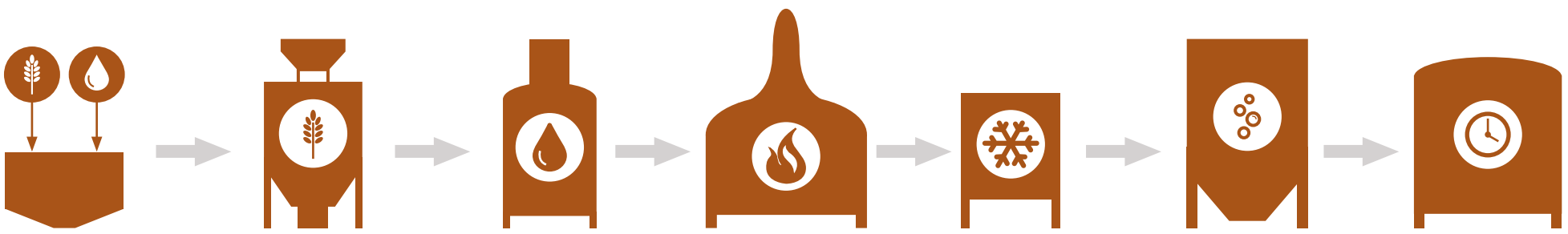
The Chemistry of Beer

COMPOUND INTEREST



MALTING
Barley soaked and dried to make malt

MILLING
Malt added and ground

MASHING
Water added to produce wort

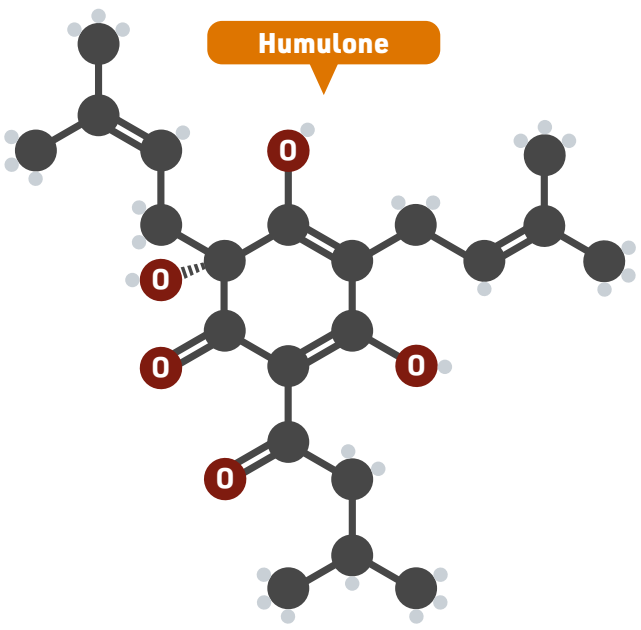
BREWING
Hops added, mixture boiled

COOLING
Mixture cooled to around 10-20˚C

FERMENTING
Yeast added, alcohol produced

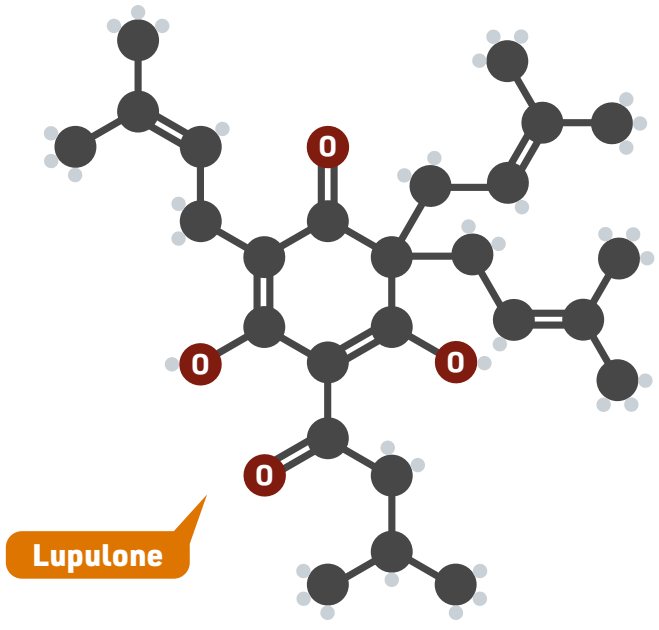
MATURING
Left to mature then filtered and bottled

