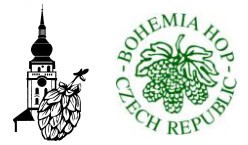


Applications of Czech hops in the brewing industry

Hop seminar - 15th April 2014, Zatec (Saaz)



Bohemia Hop

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Czech hops

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INTRODUCTION

Bohemia Hop in cooperation with the **Hop Research Institute in Zatec** organized a seminar on „ Application of Czech Hops in Brewing Industry” that took place on 15th April 2014. Almost 100 participants from Czech breweries and other experts related with brewing industry gathered at the Hop Research Institute to learn about the current trends in the brewing industry and to taste and evaluate beers brewed from Czech hop varieties in an experimental brewery.

The program included 6 oral presentations and 7 rounds (including 2 triangular tests) of the evaluation of different beer types.

The seminar was started by Mr. Zdenek Rosa, Chairman of Board of Chmelarstvi, cooperative Zatec and Bohemia Hop who described the situation of hop industry in the Czech Republic and the innovations in Chmelarstvi and Bohemia Hop.

Main topics of the seminar were focused on:

- Introduction of Czech hop varieties (Vladimir Nesvadba, Hop Research Institute in Zatec)
- Practical experience with dry hopping (Vladimir Nesvadba)
- Breeding program of Czech hops (Vladimir Nesvadba)
- Aging of hops (Karel Krofta, Hop Research Institute in Zatec)
- News from the Craft Brewer´s Conference in Denver 2014 (Zdenek Rosa, Bohemia Hop a.s.)
- Barley malt and breeding program of SELGEN company (Pavel Horčíčka. SELGEN a.s.)



Main topics of evaluation of beers:

- Introduction of the new Czech hop varieties (Harmonie, Rubin, Bohemie, Saaz Late and Vital) in lagers (single variety hopping)
- Dry hopping with different varieties (Rubin, Harmonie), different time of hopping and different dosage of hops
- Triangular test: Comparison between Saaz variety and Sladek variety added into the whirlpool
- Ale 11° Plato – Dry hopping was carried out with different varieties: Rubin, Kazbek and 3 new genotypes
- Triangular test: Comparison between beers of pure variety with different age of hops (Premiant variety – Crops 2008 and 2013)
- Dry hopping of Non-alcoholic beers with different Czech hop varieties (Kazbek, Harmonie, Premiant, Rubin)





TESTING AND EVALUATION

The **first round** of testing and evaluation was focused on introduction of new Czech hop varieties – Harmonie, Rubín, Bohemie, Saaz Late and Vital. The beers were brewed as a 12° Plato beer of pure variety (hopped with one variety).

Sample number	Hop sample	EPM %	IBU bitterness	Number of points	Rank
1	SAAZ Late	12	29	295	1
2	Bohemie	12	31	254	3
3	Harmonie	12	28	250	4-5
4	Rubín	12	33	250	4-5
5	Vital	12	36	284	2

The **second round** of testing and evaluation was focused on dry-hopped beers. Dry hopping was provided with different time of hopping (4 and 12 days) and different dosage of hops (1,5 and 3,5 g/l).

The dry hopped beers were brewed according to this sequence of hop addition: The 1st hop addition – Agnus (40%); the 2nd hop addition – Bohemie (30%); the 3rd hop addition – Bohemie (30%).

The **Harmonie** variety was used for dry hopping .

Sample number	Dosage of hops [g/l]	Time of hopping [day]	Value of popularity	Value of aroma	Rank of popularity	Rank of aroma
1	1,0	4	3,32	2,11	3	4
2	1,0	12	2,77	2,44	4	3
3	2,5	4	3,74	3,00	1	2
4	2,5	12	3,71	3,77	2	1



The **third round** of testing and evaluation was focused on dry-hopped beers. Dry hopping was provided with different time of hopping (4 and 12 days) and different dosage of hops (1,5 and 3,5 g/l).

