

Let's tap a barrel today

POPULAR | When asking your average man in the pub about the beer he likes best, the answer frequently does not refer to any specific type but simply to “a fresh draught beer”.

CONSUMERS HOLD DRAUGHT BEER in very high esteem. In days gone by, wooden pitch-lined barrels were standard, they were replaced by aluminium barrels after World War II. These in turn were replaced by stainless steel barrels that are still in use today and are referred to as kegs. Very tiny barrels, nowadays called beer cans, are also extremely popular. Draught beer has become an integral part of the beer market. The fact that barrels are exceptionally good storage containers for beer is one of the reasons. They do not alter beer taste, at least not related to the material properties of barrels.



Matters are quite different when using wooden barrels without interior lining. They indeed alter the product, even very considerably. And that's the very feature that has become increasingly popular in recent years: beers matured in wooden barrels (for more detailed information on this topic please also refer to the article on p. 171, which is one part of a whole article series on barrel aging).

■ Historical background

Wooden barrels for beer have been standard for centuries. They were lined with birch pitch to prevent any change in taste.

Things were different for wine. Wine was also stored and transported in wooden barrels. However, these barrels had no inside lining. With increasing storage times, the

flavour impression imparted to such wine was increasingly more pronounced. A fresh young wine had rather a lively bouquet whereas a search for barrel flavour impressions yielded nothing. A wine aged for a long time in barrels left flavour impressions of vanilla, spices, coconut, caramel and chocolate on the palate. Wine drinkers quickly acquired a taste and it comes to no surprise that a whole science evolved in viticulture around wine flavour impressions originating in barrels. These meantime present brewers with very interesting research results and help them to refine beer by targeted barrel ageing.

In the 1980s, experiments with wooden barrel-aged beers were on the agenda for the first time on a large scale and these beers have nowadays become an integral part of the rich repertoire of craft brewers.

■ What happens during ageing in wooden barrels?

In a nutshell, everything that we want to avoid in brewing happens.

As wood has an open-pored surface, carbon dioxide can percolate from beer through wood to the outside on the one hand. Oxygen also diffuses through wood into beer and oxidation processes take place in beer on the other hand.

The wood as such is leached by the beer and imparts aromas to the beer. At the same time, beer continues to mature in the barrel due to natural ageing and associated chemical processes.



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Depending on barrel properties, different aromas are produced in finished beer.

First of all, lactones should be mentioned, in particular β -methyl- γ -octolactone. In its cis form, this substance, also referred to as “Whiskey Lactone”, imparts an aroma reminiscent of coconut and is just as sweetish and grassy. In its trans form, it conveys a touch of spices.

Vanillin is one of the major aroma components in wooden barrels. Its intensity depends mainly on barrel pre-treatment and, here in particular, on so-called toasting. Vanillin is the main aroma component of vanilla and, accordingly, vanillin imparts the vanilla aroma.

Furfurals in wood result in a caramel flavour impression and reinforce sweetness. Their concentration is also significantly influenced by toasting.

Guaiacol, in particular 4-methylguaiacol, imparts smoked aromas. This component also results mainly from toasting.

Other aroma substances can also play a role, especially when the wooden barrel, before being filled with beer, had another occupant. This is indeed usual and is done with a view to imparting additional flavours to beer. For instance, wine barrels, in particular red wine or dessert wine barrels, are favourites so that the beer can pick up some of these wine aromas. Barrels that were used

to store spirits, such as whiskey barrels, are frequently encountered.

Which barrel properties are desirable for beer ageing?

First of all, barrel volumes have to be considered. Barrique barrels are frequently used, they can hold 228 litres.

Their ratio between volume and surface area is very favourable. The larger the volume, the longer it will take until desired oxidation processes start and the harder it is for beer to take up sufficient wood aroma components.

But when the volume is too small, this is unfavourable. Within a very short space of time, a massive amount of aromas from the wood are picked up, leading to unbalanced beers.