Alpha acids



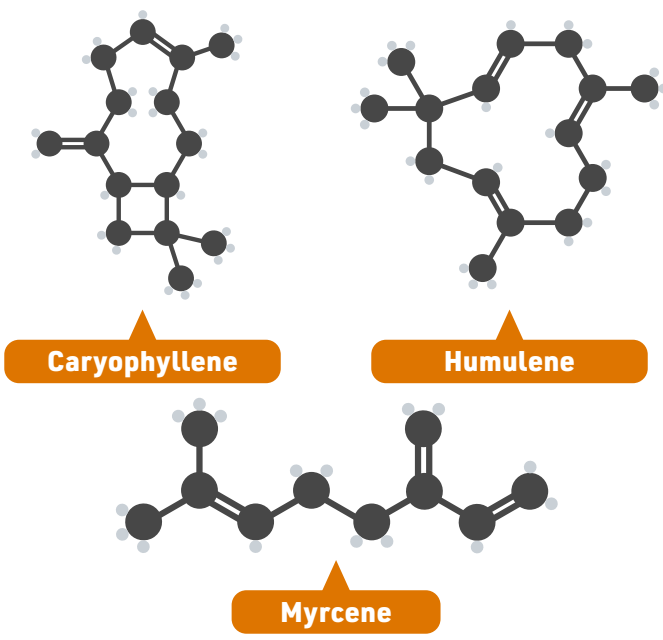
Alpha acids are found in hops used for brewing; they degrade and form iso-alpha acids, which contribute bitterness. The five main alpha acids are humulone, cohumulone, adhumulone, posthumulone & prehumulone. Humulone is the primary alpha acid in the majority of hops.

Beta acids



Beta acids come from hops and add bitterness during fermentation as they are slowly oxidised. They are considered to have a harsher bitterness than alpha acids. The ratio of alpha acids to beta acids varies in different hops, with different ratios preferred by different brewers.

Hop essential oils

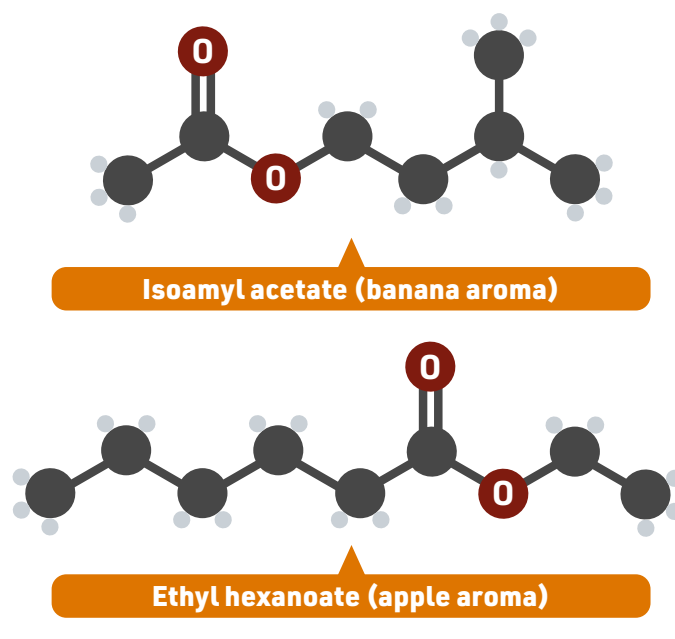


Components from hop essential oils contribute the majority of hop flavour and aroma. These compounds are volatile, so traditionally hops are added late in the brewing stage, although modern techniques vary. Though there are 3 key oils, there are 22 known to give aroma and flavour, and over 250 in hops in total.

KEY

- Carbon
- O Oxygen
- Hydrogen

Esters



The reaction of alcohol with organic acids and a molecule called acetyl coenzyme from hops forms esters, which give beer fruity flavours. Different beers have differing levels of esters; the production of esters is controlled in a number of ways including the yeast used and fermentation temperature.