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# The Use of D<sub>2</sub> Collision Gas in Isotope Dilution for the Analysis of Se with Octopole Reaction Cell Inductively Coupled Plasma-<sup>81</sup>Se-Mass Spectrometry

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## **Abstract**

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D<sub>2</sub> was used as a collision/reaction cell gas in Ar inductively coupled plasma–mass spectrometry for the analysis of selenium with an isotope dilution method. In conventional H<sub>2</sub> collision gas, <sup>80</sup>[BrH] was generated by the reaction of collision gas with Br in matrix. The use of D<sub>2</sub> could generate <sup>81</sup>[BrD] instead of <sup>80</sup>[BrH], making it possible for the use of *m/z* 80, which has the highest abundance among Se isotopes. Two collision gases, H<sub>2</sub> and D<sub>2</sub>, were compared with each other for the isotope spikes of <sup>76</sup>Se, <sup>77</sup>Se, and <sup>78</sup>Se. For an inorganic selenium standard, both gases showed good results of 99% accuracy and below 1% Relative Standard Deviation (RSD). However, for complex matrix samples, the results were different. For NIST SRM 1567b (wheat flour), which had a relatively simple matrix, accuracy and precision were similar for both gases. For KRISS CRM 108 (oyster) and NIST SRM 2976 (mussel), which had a relatively high level of Br matrix, deuterium gas showed better accuracy and precision. For H<sub>2</sub>, <sup>77</sup>Se showed the highest accuracy (98.4% recovery) but low precision (3.24% RSD). For deuterium, all three spikes showed good results, 98% average recovery and less than 1% RSD. The use of D<sub>2</sub> collision gas demonstrates that it is effective for the accurate determination of Se, even for a complex matrix.

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- Seo, Young Lee and Yong Nam Pak, Accurate Measurement of Selenoproteins with Affinity HPLC–ICP/MS Using D<sub>2</sub> as a Collision Gas, *Bulletin of the Korean Chemical Society*, **39**, 8, (941-945), (2018).  
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