S37-4 Development of Analytical Method for Pharmaceuticals in Environmental Water and its Application

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Recently, increasing attention has been paid to the presence and fate of pharmaceuticals excreted and accumulated in aquatic environments. Pharmaceuticals used for humans, animals and fish have been discharged into drinking water, groundwater, river water, wastewater and swage as the active pharmaceuticals and metabolites. Therefore, there is a need to analyze pharmaceutical residues in aquatic environments and to evaluate their adverse effects. The methods so far employed for the ultra-trace assays of pharmaceuticals in aquatic environments include GC-MS, GC-MS/MS, LC-MS and LC-MS/MS following solid-phase extraction (SPE). Traditional SPE sorbents such as silica- and polymer-based materials cannot extract pharmaceuticals in complex matrices efficiently because of lacking in selectivity. Molecular imprinting techniques are very attractive because specific recognition sites for a target molecule could be easily molded in synthetic polymer networks. However, leakage of the trace amount of a template molecule remaining in a molecularly imprinted polymer (MIP) prevents the accurate and precise assay of a target molecule in ultra-trace analysis. To overcome this problem, a MIP has been prepared using its structurally related analogue as a pseudo-template molecule. We prepared RAM-MIP materials, which have characteristics of both restricted access media (RAM) and MIP, by a multi-step swelling and polymerization method followed by a hydrophilic surface modification technique. The RAM-MIPs were applied for selective extraction of antiepileptics and non-steroidal anti-inflammatory drugs in environmental samples.