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HOP SCIENCE

KNOWLEDGE FOR YOUR SUCCESS

by Dr. Christina Schoenberger, christina.schoenberger@johbarth.de



REAL THIOLS ARE NOT ALL HANGING OUT WITH CYSTEINE!

A couple of studies in the recent past point towards the importance of sulfur components contributing to grapefruit, passion fruit and sauvignon type flavours. It was thought that these thiols are released from cysteinylated structures. However this Belgium research group discovered that when producing dry hopped beers with single hop varieties (Amarillo, Hallertau Blanc and Mosaic), the yield of 3M4MP (grapefruit-like flavour) was much higher than expected. As evidenced in grapes these thiols can also come from S-glutathione precursors and this research group was able to prove the occurrence of S-3-(1-hydroxyhexyl) glutathione and S-3-(4-methyl-1-hydroxypentyl) glutathione in hops at levels well above those reported for their cysteinylated counterparts. For the release of cysteine conjugates the beta-lyase can be responsible and the mechanism behind the cleavage of S-glutathione precursors yet has to be discovered. The potential to retrieve fruity aromas from these structures seems to be a big factor for the mentioned varieties.¹

...AND ADD JUST A HINT OF 4 MMP TO BOOST YOUR FLAVOUR

The research teams surrounding Kiyoshi Takoi have been working on hop aroma questions for years. They have been able to show that the coexistence of linalool, geraniol and beta-citronellol boosts the citrus flavour impressions in beer. In current work, these researchers show specifically how the geraniol content in beers can be significantly increased by using hop varieties rich in geraniol, e.g. Mosaic, Bravo or Citra. Relatively low amounts of these hops can increase the geraniol and citronellol content up to 15 to 20µg/L. They also found that there can be additive effects among 4MMP thiol (black currant flavour), linalool and geraniol. Only 1,2 ng/L of 4 MMP was enough for this effect.²

DRY HOPPING – DIFFERENT SCALE – DIFFERENT FLAVOUR

This was basically a summary of trials done by a German research team. They used the hop variety Comet in dry hopping three different beer batch sizes: 17L (keg), 8 hl, and 140 hl (CCTs) at an addition rate of 1,47 ml hop oil/hl or 100g of hops/hl. Temporary circulation was used for a homogenized yield of aroma transfer. Analytical methods and tasting impressions showed significant differences in various descriptors. The small scale trial showed more fruitiness than the others. The mass-transfer rates of the hop aromatic oils to the beer clearly depend on the scale of the trials. In particular, the mass-transfer rates of myrcene and linalool differ between the scales. Correlations of analytical results with the tasting results showed that the tasters were able to detect the measured differences in the mass-transfer rates of volatile hop compounds. Therefore, brewers cannot necessarily expect to achieve similar aroma impressions when scaling up laboratory- scale trials to industrial-scale trials.³

REFERENCES:

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2. VTakoi, K. et al: control of Hop Aroma Impression of Beer with Blend-Hopping using Geraniol-rich Hop and New Hypothesis of Synergy among Hop-derived Flavour compounds, BrewingScience, November/December 2016, Vol 69, http://www.brewingscience.de/index.php?tpl=table_of_contents&year=2016&edition=0011%2F0012&article=88945
3. Schnaitter, M.: Scale-up of Dry Hopping Trials: Importance of Scale for Aroma and Taste Perceptions, Chemie Ingenieur Technik, DOI: 10.1002/cite.201600040, <http://onlinelibrary.wiley.com/doi/10.1002/cite.201600040/abstract>

EVENTS



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Make sure to attend the this year's Hop Summit:

The 2nd International Brewers Symposium on Hops, July 26th to 28th, Corvallis OR USA. <http://hopsflavor2017.com/>

Other hoppy events:

- April 10th–13th, **Craft Brewers Conference**, Washington DC, USA
- May 14th–18th, **EBC Congress**, Lubiljana, Slovenia
- June 4th–7th, **ASBC Annual Meeting**, Fort Myers, FL USA