

Bohemian Floor Malt - The Origin of Pilsner Brewing

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Abstract

Original Pilsner brewing technology demands specific processes with regard to water, hops and especially malt. Historically the bohemian style of Pilsner beer differs in colour, flavour and overall character. Methods: The process of producing the required higher colour malt is very specific and traditionally done by floor malting. Moisturization and germination conditions are controlled by special treatment and turning operations. The malting process is highly sophisticated and required experience and specific know-how. This malting technology is compared with the modern pneumatic malting system. Both trial maltings and comparative brewing with traditional floor malt as a re-discovered material and standard Pilsner malt varieties were done. In brewing typically a triple decoction program is used, requiring individual brewhouse facilities. Results: The poster describes the malting and brewing process, comparing pale Pilsner type malt from modern malting facilities and darker Bohemian style Pilsner malt. The resulting beers are typical Pilsner style beers, but quite different in taste and colour and other properties. The use of floor malt provides an easy option for smaller and specialty brewers to produce the original style of bohemian Pilsner. A beer type which is very unique. The poster shows analytical parameters during production of malt and beer as well as analytical values and sensorial analytics of the final beer.

Material and Methods



Fig. 1: Floor malting

Malting

The most influencing process for the production of original Bohemian malt is the floor malting process after a 48 h steeping. This is done on traditional naturally cooled Solnhofen limestone floor tiles. The standard temperature is 14°C. Aeration is only achieved by manual moving and alteration in bed height of max. 15 cm (see Fig. 1, 3). This labour-intensive process is done twice per day and also used to do the moisture control. The CO₂-level is higher than in modern germination technologies. Typically a slightly under-modified pale malt is achieved. Barley varieties, still grown in the province of Bohemia like Tolar or Bojos are used and suitable for this technology. The quality parameters for Bojos are shown in Table 1. Quality of the resulting malt is given in Table 2.

Brewing

The malt grist composition is shown in table 3 triple decoction was used for mashing starting a 37°C, rest at 38°C for 30 min, mash transfer (2/3) in lauter tun and heat up of the remaining mash to boil in steps (10 min 65°C, 10 min 72°C 10 min boiling), return of the decoction mash, 10 min 65°C, mash transfer (2/3) and heat up of the remaining mash to boil in steps (10 min 72°C, 10 min boiling), return to the decoction mash, 10 min 72°C, mash transfer (2/3) and heat up of the remaining mash to boil (5 min), return of the decoction mash and final mash pumping with 77°C. This results in a well converted mash providing a malty note for the final product.

Malt Charge	%
Weyermann®	97
Floor Malted Bohemian Pilsner	
Weyermann® Acidulated Malt	2
Weyermann® Carabohemian®	1

Tab.1: Malt composition

Floot Malt Var.	Bojos	unit
Moisture	4,2	[%]
Extract (air dry)	77,2	[%]
Extract (fine)	81,2	[%]
Colour wort	3	[EBC]
Colour boiled wort	5,5	[EBC]
pH	5,88	
Viscosity (8,6%)	1,52	mPas
Hartong	34,1	[%]
Protein	10,8	[%]
soluable N	664	mg/100g DS
soluable Protein (airdry)	4,1	[%]
Kolbach Index	38,4	[%]
Friability	86,2	[%]
glassiness	1,8	[%]
Saccharification	10 to 15	min.

Tab 2: Malt analysis



Fig. 2 : Mash Diagram Triple Decoction

Conditions and Results

Hops	Saaz 3,35% α	BU
90 min	Wort Boiling	
1. Addition	15 min	25
2. Addition	60 min	11
3. Addition	80 min	4

Table 3: Hop additions during boiling and BU

Hops and wort boiling: Saazer Hops, a typical czech aroma variety was used throughout in the form of pellets. The additions wer done 15 minutes after the start of boil, at 60 min and 10 before the end of boil (See Table 3).The long boil makes it easy to achieve 12,5 to 13 °plato cast-out wort.

Water: In order to simulate the very soft water of the Pilsen region with very low or even negative residual alkalinity, the water has to be treated accordingly. The Pilsen water is typically of low pH, low carbonate and low sulfate ccontent. As ans alternative to softenings, the removal of hardness can be done by pre-boiling of the brewing liquor. The recommendation is to use soft water, and depending on the source use brewers gypsum.

Yeast: The used yeast historically was imported from Bavaria to Pilsen. Since the original strains have mutated and were also partly replaced, the fermentation can well be done with typical lager yeasts like W34. In the trial Fermentis® Safflager W-34/70 was used successfully.

Bohemian	Pilsner	unit
Density ρ 20/4	1,0129	g/ml
Original Gravity	12,64	°plato
Alcohol	4,76	vol.%
Resid. Extract	3,71	ww%
Attenuation	70,35	%
CO ₂	5,1	g/l
Colour	11,7	EBC
pH	4,37	
Bitterness	27,3	BU
VDKs	0,361	ppm

Tab. 4 Beer analysis

The resulting beer is typically of darker golden colour and higher gravity than todatte Pilsners. In tasting the full malty body is dominant and also VDKs above modern thresholds. A light sweetness derives from high residual extract. This beer type can carry relatively high amounts of aromatic hop notes giving a smooth bitterness (Table. 4)



Fig. 3: Floor malt raking by „wohlgemut“ device

Conclusion

The original Bohemian Pilsener was first brewed by the Bavarian Brewmaster Josef Groll in 1842 in the City of Pilsen and created a new blond lager beer style, which is the origin of most nowadays light colored lagers and Pils type beers. The character of this beer was of golden colour and slightly fruity and floral smell and distinctive bitterness in taste. While modern Pilsners usually have a more hoppy note, the original still carries a fine malty body with a crispy dry bitterness. The original can be reproduced according to the heirloom recipes with modern ingredients like Weyermann® Floor Malted Bohemian Pilsner, which requires special care and effort. As a result it could be shown that even though requiring specialty products and additional process steps an old beerstyle can be developed, that has the original attributes of Pilsner style lager but differs significantly from very pale and possibly hop dominated modern Pilsner beers. The style of such beers has survived the centuries in Czech Republic and is gaining market shares elsewhere.

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