

Analysis of isomeric flavor and aroma compounds by high resolution IMS-MS

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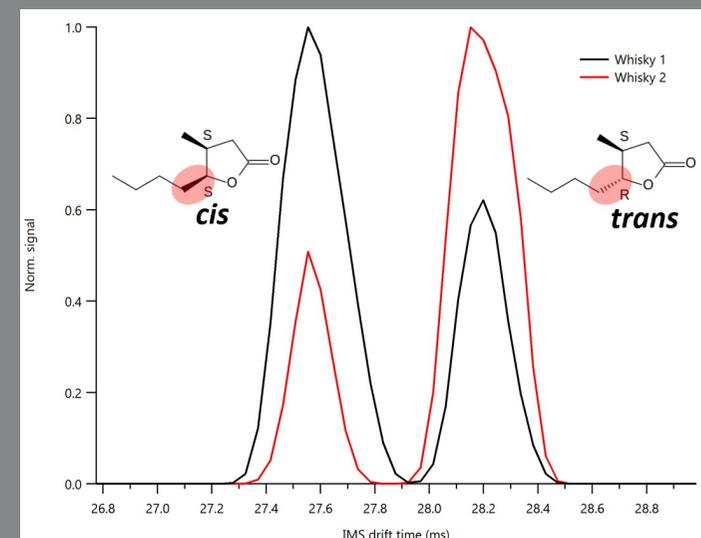
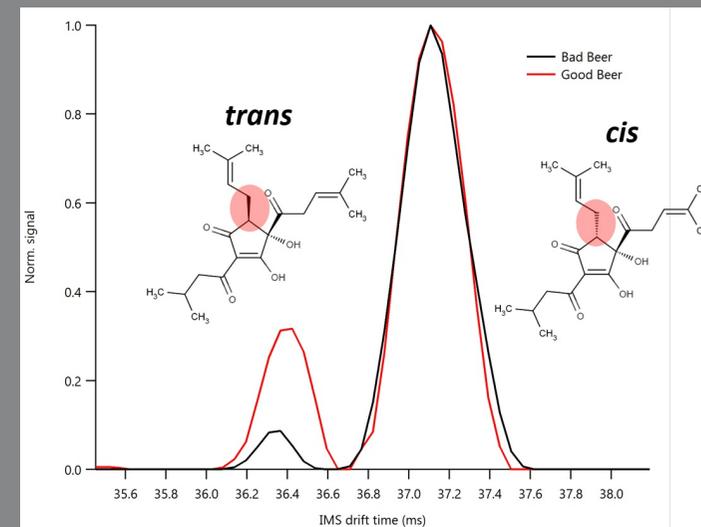
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The characteristic aroma and flavor of many of our most beloved drinks – such as beer, whisky and coffee – have strong dependence on the relative concentrations of constituent compounds. These beverages contain a rich array of molecules, many of which exist as isomeric mixtures. Subtle changes in the ratio of such isomers can significantly affect the palatability of a beverage.

Currently, analysis of flavor and aroma compounds is commonly carried out by GC-MS. Even though GC-MS techniques can exhibit high separation power, they lack speed due to sometimes cumbersome sample separation and analysis times of usually more than 30 minutes. The TOFWERK IMS-TOF exhibits comparable separation power but only a fraction of the time is needed. In many cases, beverages can just be diluted in an appropriate solvent and directly injected for analysis ("dilute-and-shoot"), with analyses not taking longer than a couple of minutes.

Here we show examples of such a direct analysis for beer and whisky. In both cases, separation of cis and trans oriented isomers which have strong influence on the taste of these beverages is achieved.

The TOFWERK IMS-TOF enables rapid separation of isomeric compounds even in complex mixtures.



Direct analysis of isomeric compounds found in beer and whisky using the TOFWERK IMS-TOF. Top: Separation of *cis* and *trans* isohumulone in beer. Whereas a *trans/cis* ratio of 0.4 yields a delightful taste, a beer with almost no *trans* isohumulone (as found in old and expired beers) will be quite bitter. Separation of *cis* and *trans* quercus lactone ("whisky lactone") in two different whisky brand. The ratio between the two isomers is known to strongly influence the character of the whisky.

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