

PUBLICATION CZECH HOPS 2010

Traditionally like each year was edited international publication Český chmel – Czech hops. This publication was officially published at fair Brau Beviale 2010 in Nurnberg.

This year, our sixth annual issue, editor in cooperation with article writers will again bring you information of a significant and professional nature from Czech hop industry. The newest archeological findings confirm the hop has been connected with our country for many years. The discovery eight and a half years ago that hop growing was conducted here is just one piece of evidence. The "green gold" plant was demonstrably present in the Žatec region during the Neolithic era – younger Stone Age.

A series of protective elements also demonstrate the quality and uniqueness of the Czech hop. For several years now, Saaz hops has had a trademark with the ZATEC HOP label. Together with precise and state-monitored certification, the consumer can be sure of the location, i.e. where his hop was grown. We live in a modern society and the development in technology gives us new options in labeling hops, which we will describe further in our publication.

Scientists from the Hop Research Institute Ltd. in Zatec have contributed to the magazine with their articles for several of years now. This issue will be no different and the trio of authors from the mentioned research institute wrote and provided an expert article on the Czech hybrid hop, Vital. You will also find a very interesting article by international author Mr. Kane Oka, Ph.D. and collective, from the research department of the Japanese Suntory brewery, regarding the results of brewery tests using Czech hops. Of course, we will not deprive our readers of history and you will find a very interesting article on the hops crisis in the 1930s written by historic Ing. Zdeněk Tempír, CSc. In this year's issue, you will also find the results of the ever-so-prestigious beer tasting at the Hop Research Institute in Zatec and we will also reveal the secret of the experimental mini brewery. We will also introduce the finished second stage of the Temple of hops and beer project and Hop, the "mascot" of the hop museum.

Despite all of the experience of growing hops, each hop year is always different, and Czech

growers remain prepared to confront this issue. In the past several years, it spent considerable means on investing into growing technology and planting with direct support from breweries, the country and the EU. Century after century, the Czech Republic produces aromatic hops, known throughout the world, and we are left to hope this tradition will continue.

Last but not least, we would like to thank the Ministry of Agriculture and Hop Growing, and the Chmelarstvi, cooperative Saaz for their financial support necessary in making this publication possible.

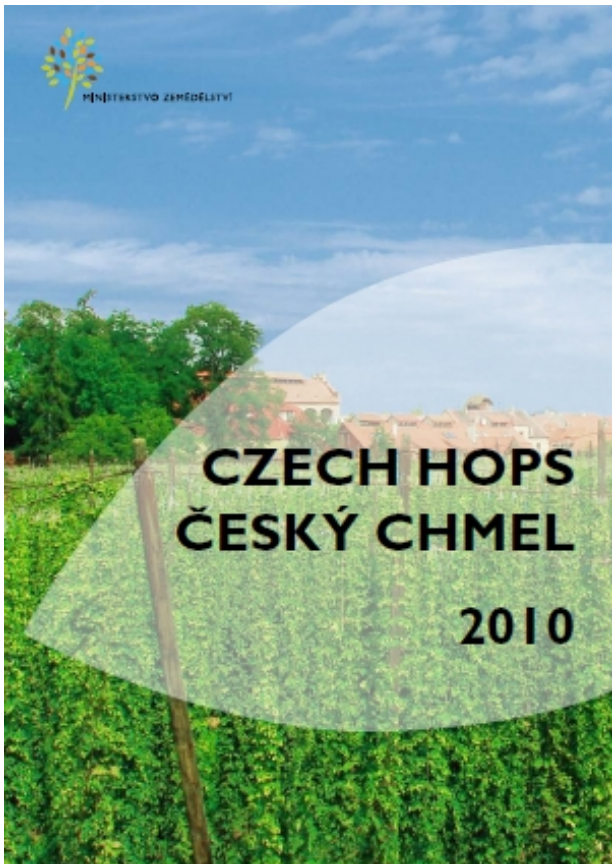
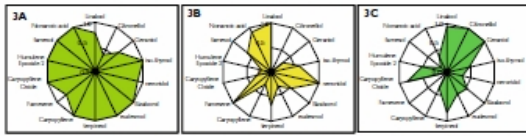


Fig 2. Aroma compound profiles for Sládek (3A), Pilsener (3B) and Agnes (3C) produced by the model hop boiling system.
 Schema 2. 3: Profil aromatických látek pro odrůdy Sládek (3A), Pilsener (3B) a Agnes (3C)



averaged 30x3 pH. It was successfully controlled. The S-traction value for Agnes was higher than the others. However there were no other significant differences in terms of general wort analysis.

