

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.

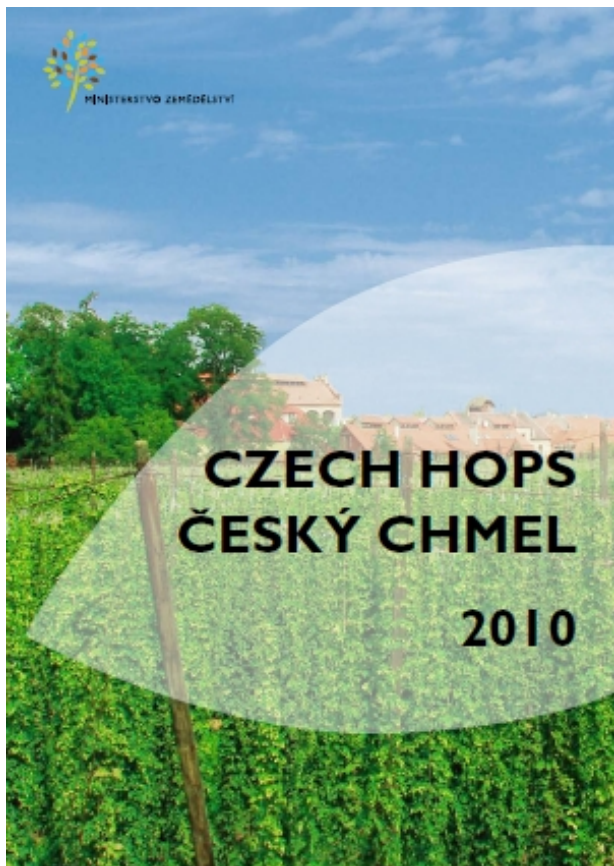
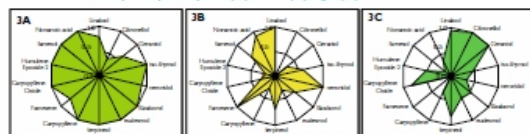


Fig 2: Aroma compound profiles for Sladok (3A), Premiant (3B) and Agnus (3C) generated by the model hop boiling system
 Schema 2.2: Profil aromatických látek pro odrůdy Sladok (3A), Premiant (3B) a Agnus (3C)



averaged 30.3 µg/l. It was successfully controlled. The S-trienol value for Agnus was higher than the others. However, there were no other significant differences in terms of general wort analysis.

Table 2: Wort analysis

Parameter	Sladok	Premiant	Agnus
Betamulin	25.4	26.3	28.3
Isa alpha acids	16.4	17.1	17.3
Isa cohumulones	5.4	5.3	5.5
Alpha acids	27.2	28.4	29.1
Cohumulones	5.5	5.1	5.9
S-trienol	5.8	4.3	9.49
Linalool	20.1	27.4	32.1
Polyphenols	180	175	176
Original gravity	13.11	13.02	13.02
pH	5.38	5.19	5.3
Color	18.7	18.6	18.7
Total nitrogen	98.0	98.8	98.9
Total amino nitrogen	31.3	31.3	31.7

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 rated as 1.0. Sladok was rich in the various aroma compounds found in beer. Premiant had the lowest content of compounds contributing a woody and hay-like flavor. Agnus had the highest content of compounds contributing a hay-like and earthy flavor.

Table 2 shows how the beer analysis results related to hop variety. Betamulin was kept to a level of 22 g/L of iso- α -humulone content was lowest in Premiant at 4.8 ppm, and highest in Agnus at 7.0 ppm. Agnus beer also produced the highest S-trienol result. Linalool content of the three beers again averaged 30.3 µg/l. It was successfully controlled. Polyphenol 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). Sladok showed the best results in terms of ISO-27-T and dng for foam quality. Each beer was subjected to sensory evaluation by 6 trained panellists. In order to compensate for the range of evaluation scores awarded

1.0 for all aromatic compounds. The S-trienol value for Agnus was higher than the others. However, there were no other significant differences in terms of general wort analysis.

Výsledky analýzy složení uvádějí tabulka č. 2. Obsah linalolu v off chmelu byl 30 a 3 µg/l. S-trienol odrůdy Agnus byla vyšší než ostatní. V ostatních analytických veličinách výše popsaných měřily hodnoty s obdobnými rozdíly. Po filtraci byla piva plněna do lahví.

Profil aromatických látek off chmelů pro laze uvádějí tabulky 4A, 4B a 4C. Jak bylo již výše uvedeno, výsledky jsou vyjádřeny poměrem k nejvyšší hodnotě, která je přirovnána hodnotě 1.0. Sladok byl bohatý na aromatické látky v piva. Premiant měl nejnižší obsah látek s dřevitým a slámovým chutím. Agnus vykazoval nejvyšší obsah látek s příchutí dřeva a sena. Tabulka č. 2 ukazuje, jak výsledky analýzy souvisejí s příchutí seny či senu. Tabulka č. 2 ukazuje, jak výsledky analýzy souvisejí s příchutí dřeva či dřevitosti.

Table 3: Beer analysis related to hop variety

Parameter	Sladok	Premiant	Agnus
Betamulin	25.4	26.3	28.3
Isa alpha acids	16.4	17.1	17.3
Isa cohumulones	5.4	5.3	5.5
Alpha acids	27.2	28.4	29.1
Cohumulones	5.5	5.1	5.9
S-trienol	5.8	4.3	9.49
Linalool	20.1	27.4	32.1
Polyphenols	180	175	176

by analyzována piva se rozdíl v obsahu chmelu. Sladok bohatě byl chmelu na 22 g/l (jednotlivých hodnoty nebo měř: nejvyšší obsah iso- α -humulonu (4.8 ppm) byl při použití odrůdy Premiant a nejnižší (7.0 ppm) při použití Agnus. S-trienol byla také nejvyšší v piva z odrůdy Agnus. Obsah linalolu v off piva byl: 30 a 3 µg/l. S-trienol Agnus byl vyšší než ostatní. V ostatních analytických veličinách výše popsaných měřily hodnoty s obdobnými rozdíly. Po filtraci byla piva plněna do lahví.

Senzorická hodnota piva byla provedena souběžně s obecnou kontrolou. Každé pivo bylo standardizováno dle normy. Přesnost standardizace postupů byl provedena na hodnotě 1.0 a standardní odchylka na 15. Výsledky byly hodnoceny odborníci. Hodnotou všech chmelů odrůdy Sladok a Premiant bylo vyjádřeno vyšší než odrůdy Agnus (jakékoli č. 2). Měřítko odrůdy Sladok bylo hodnoceno

Fig 4: Aroma compound profiles for Sladok (4A), Premiant (4B) and Agnus (4C) trial beers
 Schema 4.4: Profil aromatických látek odrůdy Sladok (4A), Premiant (4B) a Agnus (4C) v chmelových pivech

