**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.

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**Ethanol Hydrates**

![Ethanol hydrate structure](image)

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
- Methanol
- Propanol

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.

**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

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