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Brennereitechnologie

Production of Whisk(e)y

- Technology, malts, dry selected yeast -

Whiskey Select -

version 06/2015

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Technical informations and use instructions

Legal prerequisites:

According to Regulation (EC) No. 110/2008 on Spirit Drinks, whisky (Scottish spelling) or whiskey (Irish spelling) is a spirit which fulfils the following prerequisites:

- The mash consists of malted (and possibly unmalted grain), has been saccharified with malt amylases and/or microbial amylases, and fermented with yeast.
The distillate from this mash clearly indicates the raw material in this aroma.
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- Whisk(e)y may neither be stretched with extraneous alcohol nor sweetened, flavoured or coloured, with one exception:
- The brown colouration arising from storage in barrels may be standardised with caramel.
- The minimum alcohol content of the finished whisk(e)y is 40 % ABV.

In the following, a few well-known **foreign whisk(e)ys** are mentioned with respect to their special features in the selection of raw materials and production:

- **Scottish malt whisky**

Barley malt, directly kiln-dried over coke or coal, perhaps with the addition of peat (smoked malt); mashing process at max. 75 °C; lautering the mash and fermenting only the wort; distillation in crude / fine distillation method (pot still).

- **Scottish grain whisky**

Unmalted grain ("unmalted grain", i.e. barley, maize, oats, rye); mash preparation in a high-pressure steaming process at up to 150 °C;

Liquefaction and saccharification with about 20% malt; fermentation of the complete mash; continuous distillation in a fractionating column and rectifying column (patent still).

- **Irish whiskey**

Barley malt, partially with proportions of unmalted grain (possibly also wheat, rye, oats); pot still distillation, but threefold.

- **American rye whiskey**

Unmalted rye; high-pressure steaming process; liquefaction and saccharification with barley malt; continuous distillation.

- **American bourbon whiskey**

At least 50%, at most 80% unmalted corn, possible addition of rye; liquefaction and saccharification with barley malt; fermentation with addition of distiller's wash; continuous distillation.

- **American corn whiskey**

Like bourbon, but 100% unmalted corn.

The large number of variation possibilities in the...

- selection and combination of raw materials,
- type and intensity of drying / roasting / smoking of green malt,
- choice of malting process,
- fermentation method (temperature, yeast lees),
- distillation technique,
- distillate storage and
- blend

...undoubtedly makes whiskey the most varying sensorial category of spirits.

Malts for the production of whisk(e)y:

On the one hand, the grain malt can be a convenient source of starch-reducing enzymes (amylases) which are necessary for the liquefaction and saccharification of the starch contained in the malt and unmalted grain. But the malt is of greater importance as an aroma compound, since a possible enzyme deficiency can be readily balanced through the use of microbial amylases ("Schliessmann VF" and "VZ"). The following table describes the malts in our product range (ready for processing and finely crushed):

	Grain	Enzymatic activity	Aroma	Art. No. 25 kg bag
Distillers' malt	Wheat	very high	mild	5620
Smoked malt	Barley	high	fine aroma of smoked beech	5622
Munich malt	Barley	medium	pronounced malt aroma	5624

Dry selected yeast *Whiskey Select*:

Whiskey Select is a mixture of two yeast strains which have been selected from whiskey mashes. Experimental fermentation processes have shown that this yeast produces distillates more pronounced malt aroma. Particularly in mashes with malt percentages of over 50% this advantage is shown compared to the in comparison to the "**Kornbrand Premium**" yeast, which on the other hand is better suited for the fermentation of unmalted grain mashes.

Information for mash preparation:

Which process can be mashed depends on the amount of malt percentage in the raw material mixture and the quality of malt. Anyone who does not have much experience or cannot evaluate the enzymatic activity of their malt will most certainly achieve complete alcohol yields and flawless distillates with the following process principle:

- Clump-free mashing of the entire crushed raw material just beneath, at or slightly above the gelatinisation temperature in order to bring the starch completely in the solution. This is a prerequisite for being able to enzymatically reduce the starch into fermentable sugars at all;
- Liquefaction with temperature-stable α -amylase ("VF" for wheat, rye, barley and oats or "VF Potato" for corn/maize) during a liquefaction break at gelatinisation temperature;
- Cooling and enzymation with glucoamylase ("VZ") for saccharification at about 55 °C;
- Acidification with diluted sulphuric acid at pH 4.5 in order to prevent heat-resistant bacterial spores from germinating and proliferating;
- Cooling and inoculation with rehydrated dry selected yeast *Whiskey Select* at approx. 25°C.

Our information sheet "Instructions for production of alcohol from grain" shows in detail two mashing processes which take place according to this principle. Variation 1 is suitable for instrument-based equipment which does not permit the heating of mash. Variation 2 describes the process for mash vessels which can be heated with steam or an emersion heater.

Anyone who has some experience and knows the enzymatic quality of malt can scan temperature programmes which utilise the malt amylases for saccharification, possibly also for liquefaction, and thereby avoid the effort involved with technical enzyme preparations.

The full information contained in this leaflet is based on our current experiences and knowledge. Schliessmann Kellerei-Chemie does neither guarantee that the products, as described above, can be used without prior intensive testing, nor that by their use no patent rights of third parties are being injured.