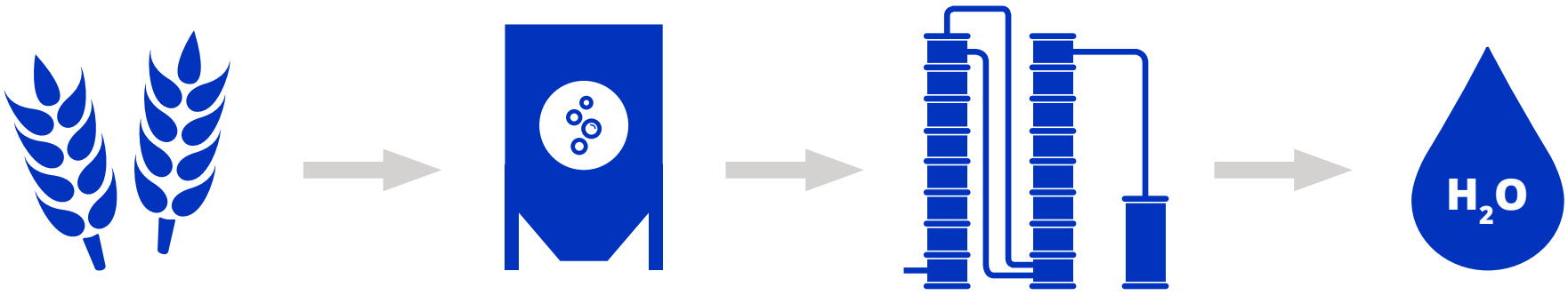
THE CHEMISTRY OF VODKA



RAW MATERIALS
Traditionally made using cereal grains or potatoes

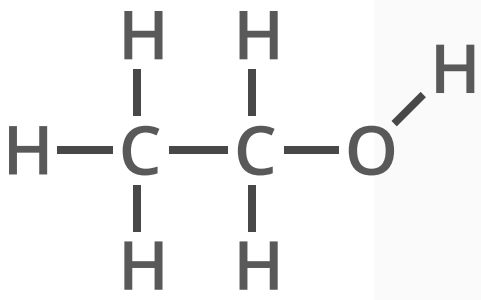
FERMENTATION
Yeast added to mash to make approx 16% alcohol solution

DISTILLATION & FILTRATION
Removes most impurities and concentrates alcohol up to 96%

DILUTION
Water is added to the alcohol to dilute it to 40%

In the USA and Europe, filtration through activated charcoal to remove impurities is used extensively. More traditional methods keep filtration to a minimum, instead utilising accurate distillation to remove impurities.

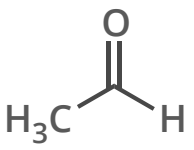
ETHANOL HYDRATES



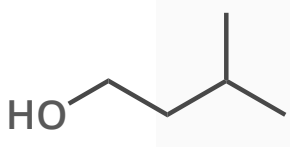
ETHANOL
principal alcohol found in alcoholic beverages

Ethanol and water molecules in vodka can bunch together in clusters called hydrates. The most common hydrate has a cage-like structure, and around 5 water molecules to every ethanol molecule. This hydrate varies in concentration in different vodkas, and it's been suggested it may affect a taster's perception of vodka (though this hypothesis is yet to be confirmed).