Table 2: Wort analysis

	Sládek	Pilsener	Agnes
Bitterness	BLU	25.4	26.3
iso alpha acids	ppm	18.2	19.9
iso columbinones	ppm	4.6	5.3
Alpha acids	ppm	15.6	16.6
Columbinones	ppm	5.55	6.19
S-traction	ppm	2.8	4.3
Linalool	ppm	293	274
Polyprenols	ppm	180	172
Original gravity	wt%	13.61	13.02
pH	---	5.48	5.19
Color	ppm	18.7	18.6
Total nitrogen	ppm	98.0	98.8
Total amino nitrogen	ppm	31.3	32.3

Fermentation and maturation processes were carried out successfully and all the beers were filtered and hand bottled.

The profiles for the aroma compounds in the three trial beers are shown in Figures 4A, 4B and 4C. As described above, the results are expressed as a ratio with the highest value of the three beers listed as 1.0. Sládek was rich in the various aroma compounds found in beer. Pilsener had the lowest content of compounds contributing a woody and hay-like flavor. Agnes had the highest content of compounds contributing a hay-like and earthy flavor.

Table 3 shows how the beer analysis results related to hop variety. Bitterness was kept to a level of 22 BLU of iso. iso-columbinones content was lowest in Pilsener at 4.6 ppm, and highest in Agnes at 7.0 ppm. Agnes beer also produced the highest S-traction result. Linalool content of the three beers again averaged 30x3 pH. It was successfully controlled. Polyprenol levels were around 180 ppm and at roughly the same level for all 3 beers.

There were no significant differences in the general beer analysis results (Table 4). Sládek showed the best results in terms of nitrogen and sugar for main quality. Each beer was subjected to sensory evaluation by 8 trained panelists. In order to compensate for the range of evaluation scores awarded

1.0 pro účel standardizace porovnání jednotlivých profilů. Sládek vynikl vysokými profily aromatických sloučenin. Pilsener měl nejvyšší obsah linalolu a ferulonu, ale nejspíše nižší obsah optického sloučenin. Agnes vynikl také relativně dobrým spektrem sloučenin.

Výsledky analýzy sladiny ukazují tabulka 2. 3. Obsah linalolu a pH chromozéru byl 30 x 3 pH. S-traction odrůdy Agnes byla vyšší než ostatní. V ostatních analýzách sladiny výše uvedené odrůdy vykázaly podobné výsledky. Po filtraci bylo pivo přefiltrováno do lahví.

Profil aromatických látek tří vzorků piv lze vidět na schématech 4A, 4B a 4C. Jak bylo již výše uvedeno, výsledky jsou vyjádřeny poměrem k nejvyšší hodnotě, která je přitom hodnota 1.0. Sládek byl bohatý na aromatické látky v pivu také. Pilsener měl nejvyšší obsah linalolu a ferulonu. Agnes vynikla vysokými profily obsah sloučenin s příchutí země a sena. Tabulka 2. 3 ukazuje, jak se výsledky analýzy sladiny vztahují k odrůdám.

Table 3: Beer analysis related to hop variety

	Sládek	Pilsener	Agnes
Bitterness	BLU	25.4	26.3
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Columbinones	ppm	5.55	6.19
S-traction	ppm	2.8	4.3
Linalool	ppm	293	274
Polyprenols	ppm	180	172

sládek analyza piva se vztahu k odrůdám chmele. Sládek vynikl vysokými profily aromatických sloučenin. Pilsener měl nejvyšší obsah linalolu a ferulonu. Agnes vynikla vysokými profily obsah sloučenin s příchutí země a sena. Tabulka 2. 3 ukazuje, jak se výsledky analýzy sladiny vztahují k odrůdám chmele.

Sensory results for the three beers are shown in Figures 4A, 4B and 4C. As described above, the results are expressed as a ratio with the highest value of the three beers listed as 1.0. Sládek was rich in the various aroma compounds found in beer. Pilsener had the lowest content of compounds contributing a woody and hay-like flavor. Agnes had the highest content of compounds contributing a hay-like and earthy flavor.

Fig 4. Aroma compound profiles for Sládek (4A), Pilsener (4B) and Agnes (4C) trial beers.
 Schema 4. 4: Profil aromatických látek odrůdy Sládek (4A), Pilsener (4B) a Agnes (4C) v chmelových pivu

