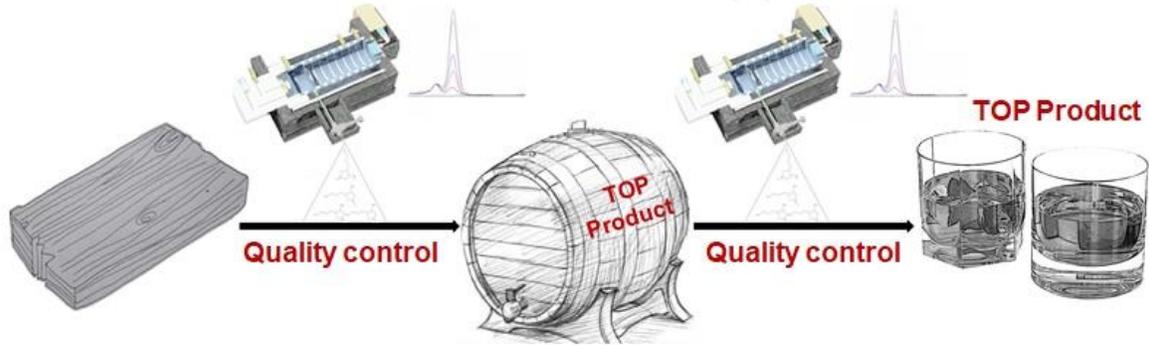


## Fast Quantification of Whisky Lactone in Oak Wood by Advanced Ion Mobility Spectrometer - AIMS



Whisky lactone (WL) in oak staves / barrels has the biggest share in the resulting taste of beverages. The quantity of WL in oak wood have strong effect on quality of final products. Based on WL quantity, the barrel's staves are divided into ten categories. This categories are *category1* (0-7  $\mu\text{g/g}$ ),....., *category10* (63-70  $\mu\text{g/g}$ ). In this application report we are introducing the ion mobility spectrometer as useful tool for fast monitoring and quantification of whisky lactone in oak wood. The ion mobility spectrometry technique offers advantages like high sensitivity (ppb range), fast response, compact design, operation in atmospheric pressure and ability to separate the isomeric compounds.

The oak wood samples of 10 different categories based on WL quantity was used for this application. The whisky lactone of analytical grade purity (*Sigma-Aldrich*) was used as reference compound. The experimental conditions are listed in table 1.

Sample quantity	1g
Sample preparation	10min
Analytical time	7s
Sampling technique	Headspace
Operation	Manual/Autosampler

Table 1. Experimental conditions for Whisky Lactone quantification

The AIMS response of WL standard is shown in figure 1.

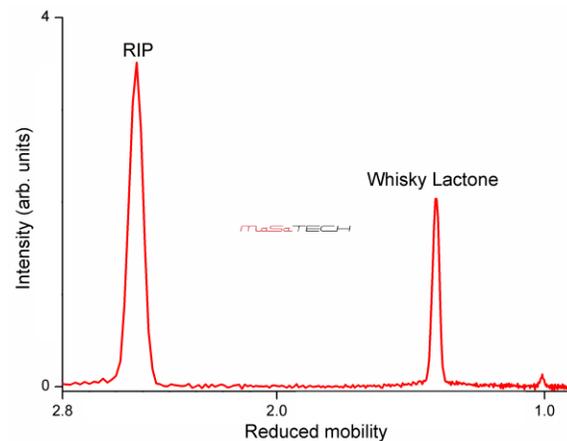


Figure 1. The AIMS response of WL standard

The reached detection limit for WL standard was 50 ppb. The concentration course for WL standard is shown in figure 2.

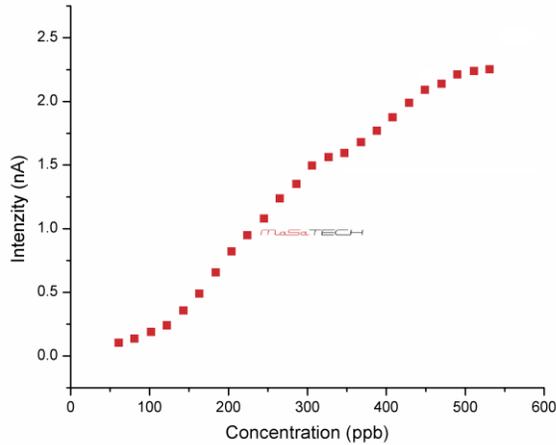


Figure 2. The AIMS concentration course for WL

The AIMS response for oak wood samples of categories 1 to 10 are listed in table 2. In this table, the category 1 represents the oak wood with lowest concentration of WL and is considered for Quality Level 1. On the other hand, the highest concentration of WL in oak wood belongs to Quality Level 10.

Category	AIMS response (nA)
1	0.262
2	0.329
3	0.653
4	0.937
5	1.26
6	1.302
7	1.394
8	1.454
9	1.485
10	1.729

Table 2. AIMS response for WL of categories 1...10

As we can see from table 2, the AIMS for oak wood of different categories is not absolutely linear. We assigned this behavior to a quite big range of WL contents in each category and the exact concentration of WL wasn't known to us. The AIMS spectra of oak wood samples of quality level 2, 6 and 9 are shown on figure 3.

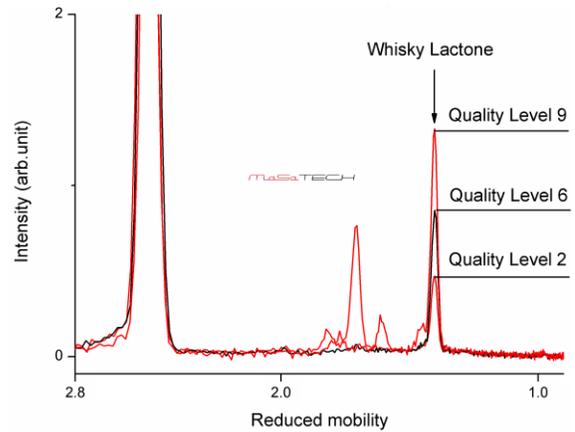


Figure 3. The AIMS response for oak wood samples of categories 2, 6 and 9

In this short application report, we have demonstrated the ability of AIMS instrument for fast monitoring of Whisky Lactone in oak wood.

The main advantages of AIMS, compared to other analytical techniques, are:

- Lower price
- Zero operation cost
- Easy manipulation
- Fast response