

CHEMICAL COMPONENTS



MILLING

Dried barley added and ground



MASHING

Water added to produce wort



BREWING

Hops added, mixture boiled



COOLING

Mixture cooled to under 10°C



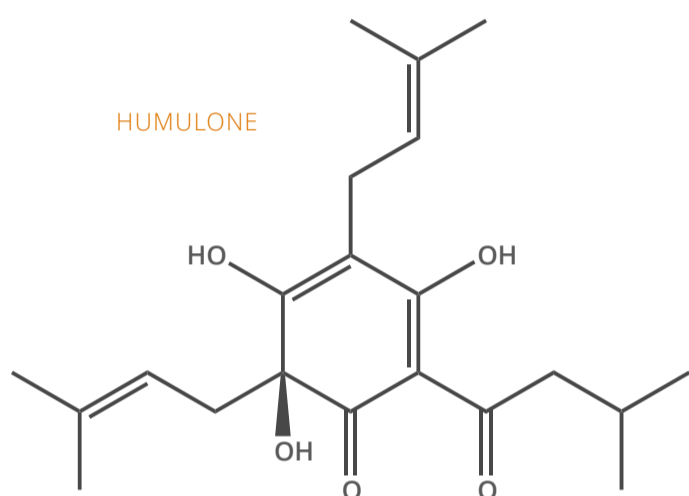
FERMENTING

Yeast added, alcohol produced



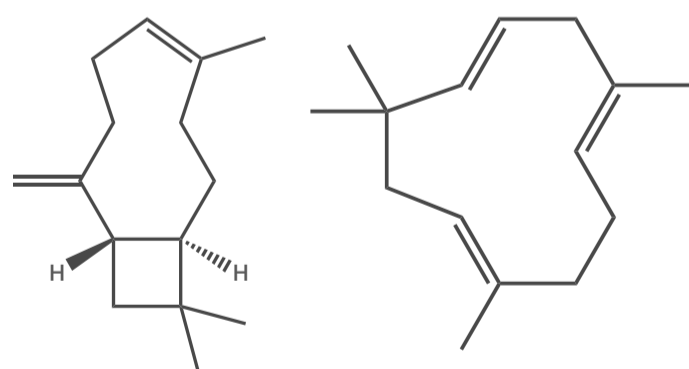
MATURING

Left to mature then filtered & bottled



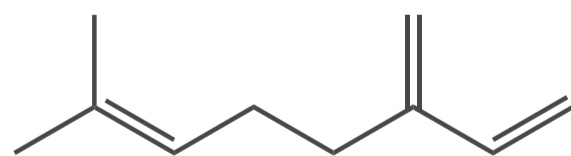
ALPHA ACIDS

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



CARYOPHYLLENE

HUMULENE



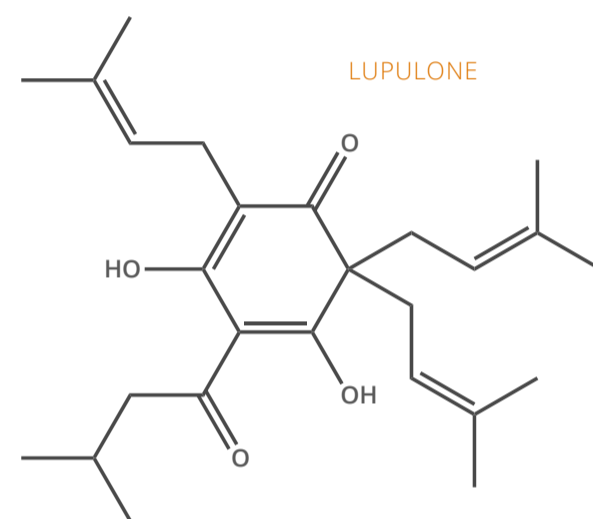
MYRCENE

ESSENTIAL OILS

These contribute the majority of hop flavour and aroma. As they are volatile, they were traditionally obtained by adding hops 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.

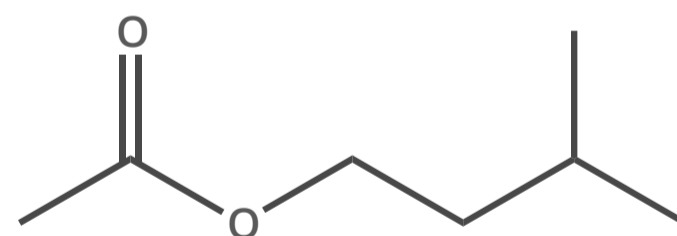


OVER
800
DIFFERENT
COMPOUNDS

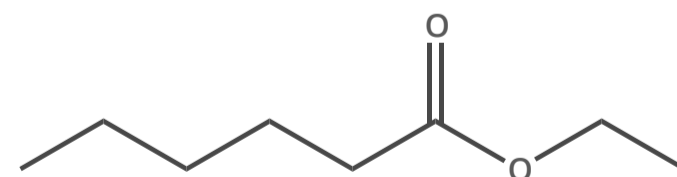


BETA ACIDS

Beta acids also originate from hops, and add bitterness during fermentation of the beer 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 from hop to hop, with different ratios preferred by different brewers.



ISOAMYL ACETATE (BANANA AROMA)



ETHYL HEXANOATE (RED APPLE/ANISE AROMA)

ESTERS

Esters are formed via the reaction of alcohol in beer with organic acids and a molecule called acetyl coenzyme from the hops. They contribute fruity flavours to beers. Different styles of beer require different levels of esters; their production is controlled in ways including the yeast used and fermentation temperature.

