Electronic Supplementary Material (ESI) for Analytical Methods.

Based on a Novel Magnetic Metal–organic Framework Absorbent for Rapid Detection Aflatoxins $B_1B_2G_1G_2$ in Rice by HPLC-MS/MS

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Synthesis of Fe_3O_4@UiO-66

Fe_3O_4@UiO-66 materials were prepared implementing a simple solvent–thermal method according to the published procedure [1, 2] with small modifications. In detail, $ZrCl_4$ (0.15 g), terephthalic acid (0.13 g), and the newly synthesized Fe_3O_4 nanoparticles (0.2 g) were dissolved in 80 mL of DMF. Subsequently, 4 mL of acetic acid were added to the solution. The solution thus obtained was transferred to a Teflon autoclave, which was heated at 130 °C for 12 h. Afterwards, the reaction mixture was left to cool down to room temperature. Finally, the magnetic nanocomposites were collected and washed three times with ultrapure water and Ethanol. The MMOFs thus isolated were dried at 70 °C overnight.

Synthesis of Fe_3O_4@UiO-66-COOH

Fe_3O_4@UiO-66-COOH materials were prepared by solvent–thermal method [2][3] with small modifications. In detail, $ZrCl_4$ (0.93 g), 1,2,4-Benzenetricarboxylic acid (0.85 g), and the newly synthesized Fe_3O_4 nanoparticles (1 g) were dissolved in 17.5 mL of water. Subsequently, 2 mL of HCl was added to the solution. The solution thus obtained was transferred to a Teflon autoclave, which was heated at 100 °C for 24 h. Afterwards, the reaction mixture was left to cool down to room temperature. Finally, the magnetic nanocomposites were collected and washed three times with ultrapure water and Methanol. The MMOFs thus isolated were dried at 70 °C overnight.

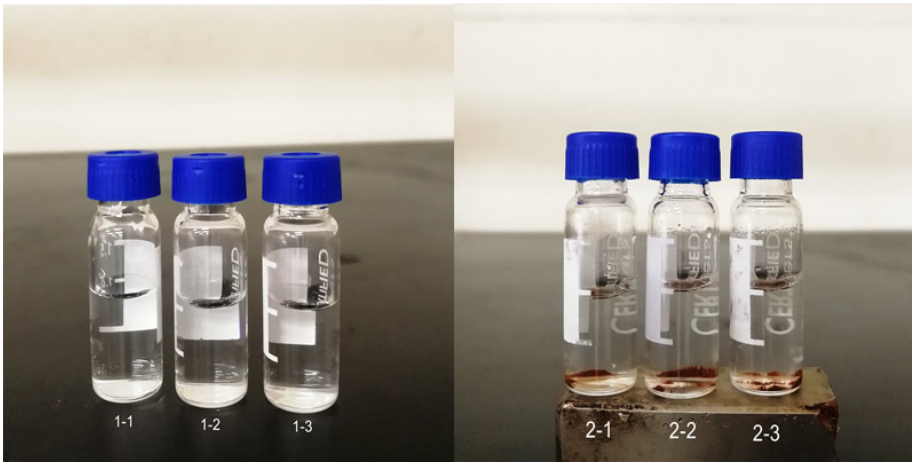


Fig. S1. Comparison of photos before purification (1-1,1-2,1-3) and after purification (2-1,2-2,2-3)

