

Simultaneous multi-elemental speciation of As, Se, and Hg in wild edible mushrooms by HPLC-ICP-MS

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Some wild edible mushrooms have the ability to concentrate elements such as arsenic (As), selenium (Se) and mercury (Hg). The toxicity and bioavailability of these elements to living organisms varies widely depending on their chemical forms, thus, their chemical forms need to be known in order to understand their health effects on living organisms. In this study, simultaneous multi-elemental speciation technique of As, Se, and Hg by HPLC-ICP-MS has been developed to reduce the amount of the sample and analysis time. The presented technique was applied to commercially available wild *Tricholoma matsutakes* to determine the chemical forms of As, Se, and Hg.

A C-18 reversed-phase column was used for the speciation analysis. The eluent was a mixture of methanol, sodium 1-butanedisulphonate, TMAH, and L-cysteine. The pH of eluent was adjusted to 8.0 using malonic acid. This technique is able to separate and detect 8 As compounds (As(III), As(V), MMA, DMA, TMAO, TeMA, AsB, AsC), 5 Se compounds (Se(VI), Se(IV), SeCys, SeMet, Seet), and 2 Hg compounds (Hg(II), MeHg) within 1200 seconds.

The developed technique was used for the speciation analysis of wild *Tricholoma matsutakes*. In the case of As, AsB was the most dominant species in stipe and pileus, while DMA and TMAO were also detected. The As(III), which is considered highly toxic, was not detected in this analysis. On the other hand, the major species of Se differed from site to site, with the highest proportion of inorganic selenium (Se(IV) and Se(VI)) found in the stipe, whereas the highest proportion of SeCys was found in the pileus. Hg(II) was detected only in the pileus, while the highly toxic MeHg was not detected in any part. These results indicate that the concentrations and chemical forms of the elements enriched in *Tricholoma matsutakes* differ according to their site.