The dry hopped beers were brewed according to this sequence of hop addition: The 1st hop addition – Agnus (40%); the 2nd hop addition – Bohemie (30%); the 3rd hop addition – Bohemie (30%).

The **Rubin** variety was used for dry hopping .

Sample number	Dosage of hops [g/l]	Time of hopping [day]	Value of popularity	Value of aroma	Rank of popularity	Rank of aroma
1	1,0	4	3,34	2,24	4	4
2	2,5	4	3,81	2,87	2	2
3	1,0	12	3,85	2,71	1	3
4	2,5	12	3,78	4,00	3	1

The **fourth round** of testing and evaluation was focused on Triangular test between **Saaz** variety and **Sladek** variety **added into the whirlpool**.

The beers were brewed according to this sequence of hop addition: The 1st hop addition – Agnus; the 2nd hop addition –Sladek; the 3rd hop addition – Saaz.

Saaz variety and **Sladek** variety **added into the whirlpool**.

Sample number	Hop sample	IBU bitterness	Guess righth	Guess wrong
1 a 2	Sládek	41	30	59
3	Saaz	39	-	-

The fifth round of testing and evaluation was focused on dry-hopped Ales 11° Plato – Dry hopping was carried out with different varieties: Rubin, Kazbek and 2 new genotypes.

Dry hopping was provided with 3,0 grams of hop pellets per liter during 10 days.

Sample number	Variety (designation of genotyp)	IBU	Value of popularity	Value of aroma	Rank of popularity	Rank of aroma
1	5166 - whole leaf hops	38,6	3,01	2,48	5	5
2	5196 - whole leaf hops	37,5	3,62	3,45	1	1
3	5193 - whole leaf hops	37,5	3,43	2,88	2	4
4	Rubín - Pelletes 90	41,2	3,29	3,16	3	2
3	Kazbek - Pellets 90	38,7	3,26	3,06	4	3

The sixth round of testing and evaluation was focused on Triangular test between beers of pure Premiant variety with different age of hops (Crop 2008, Crop 2013).

Sample number	Crop year	IBU bitterness	Guess righth	Guess wrong
1	2008	30	30	56
2 a 3	2013	28	-	-

The seventh round of testing was focused on Dry hopping Non-alcoholic beers with different Czech hop varieties (Kazbek, Harmonie, Premiant, Rubin, standard non-alcoholic beer).

Dry hopping was provided with 1,5 grams of hop pellets per liter during 14 days.

Sample number	Variety (designation of genotyp)	Value of popularity	Value of aroma	Rank of popularity	Rank of aroma
1	Premiant	3,57	2,22	1 - 2	4 - 5
2	Rubín	3,18	2,51	4	3
3	standard	3,15	2,22	5	4 - 5
4	Kazbek	3,57	3,01	1 - 2	1
3	Harmonie	3,37	2,58	3	2



VISIT OF ZATECKY PIVOVAR (SAAZ BREWERY) AND LABORATORIES OF HOP RESEARCH INSTITUTE

After the seminar, the first group of participants moved on to Žatecký pivovar (Saaz Brewery) that was found in 1801. Brewery guides introduced the brewery history, present and technology of brewing as well. Moreover, participants could see a technological process of brewing. They visited also brewery cellar. The second group visited laboratories of the Hop Research institute where they could see several ways of analysing hops. Mr. Nesvadba delivered interesting information about breeding program of the Institute.

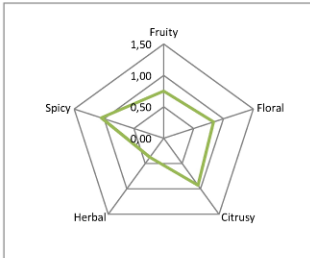
This successful and interesting day was concluded with common dinner and reception in the event hall of the Institute.



