



# NEWSLETTER 07/2015

## TECHNICAL SUPPORT

### The Non-Volatile Contributions to Dry Hopping

Brewers who dry hop are trying to incorporate hop essential oils into their beer. However, little has been reported about non-volatile hop compounds that also dissolve into beer when one dry hops. In our June 2015 Newsletter we mentioned that after 5 days of dry-hopping Humulinones, a hop bitter acid about 65 % as bitter as isoalpha acids, readily dissolves into beer. In this Newsletter we report the concentration and utilization of Alpha Acids, Beta Acids, Humulinone, Hulupone, Xanthohumol, and Desmethylxanthohumol when a 51 IBU beer is dry-hopped with Cascade hop pellets for five days using a dose rate of 0, 0.5, 1.0 and 2 lbs of Cascade hop pellets per barrel of beer. Table one contains the complete analysis of the Cascade hop pellets analyzed the day of dry-hopping. Table 2 contains the analysis of the control beer along with the dry hopped beers.

Table 1 – Cascade Hop Pellet Analysis

Compound	Concentration
Alpha acids (ICE-3)	5.6 %
Beta acids (ICE-3)	5.8 %
Humulinones (DCHA humulinones, 65.9 %)	0.26 %
Xanthohumol (99.7 % pure, in-house std)	0.26 %
Desmethylxanthohumol (Xn used as std)	0.12 %
Hulupones (DCHA hulupones, 67.0 %)	0.05 %

Table 2 – HPLC Analysis of Beers Dry Hopped for 5 Days with Cascade Hop Pellets

Lbs Hops per BBL	PPM Iso-Alpha Acid	PPM Alpha Acids	PPM Hum	PPM XN	PPM DMX	% Utilization				
						Iso-Alpha	Alpha Acid	Hum	XN	DMX
0	51.3	9	4.2	0.24	0.05	–	–	–	–	–
0.5	42.5	21.6	10	0.62	0.65	- 17 %	11 %	100 %	12 %	26 %
1.0	29.4	27	14	0.79	0.87	- 43 %	8 %	97 %	8 %	17 %
2.0	25.9	35	23	0.79	1.01	- 49 %	6 %	90 %	4 %	10 %

Hum = Humulinone; XN = Xanthohumol, DMX = Desmethylxanthohumol

No beta acids or hulupones were detected in any of the beers. Interestingly, dry hopping appears to remove substantial amounts of isoalpha acids as one increases the amounts of hops used to dry hop. We've notice higher losses of isoalpha acids when one dry hops high IBU beers vs low IBU beers, beers that contain less than 30 ppm of isoalpha acids. When dry hopping, humulinone incorporation can off-set some of the isoalpha acids & bitterness lost due to dry hopping. Perhaps this is why few notice a sensory loss in bitterness after dry hopping.

*Simon H. Steiner, Hopfen, GmbH S.S. Steiner, Inc.*

Newsletter, July 2015



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# Tasting

## Experience Diversity

Gaffel

**Date 1 – Tuesday, July 14<sup>th</sup>, 2015**

**Location** | Gaffel am Dom  
Bahnhofsvorplatz 1  
D-50667 Köln

**Start** | 2.00 p.m.

**Language** | german

**Registration** | forum@hopsteiner.de or  
Tel +49 (0) 8751-8605-0



**Date 2 – Friday, July 17<sup>th</sup>, 2015**

**Location** | Camba Bavaria  
Mühlweg 2  
D-83376 Truchtlaching

**Start** | 2.00 p.m.

**Language** | german

**Registration** | forum@hopsteiner.de or  
Tel +49 (0) 8751-8605-0

**Programme and Registration**

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