

9th Edition of International Conference on **Chemistry Science and Technology**
&
11th International Conference & Expo on **Chromatography Techniques**

April 22-24, 2019 Dublin, Ireland

A magnetic porous molecularly imprinted polymer combined with HPLC method for efficient and selective detection of aristolochic acids from rat urine

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Aristolochic Acids (AAs) are the forms of nephrotoxins and mutagens in aristolochia and related plants. However, there is still lack of a fast and specific method for monitoring AAs in biological samples. It is well known that the low-cost molecularly imprinted polymers (MIPs) have an outstanding mechanical robustness, especially its high selectivity for binding and trapping target molecule, which received lots of attention in recent years. Herein, we synthesized a hybrid magnetic mesoporous carbons which are molecularly imprinted polymers (MMC@MIPs) based on pericarpium granati and then used as a novel magnetic solid-phase extraction (MSPE) adsorbent for selective recognition of aristolochic acid I and II in rat urine. The choline chloride/glycol-based deep eutectic solvent was used as the eluent and indomethacin as dummy template molecule accordingly. The optimum conditions of the MMC@MIPs-MSPE procedure were also optimized when well combined with high performance liquid chromatography (HPLC). Results showed that the proposed method had a relatively satisfactory recovery (86.7 – 94.3%), with low standard deviation (< 4.85%) and acceptable correlation coefficients (0.991-0.996). Overall, this work not only provides an inexpensive and eco-friendly method to fabricate MMC@MIPs but also develops a highly promising approach for the detection of aristolochic acid I and II in biological samples.