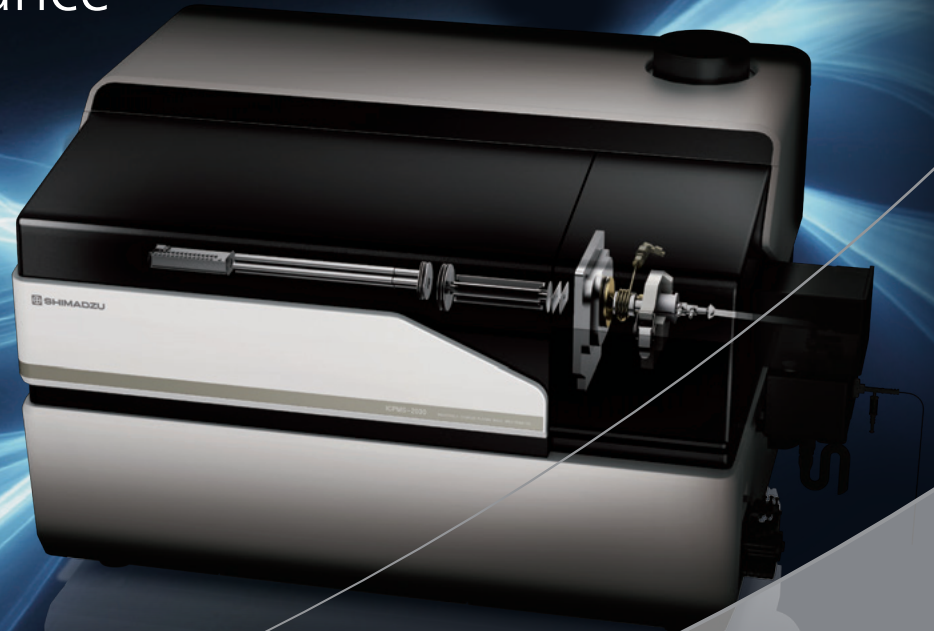


Accelerating Reliable Performance



Shimadzu ICPMS-2030 Inductively Coupled Plasma Mass Spectrometer

Quantitation of Trace Elements in Beer Using Shimadzu ICPMS-2030 Inductively Coupled Plasma Mass Spectrometer

- ▶ A newly developed collision cell provides high sensitivity and low interference.
- ▶ A unique system developed by Shimadzu results in the industry's lowest running costs*.

*As of February 2016, based data obtained by Shimadzu

Quantitation of Trace Elements in Beer Using the ICPMS-2030

Raw materials and the brewing process affect the concentrations and speciation of trace elements included in beer. Such trace elements can have a significant effect on the taste, color, shelf-life, and the safety of beer. The ICPMS-2030 allows the precise measurement of the trace elements in beer at low cost.

Sample Pretreatment and Measurement Procedures

Two kinds of undiluted commercial beer were measured with the ICPMS-2030 after they were degassed. The concentrations of Ni, Cd, Sb and Pb in the undiluted beer were determined by the calibration curve method (internal standard method). Figure 1 shows the calibration curve of Pb.

System Configuration

▶ ICPMS-2030



▶ AS-10 Autosampler



Measurement Conditions

RF Power	1.2 kW
Plasma Gas Flow Rate	8.0 L/min
Aux. Gas Flow Rate	1.10 L/min
Carrier Gas Flow Rate	0.65 L/min
Sample Introduction	Nebulizer 07
Spray Chamber	Electronically-cooled Cyclonic
Torch	Shimadzu mini-torch
Collision Gas	He
Conc. of Standards	0, 2, 5, 10 µg/L (in 5% EtOH)
Internal Standards	10 µg/L Ga, In, Tl

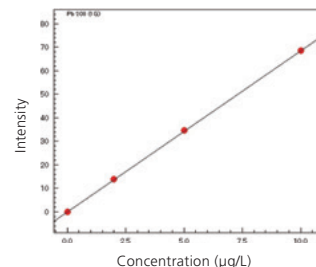


Fig.1 Calibration Curve for Pb

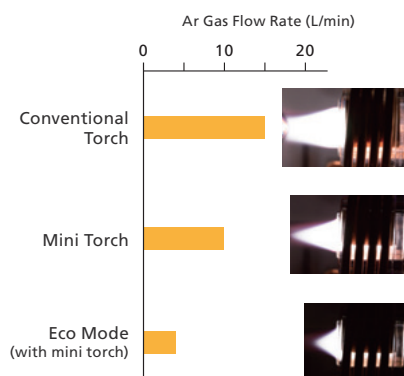
Measurement Results

Table 1 shows the measurement results. The collision cell provides high sensitivity and low interference, the detection limit of the ICPMS-2030 for Ni, Cd, Sb and Pb is much lower than their concentrations in the beer obtained by the measurement. The additional recovery for each element is within 10% of deviation.

Table 1 Measurement Results for Trace Elements in Beer

Measured Element	Ni	Cd	Sb	Pb
Mass Number	60	111	121	208
Detection Limit (3σ) (µg/L)	0.007	0.002	0.0006	0.0004
Beer 1 (µg/L)	4.4	0.051	0.16	0.15
Beer 2 (µg/L)	1.8	0.007	0.23	0.095
Additional Recovery (%)	107	101	108	101

Shimadzu's proprietary mini-torch plasma system significantly reduces running cost by reducing argon gas consumption and using lower-purity argon gas.



1. Unique combination of mini-torch and eco mode developed by Shimadzu reduces consumption of argon by 50% compared with a conventional torch.

- * Mini-torch Plasma Unit : 10 L/min during measurement (Conventional 18 L/min)
- * Eco Mode: 5 L/min during standby

2. Compatible with low-purity (99.95%) argon

- * Expensive, high-purity (≥99.999%) argon no longer necessary



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