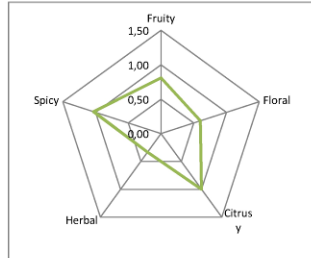
SENSORY PROFILE OF CZECH HOP VARIETIES

SAAZ

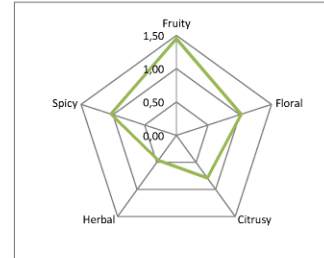
Fruity	Floral	Citrusy	Herbal	Spicy
0,75	0,84	0,93	0,38	1,05


SAAZ LATE

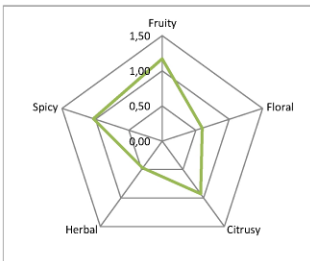
Fruity	Floral	Citrusy	Herbal	Spicy
0,81	0,60	1,00	0,33	1,03


PREMIANT

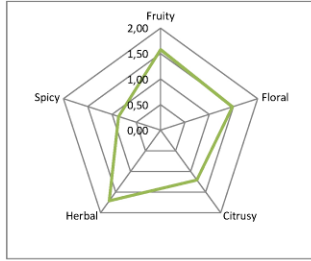
Fruity	Floral	Citrusy	Herbal	Spicy
1,45	1,02	0,79	0,46	1,03


SLADEK

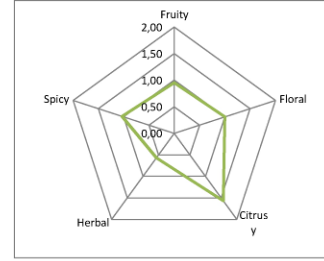
Fruity	Floral	Citrusy	Herbal	Spicy
1,17	0,60	0,93	0,48	1,03


HARMONIE

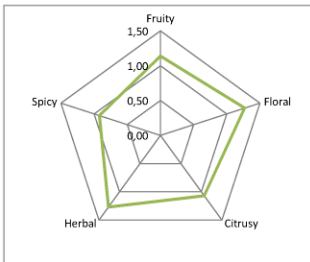
Fruity	Floral	Citrusy	Herbal	Spicy
1,58	1,48	1,21	1,71	0,87


AGNUS

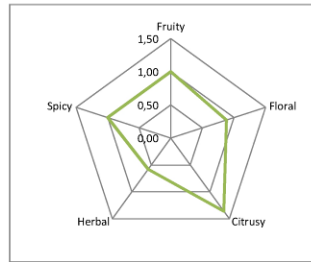
Fruity	Floral	Citrusy	Herbal	Spicy
0,95	1,00	1,57	0,57	1,03


BOHEMIE

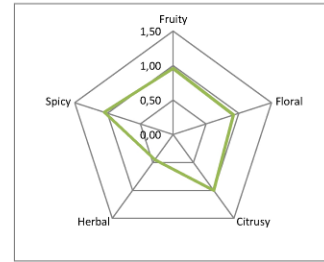
Fruity	Floral	Citrusy	Herbal	Spicy
1,14	1,27	1,07	1,27	0,92


KAZBEK

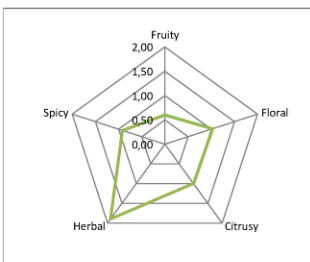
Fruity	Floral	Citrusy	Herbal	Spicy
1,00	0,88	1,36	0,58	1,00


BOR

Fruity	Floral	Citrusy	Herbal	Spicy
0,96	0,92	1,00	0,45	1,05


RUBIN

Fruity	Floral	Citrusy	Herbal	Spicy
0,60	1,03	1,00	1,90	0,92


VITAL

Fruity	Floral	Citrusy	Herbal	Spicy
2,00	1,49	1,36	1,34	0,78

