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# HOP SCIENCE

KNOWLEDGE FOR YOUR SUCCESS

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## 3-MH, WHERE DO YOU GO?

3-MH (3-Mercaptohexan-1-ol) is one of the free thiols in beer that can give us passion fruit, grapefruit or rhubarb flavours. 3-MH is present in both, hops and malt. However the big portion of this aroma compound is present in precursor structures in hops. So far we knew about cysteinylated and glutathionylated precursors. Now French researchers have identified two more precursor structures, known to be present in grapes, also to be present in hops and malt. The precursor quantification was performed by SIDA-UPLC-MS/MS analysis. From grape must we know that a certain percentage of these precursors release the free thiol during fermentation, however in these brewing trials the precursors decreased about 40% and only 0.2% was converted into 3-MH. So obviously we need more research to find out what is happening in beer fermentation with thiol precursors!!

## OXYGEN—MAYBE ONLY THE SECOND ENEMY FOR HOP AROMA?

It is part of each brewer's bible: avoid oxygen uptake in beer in every brewing step. The same is true for hop producers, who strive to prevent hop exposure to oxygen. These US Researchers looked into the impact of dissolved oxygen on dry hopped beer flavour, and investigated the aroma stability of beer with different amounts of oxygen (40 ppb->150ppb) and stored at different temperatures (3°C vs 30°C). Using the napping technique for sensory analysis they found that temperature was a better proxy for product age than dissolved oxygen, especially for the stability of fruity flavours. However within low temperature treatments the effect of dissolved oxygen dosage was still evident. So to make these great hop flavours available to the consumers, it is not only important to avoid oxygen pickup during processing (especially during) bottling but also to ensure a cold transport and storage to the point of sale (or drinking).<sup>2</sup>

### REFERENCES:

1. Delpech, S., et al: Identification of New Odourless Thiol Precursors in Hop and Malt, Poster A060 at the Brewing Summit, August 2018, San Diego
2. Bradley, M.B. et al: Evaluating the Impact of dissolved Oxygen on dry hopped beer flavour and aroma, Poster A 090 at the Brewing Summit, August 2018, San Diego

## THESE ARE THE 2018 BARTH HAAS GRANT WINNERS

Title	Student	University/Institute
Anti-aging effects of hop ( <i>Humulus lupulus</i> ): Modulation of oxidative and thermal stress as well as longevity by hop extract, pomace and isolated compounds in the model organism <i>Caenorhabditis elegans</i>	Theresa Wolfram	Institute for Agricultural and Nutritional Sciences, Martin-Luther-University Halle, Germany
The effect of physiological resistance on behavioral response of two spotted spider mites to acaricides on hops	Adekunle W. Adesanya	Department of Entomology, Washing State University, Pullman, USA
Determining the extraction efficiency of dry hopping: elucidating the concentration effect	Dean Hauser	Department of Food Science and Technology; Oregon State University, Corvallis, USA
Yeast Strain Specific Release of Cystein-Conjugated Thiols like 4-MSP by -Lyase Activity	Aofei Cheng	Research Center Weihenstephan for Brewing and Food Quality, Weihenstephan, Germany
Elucidation of factors involved in the formation of humulinones in hops and during hop processing	Franziska Keil	Technical University of Berlin, Berlin, Germany
Development of tropical-adapted hops hybrids	Renan Furlan Gonsaga	São Paulo State University, School of Agricultural and Veterinarian Sciences, Jaboticabal campus, Brasil

## EVENTS Hops Academy



## BARTH-HAAS HOPS ACADEMY

Sign up for our Hop Flavourist Course—Level 1—The Connoisseur, October 10/11th, Nuremberg, Germany. Information and registration is here: [https://www.barthhaasgroup.com/de/hops-academy#termine\\_BrewingSummit2018.aspx](https://www.barthhaasgroup.com/de/hops-academy#termine_BrewingSummit2018.aspx)