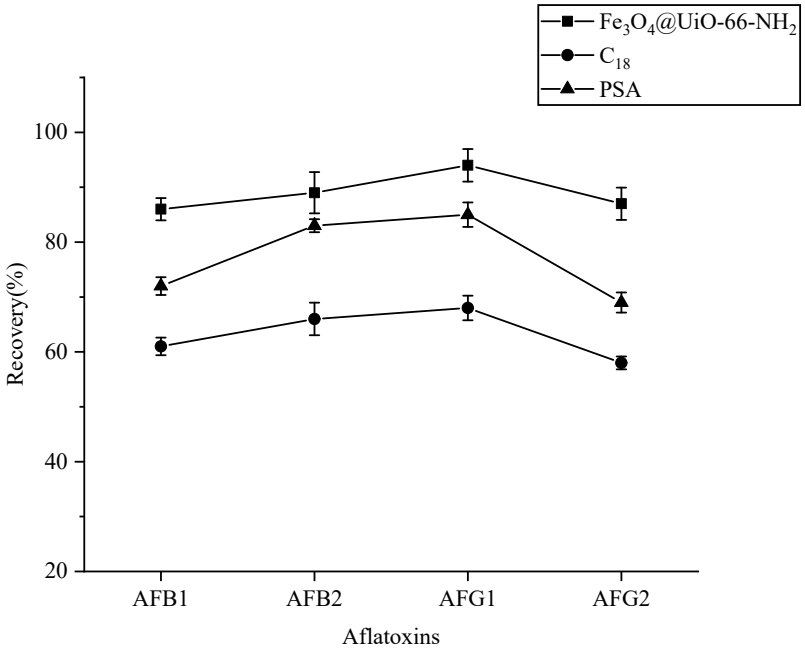
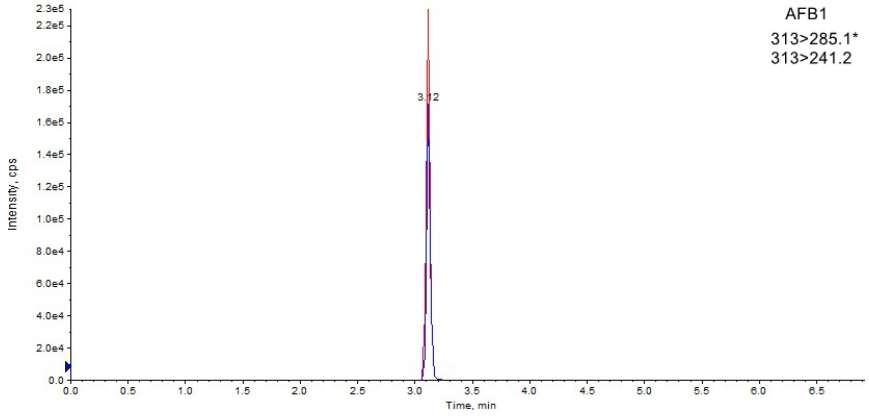
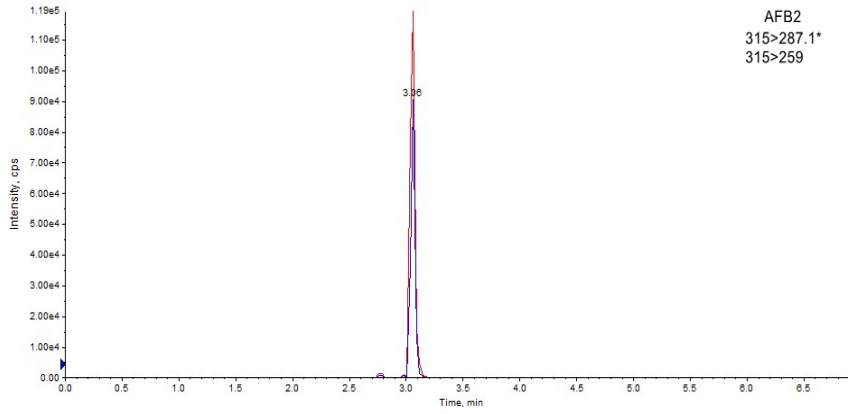
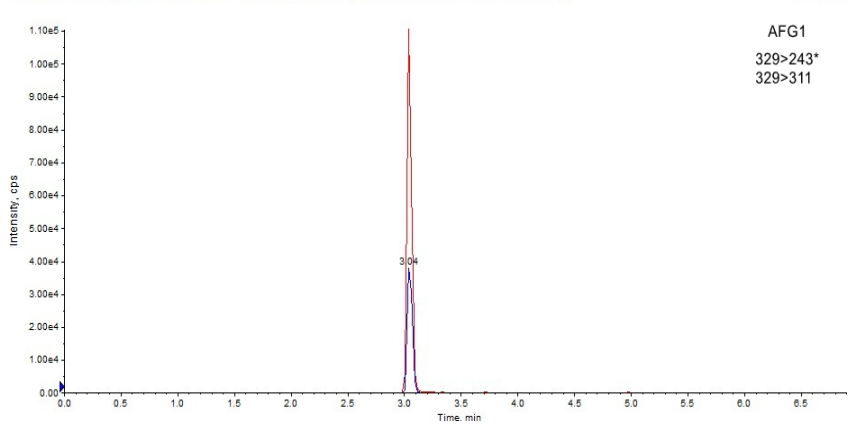


