HOP VARIETY DEPENDENT “THIOL IMPACT” FOR BEER BREWING

|TECHNICAL SUPPORT|

Free polyfunctional thiols like 4-mercapto-4-methylpentan-2-one (4MMP), 3-mercaptohexan-1-ol (3MH) as well as 3-mercapto-4-methylpentan-1-ol (3M4MP) are known as very potent aroma compounds in food and beverages including beer. Even contents of a few µg/kg in hops can be high enough to finally result in significant contributions to beer flavour, especially after dry hopping. The known aroma impressions are blackcurrant-like for 4MMP, grapefruit-like or rhubarb-like, both for 3MH and 3M4MP.

250 samples of 97 different hop cultivars from 12 countries and 5 crop years (2019-2023) were investigated with a LC-MS/MS method and enabled to create a general classification serving as useful information in variety descriptions, e.g. in data sheets. Considering transfer rates during brewing and individual odour threshold values, the limits of classification for the “thiol impact” were set at 10 µg/kg for 4-MMP or the sum of 3MH and 3M4MP, respectively.

Based on this study, hop varieties can be differentiated into three categories showing “low”, “medium” as well as “high thiol impact” for beer brewing. Hops in the “low thiol impact” category are free of 4MMP and have no or only low contents of 3MH and/or 3M4MP (in total < 10 µg/kg). This group includes all the classic aroma hops. The next category summarizes varieties with “medium thiol impact” with either no 4MMP but the sum of 3MH plus 3M4MP being higher than 10 µg/kg or both 4MMP as well as the sum of 3MH plus 3M4MP are below 10 µg/kg. All well-known hop cultivars with special flavour impressions could be clearly classified as “high thiol impact” with the sum of 3MH and 3M4MP being always above 10 µg/kg, and 4MMP present in all cases.

Examples of hop cultivars of each of the three categories:

Growing Country	Hop variety	“Thiol impact” category
Germany	Akoya	low
England	East Kent Golding	low
USA	Bravo	medium
Australia	Ella	medium
USA, Spain	Eureka!	high
New Zealand	Nelson Sauvin	high

Are you looking for a thiol bomb or do you describe yourself as a thiol denier? In both cases you will find more information on this topic in the current hop special issue of BrewingScience journal with the title “Determination of variety dependent thiol impact based on LC-MS/MS analysis of different hop samples collected worldwide” (Christina Schmidt, Laura Hoferer and Martin Biendl, https://doi.org/10.23763/BrSc24-10schmidt).

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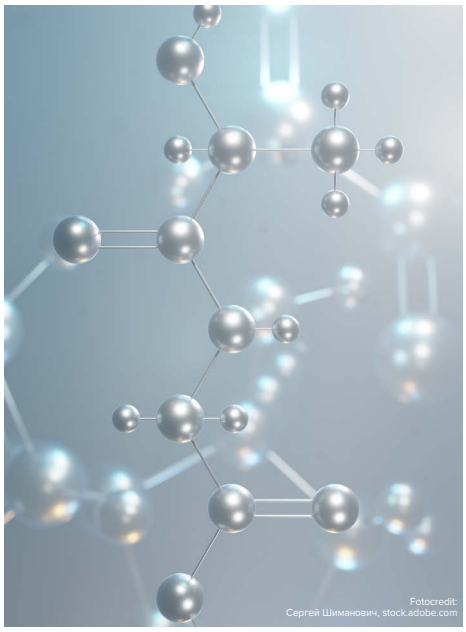
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