

food, medicine and cleansing agents, read as ordinary organic chemistry

Food basics *

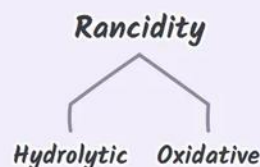
- nutrients (carbohydrates, lipids, proteins, vitamins, minerals, water) supply energy and regulate growth and repair
- most nutrients are organic macromolecules
- digestion breaks polymeric proteins and carbohydrates down to their monomers, amino acids and glucose, by enzymes
- cooking hydrolyses high polymers into smaller ones
- and turns a heterogeneous suspension into a colloid, which is why cooked food digests more easily
- food quality is judged by flavour, smell, texture, colour and microbial spoilage
- it changes on shelving mainly through enzyme action, environmental reactions and microorganisms

Browning of cut fruit and vegetables *

- cutting damages cells and releases polyphenols, which an enzyme oxidises with air's oxygen into quinones
- quinones polymerise further into brown tannins, the visible browning
- slowed by a reducing agent (SO_2 , ascorbic acid/vitamin C)
- or by lowering pH with an edible acid, e.g. lemon juice (citric acid) or vinegar

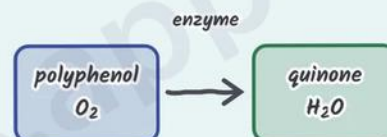
Rancidity has two separate causes *

- hydrolytic rancidity : water, often with microbial/enzyme help, hydrolyses a fat's ester bonds
- releasing free fatty acids whose smell IS the rancid smell
- butanoic, hexanoic and octanoic acids in milk/butter, lauric acid gives coconut oil a soapy note
- oxidative rancidity : molecular O_2 attacks the $\text{C}=\text{C}$ bonds of an unsaturated fat's chains
- breaking them into volatile aldehydes and acids, a free-radical process
- sped up by light (photo-oxidation), enzymes, metal ions or heat
- more $\text{C}=\text{C}$ bonds (polyunsaturated) means faster oxidative rancidity
- extensive oxidation can even polymerise and darken the oil



two unrelated mechanisms sharing one name: water breaking the ester, or oxygen breaking the $\text{C}=\text{C}$

Where a polyphenol goes when a fruit is cut



the first step of browning; the quinone then polymerises further into brown tannins