



# The Alcohols

## How Can We Distill Alcohol?

In the past, distillers set up shop on the outskirts of villages with their carts and their copper stills to distill cider, wine, and the fermented juice of various fruits: pears, apples, plums. The principle behind distillation is simple. Since ethylic alcohol boils at  $78^{\circ}\text{C}$  ( $172^{\circ}\text{F}$ ) and water boils at  $100^{\circ}\text{C}$  ( $212^{\circ}\text{F}$ ), alcohol is separated from water by heating a mixture of the two substances; the alcohol, which evaporates first, is condensed in a coil, while the water remains in the vat.

In practice, the operation is a bit more complex, because the aim is to recuperate not pure alcohol but flavored alcohol. In addition, the methanol, or methylic alcohol, must be eliminated by eliminating the first distilled fractions; this alcohol is toxic and, most important, causes blindness (nevertheless, it contributes to the bouquet when it is present in weak concentrations in certain white alcohols).

It is especially important to know that a high-quality brandy can only be obtained beginning with white wines that are quite acid, have a very light bouquet, and are low in alcohol content, because distilling strongly flavored wines produces too heavy a brandy.

In addition, it is important that the distilling vat be copper. Copper atoms fix the fatty acids in the wine and also capture the sulfur of the sulfur dioxide often present in white wines.

If distillation were not forbidden, anyone could easily practice it at home. All you have to do is put the mixture to be distilled in a pressure cooker, connect

a length of pipe over the safety valve, and make cold water run over the pipe to condense the distilled vapors. One or two runs in succession, eliminating the first and second fractions in which various toxic products are concentrated, will procure an alcohol of the desired degree.

### Improved Whisky?

Once the alcohol is made, its taste can then be improved by letting it age in bottles in which sticks of dry wood have been placed (in eastern France, hazel wood is often used). (Better still, the wood in question can be heated briefly over a fire before being placed in the bottles. This operation, also carried out by barrel makers who heat their staves, causes other interesting compounds to appear.) The acids in the brandy gradually break down the lignin in the wood into phenol aldehydes, which are then oxidized into phenol acids. The brandy becomes less acidic while at the same time aromatic compounds, such as syringic, syringic, vanilic, and ferulic acids, appear.

Why dry wood and not green wood? Because green wood contains aesculin (bitter), which is gradually transformed into aescutin (sweeter) when the wood dries.

Since compounds like vanilla are present in aged alcohols in contact with wood, why not speed up the aging process by adding these compounds directly to young alcohols? Adding a few drops of vanilla extract to whisky, for example, will make it more full-bodied—but stop before the whisky smells like vanilla. Similarly, you can add a very small amount of cinnamon, since cinnamic aldehyde is formed in the same process as vanillin as alcohols age.

### Cold Distillation

Another distillation method, less well known but perhaps even simpler than the one I've described, consists of placing the mixture to be distilled in a freezer. When it freezes, the water forms into a block of ice, separating itself from the alcohol and the other compounds that remain in the liquid phase.

Alas, it is also against the law to proceed in this fashion . . .

## Why Does Alcohol Make You Drunk?

The compound commonly referred to as alcohol, which chemists call ethylic alcohol, or ethanol, is only one member of a huge chemical class of alcohols. In its pure form, it is a colorless, odorless compound that burns the tongue.

From its chemical formula,  $\text{CH}_3\text{CH}_2\text{OH}$ , we can locate its alcohol function in the OH group, which replaces a hydrogen atom in ethane (a compound with the formula  $\text{CH}_3\text{CH}_3$ ).

Why the name “alcohol”? Because the Arab word, *al Kohl*, means “fine powder.” Actually, the Egyptians tinted their eyelids with an inorganic compound, sulfur of antimony, which they ground in order to apply it. Then, the name was given to the essence of anything at all, notably liquids obtained by distilling wines, when this operation was invented by Avicenna in the tenth century.

Why does alcohol make you drunk? Because it stimulates the brain, which frees the cortex of inhibitory controls; that explains the excitement of drinkers, at least in the first stages of what health workers call “alcoholic intoxication.” More precisely, alcohol works by interacting during neurotransmission. The brain cells called neurons function by receiving information from other neurons, by calculating the sum of activations and inhibitions, and by stimulating neurons further along in the system according to that calculated sum. A neuron activates other neurons by releasing neuromediating molecules that attach themselves to the receptor molecules of neurons further along.

The neuromediator with which alcohol interacts is gamma-aminobutyric acid, or GABA, which acts as an inhibitor. By attaching itself to its receptors, GABA deforms them and facilitates the entry of chloride ions into the neuron, which becomes less excitable.

On the other hand, when it attaches itself to the GABA receptors, alcohol facilitates the fixation of the neuromediator, so that the neurons further along in the system are less inhibited.

Now knowing the dangers that lurk for us in alcoholic beverages, let us remain temperate. . . .