Fig. S2. Comparison of the recovery rates obtained for the purification of rice samples using Fe_3O_4@UiO-66-NH_2, C18, and primary secondary amine (PSA) as adsorbents.


AFB1
313>285.1*
313>241.2
3.12
Intensity, cps
Time, min


AFB2
315>287.1*
315>259
3.06
Intensity, cps
Time, min


AFG1
329>243*
329>311
3.04
Intensity, cps
Time, min

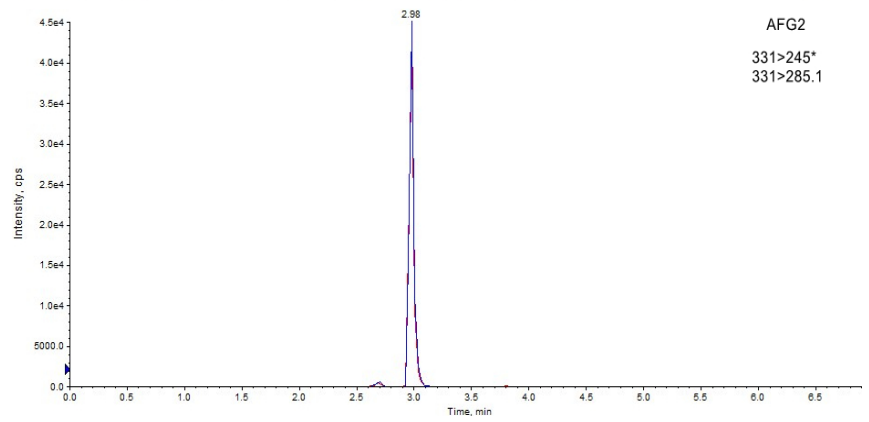

AFG2
331>245*
331>285.1
2.98
Intensity, cps
Time, min

Fig. S3. Chromatograms of the four AFs in rice samples

Reference

1. Kalaj, M., Palomba, J. M., Bentz, K. C., Cohen, S. M., Multiple functional groups in UiO-66 improve chemical warfare agent simulant degradation. *Chem Commun (Camb)*. 2019, *55*, 5367-5370.

2. Far, H. S., Hasanzadeh, M., Nashtaei, M. S., Rabbani, M., Haji, A., Hadavi Moghadam, B., PPI-Dendrimer-Functionalized Magnetic Metal–Organic Framework (Fe3O4@MOF@PPI) with High Adsorption Capacity for Sustainable Wastewater Treatment. *ACS Applied Materials & Interfaces*. 2020, *12*, 25294-25303.

3. Khabzina, Y., Dhainaut, J., Ahlhelm, M., Richter, H. J., Reinsch, H., Stock, N., Farrusseng, D., Synthesis and Shaping Scale-up Study of Functionalized UiO-66 MOF for Ammonia Air Purification Filters. *Industrial and engineering chemistry research*. 2018, *57*, 8200-8208.