

## BACKGROUND

“Aroma” is an important factor in the enhancement of taste in foods and beverages. Gas chromatography-mass spectrometry (GC-MS) has been conventionally used for analyzing fragrance brought from volatile compounds of foods and beverages. GC-MS is an excellent analytical technique that can analyze trace amounts of volatile compounds, but it is not suitable for measuring time-dependent change (flavor release) of volatile compounds in seconds.

The Direct Analysis in Real Time (DART®) is an atmospheric pressure ionization method which makes it possible to detect volatile compounds directly in real time. Furthermore, by using the volatile compound analysis device “Volatimeship”, volatile compounds can efficiently be guided to the mass spectrometer (MS), which enables the highly sensitive measurement (Figure 1).

For this experiment, the scent of coffee was measured with the DART®-MS-Volatimeship.

**SAMPLE** Drip Coffee

## METHOD

The analysis system was composed of DART® ion source and a mass spectrometer with the Volatimeship connected in between. (Figure 1 (B)).

10 mL of coffee was placed in a 40 mL vial, which was then sealed. An empty vial was first measured by the mass spectrometer as a negative control.

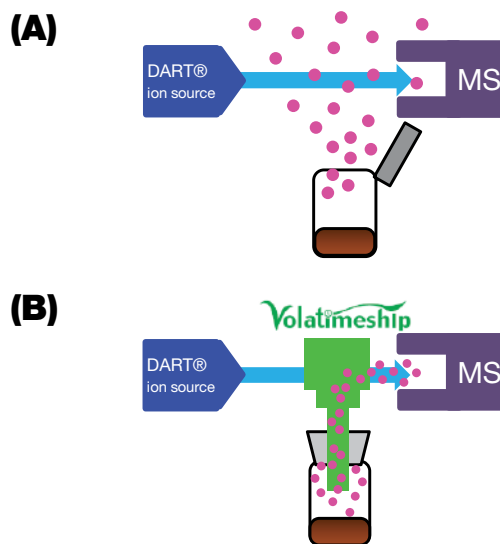
The vial with coffee was set, and the coffee scent was measured in a time-dependent manner with the MS.

## RESULTS

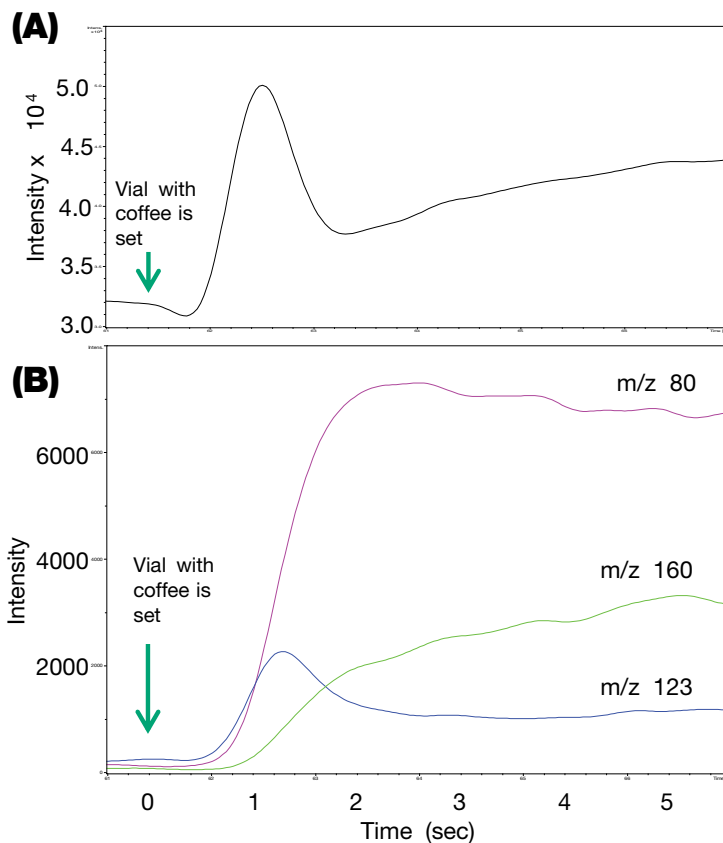
The total ion current gram (TIC) is shown in Figure 2 (A). The vial with the coffee sample was placed on the apparatus at 0 sec. Immediately after the vial was set, the TIC increase was detected.

The extracted ion current gram (EIC) of  $m/z$  80, 123, 160 are shown in Figure 2 (B).  $m/z$  123 was gradually attenuated after the rise, and  $m/z$  160 gradually increased. The release behavior of  $m/z$  80 was detected once the vial was set.

By combining Volatimeship with DART®-MS, it enables to detect the release behavior (flavor release) of volatile compounds from coffee in real time in seconds.



**Figure 1. Configuration**  
(A) DART®-MS only (B) DART®-MS and Volatimeship



**Figure 2. Analysis results of coffee scent**  
(A) TIC (B) EIC

**TARGET** Coffee | Scent | Volatile compounds | Flavor release | Volatimeship

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