIN

Flavonols can help enhance the colour of red wine, via a process called 'co-pigmentation'. These compounds have potential anti-oxidant and anti-carcinogenic effects; however, their concentration in red wine is likely too low to confer any significant health benefits.


Tartar
Buffie
30676414
Curvabezier | Dreamstime.com
Download from
Dreamstime.com
This watermarked comp image is for previewing purposes only.


VICKY BERRY
shutterstock
IMAGE ID: 629252006
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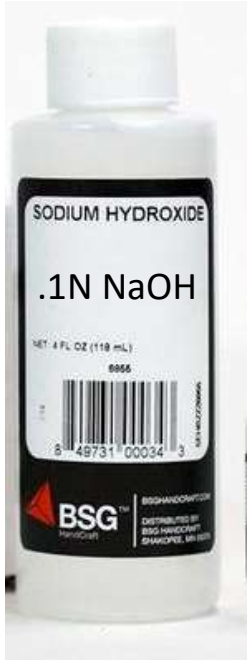
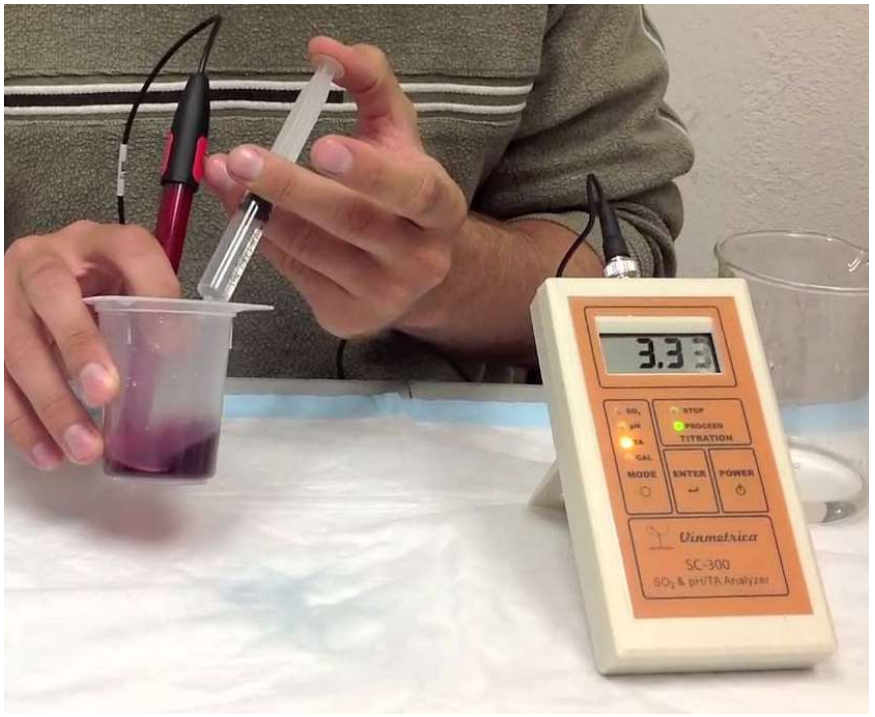
BONDING!


Schilling
CREAM OF TARTAR
NET WT 1.5 OZ. 42 g


SODIUM HYDROXIDE
.1N NaOH
BSG


HANNA
pH
7.1
Checker


3.33
STOP
PROCESS
TITRATION
MODE
ENTER
POWER
Vinmatrica
SC-300


IDEAL®
INSTRUMENTS

MEASURING TITRATABLE ACIDITY

Step 1: Put 15 ml of wine into a glass
Step 2: Put pH probe into the wine
Step 3: Fill syringe with .1N NaOH solution
Step 4: Start adding NaOH to the wine while mixing it carefully

RESULT: When the pH is 8.20, the wine is 'Neutralized'

Calculate the total number of ml's of NaOH that you added to the wine and divide by 2.

This yields the number of grams/Liter of acid that are in the wine.

The Sweet Spots:

For pH:

White and Fruit wines range from 3.0–3.4

Red wines range from 3.3–3.7

Best for preserving the wine.. .ageability

For Titratable Acidity:

White and Fruit wines range from 6–9 g/l

Red wines range from 7–8 g/l

Best ranges for our tastes

Adding Acid to wine:

To reduce the pH of a wine by .1, add 1 gram of Tartaric Acid per Liter of wine.

A 5 gallon carboy is approximately 19 Liters. A 6 gallon carboy is approximately 23 Liters

Adding Malic is more difficult because it is not as acidic.

1.0 g/L addition of Malic acid will increase the TA by about 1.12 g/L and will decrease the pH by 0.08 pH units.

1.0 g/L addition of Citric acid will increase the TA by about 1.17 g/L and will decrease the pH by 0.08 pH units

Removing acid from wine

1) Malolactic Fermentation (Red wines and Chardonnay)

2) Cold Stabilize while it's still winter

3) BLEND! Taste and blend to create the wine that you love - My personal favorite

4) Add buffers.
   Calcium carbonate (chalk) will help. It will create solids out of the acids that will drop to the bottom of your carboy.

The Summary

- pH measures how much acid is in the wine
  - ❖ This helps with preservation of the wine
  - ❖ pH can’t be tasted

- TA measures how the wine tastes
- TA does NOT necessarily correlate to pH.
- There are sweet spots. (slide 15)
- You can add and/or remove acid from wine

- The real answer is, make what you like. Check the acids if you don’t find it to be to your liking. Adjust it. Drink it