IMPURITIES

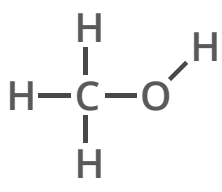


ACETALDEHYDE

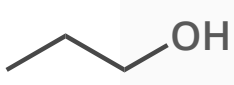


ISOAMYL ALCOHOL

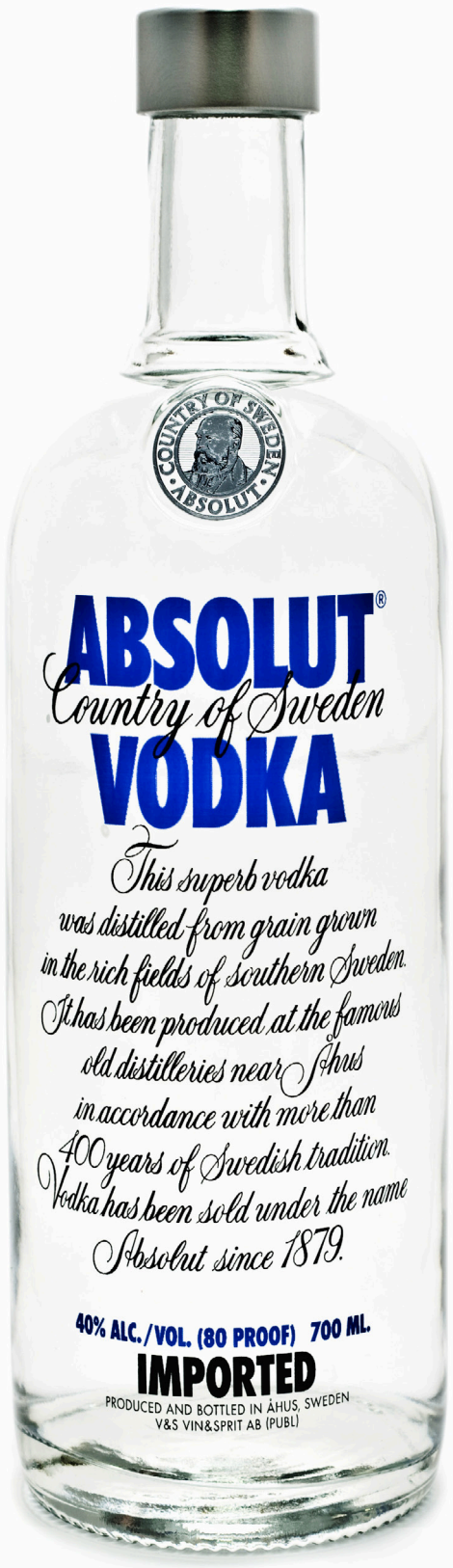
Though distillation and filtration removes most impurities in vodka, milligram amounts of some compounds, including those shown here, can remain. Cheaper brands of vodka tend to have a larger amount of remaining impurities, which could affect flavour perception.



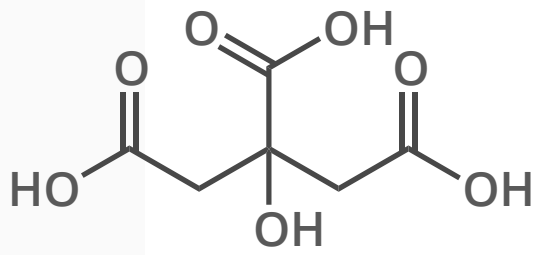
METHANOL



PROPANOL

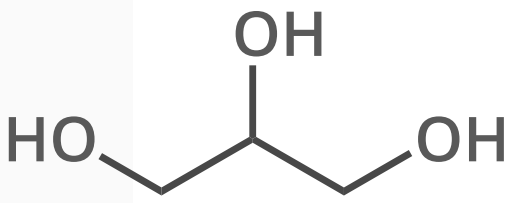


ADDITIVES



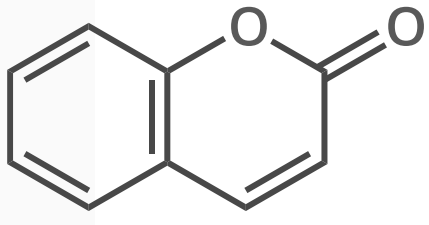
CITRIC ACID
acts as a 'smoothing agent' in vodka

Vodka can sometimes be more than just ethanol and water. Some additives are permitted in most countries. These include citric acid, which is permitted up to 0.1% by volume, glycerol, and sugar (maximum of 0.2% by volume). These additives do not need to be disclosed on the label.



GLYCEROL
another compound used as a 'smoothing agent'

Flavoured vodkas can also be produced using additives. One of the best-known is Żubrówka, a vodka of Polish origin flavoured using bison grass. The bison grass gives it a yellowish colouring but also leads to the vodka containing coumarin. Coumarin has minor liver toxicity in large amounts, and as such Żubrówka was banned in the USA until a coumarin-free version could be formulated.



COUMARIN
compound found in bison grass vodka