When selecting barrels, two things in particular have to be considered: wood type and toasting.

There are various types of wood to choose from. Oak wood is one of the classic wood types for barrel construction. A differentiation is made again between various oak species such as limousine oak or American white oak. Apart from oak, chestnut or acacia wood is also used.

The raw barrels are first of all assembled from individual staves and then toasted, i.e.

a fire is ignited in the barrel body that, at this point of time, has no lid or bottom. The fire heats the inside of the barrel body to a specific temperature, thereby toasting it, i.e. it is charred to a greater or lesser degree. During toasting, most of the above-mentioned aroma components are formed. Depending on the strength of toasting, components can vary considerably.

Which beers are suitable for barrel ageing?

It goes without saying that not every beer can be refined in wooden barrels.

An American Lager with just under 4% ABV and possibly 12 IBU will certainly not be improved by barrel ageing.

High-proof beers, in particular, can be refined by being stored in wooden barrels and also having the potential of leaving the wooden barrel in a better condition after storage in wooden barrels, sometimes even for several years, before being drunk.

Slightly higher hopping does not adversely affect the beers but is not a mandatory requirement.

The beer should have a relatively low CO₂ content. After pressureless main fermentation, that's not too difficult to achieve. The range is mostly between 2.7 and 3.3 g CO₂/L, very suitable for going into a barrel.

However, opinions differ about adequate storage conditions. Whereas some prefer “classical” storage at wine cellar temperatures (10-12 °C), others advocate temperatures around 18 °C. Another group is convinced that beer should be stored cold (about 0 °C). One thing is certain: every temperature gives rise to specific beers. Chemical reactions such as diffusion processes are very much faster at higher temperatures than at low temperatures. However, at higher temperatures, it is usually more difficult to pinpoint the correct point in time at which beer has reached its optimal condition and should be bottled.

Independently of the temperature selected, the barrel should be left in peace in any case. This means that it should not be moved. Moving can be beneficial for some spirits (e.g. Linie Aquavit), but the outcome in the case of beer cannot be predicted or reproduced.

The storage cellar should not be too humid to prevent formation of fungi on the barrel surface.

How should barrels be handled?

That depends on the type of barrel. A completely new barrel should be soaked in water from the inside for at least 24 h before being used for the first time. The wood will swell and make the barrel water-tight.

Barrels that had previous occupants should not be soaked from the inside as desirable aromas would also be washed out. The barrel should be soaked from the outside, i.e. it should be wetted regularly with a hose so that the wood can swell.

Once a brewer has acquired a number of wooden barrels, the question arises about what to do with them if they are not filled with beer at one time or another. Opinions again differ

considerably. Whereas some are ardent proponents of the idea that barrels should be full at all times, no matter what, others propose to simply fill the barrels with water, possibly with the addition of some citric acid. However, this method will inevitably lead to further leaching. Others again are very pragmatic: they just let the barrels dry out and soak them again with water before re-using them. Everyone should decide for themselves on the method of choice and simply take a stab at it.

Opinions again differ about how often a barrel can be filled. It goes without saying that part of the aroma substances will be leached out every time the barrel is filled. At some point in time, hardly any aroma substances will pass into the beer. It's difficult to say when this will happen. This depends on the wood, on toasting but also on the beer and on the extent to which the beer could leach out the wood.

According to a rule of thumb, three to four fills should be possible.

But such wooden barrels do not come cheap. So what to do with a wooden barrel that has been filled four times and can no longer give off that certain something to beer.

Here, one should look out of the box and try to take a spirits producer on board. In this way, distillers and brewers have already cooperated and have exchanged barrels on a regular basis. Barrels having held several fills of beer will then be filled with high proof spirits that will benefit from the beer aromas. The same barrel can subsequently be filled again with beer which in turn will benefit from the spirits and from the aroma substances in the wood released by the spirits.

This leads to a wonderful symbiosis making it possible to use such a fine container in the long term. ■