Electronic Supplementary Material (ESI) for Analytical Methods.

A magnetic restricted access material for rapid solid-phase extraction of multiple macrolide antibiotics in honey

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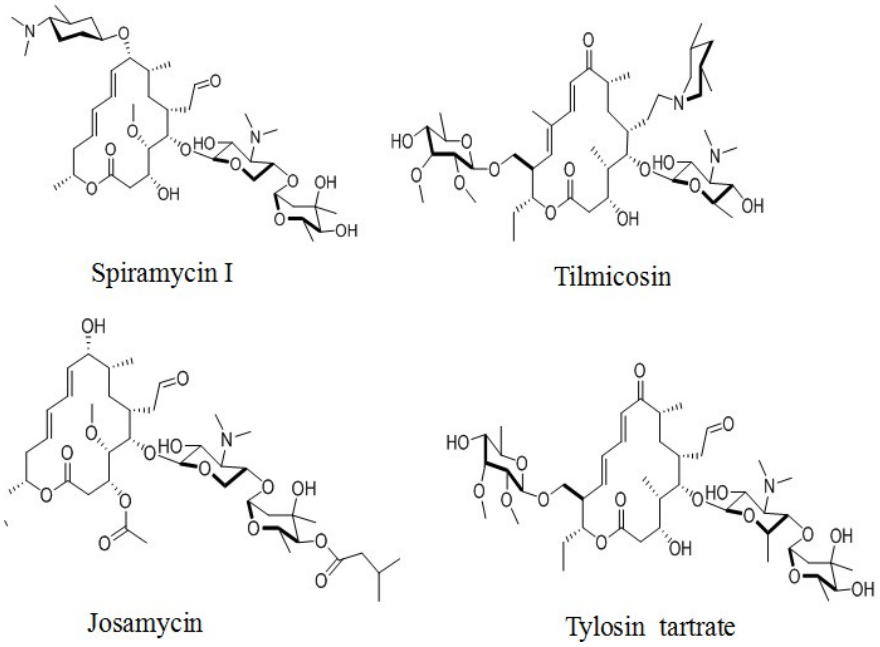


Scheme S1 Chemical structures of four MACs (SPI, JOS, TILM, TYL)

Exclusion of protein by MRAM

50 mg dry MRAM particles were firstly activated by flushing with methanol and water, followed by the addition of 20 mL BSA solution (100 μg/mL) in phosphate buffers (pH=7.6). After ultrasonic treatment for 5 min, the MRAM particles were isolated from the solution by the magnetic field. The left BSA concentration in the solution measured by CE was compared with that of the original solution. In addition, the MRAM was washed by deionized water and finally eluted by phosphate buffers, the corresponding fractions were collected for further measurement by CE.

Static adsorption isotherms and adsorption kinetics of MRAM

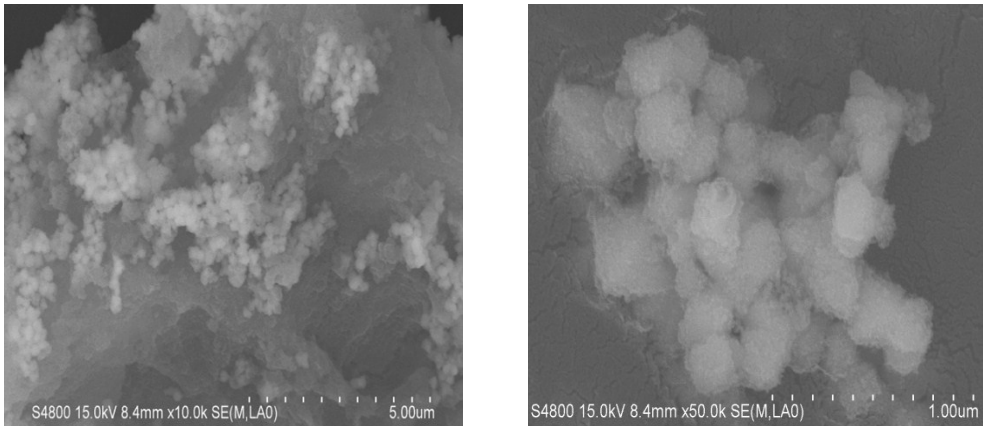
The measurement method was similar to that previously described[1]. 5 mg MRAM was added in a 50.0 mL conical flask containing 50.0 mL TYL solution with concentration ranging from 1.0 μg/mL to 30.0 μg /mL. After the mixture was well

dispersed ultrasonically for 5 min, the polymers were isolated from the solution by an external magnetic field. The eluted adsorption amount (Q, μg/mg) of TLY from the polymers was determined by following equation:

$$Q = \frac{(C - C_t)V}{m}$$

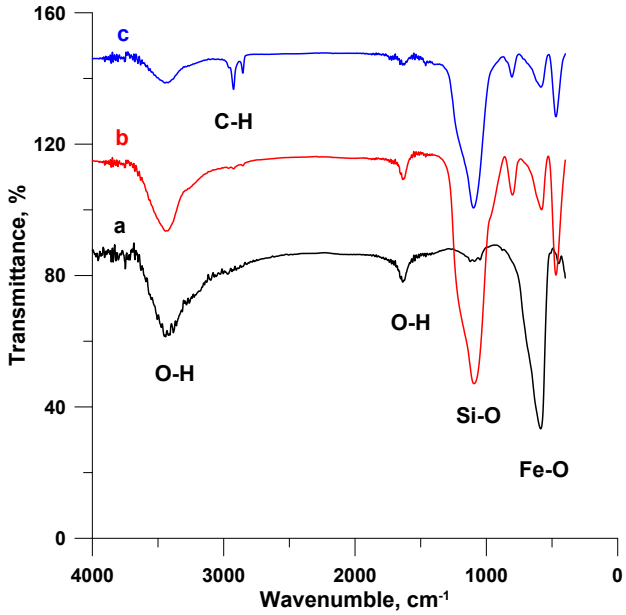
Where C (mg/mL) and C_t (mg/mL) is the initial and final TYL concentration, respectively. V (mL) is the sample volume and m (g) is the mass of MRAM.

Adsorption kinetic studies were carried out as follows. 1.0 mg MRAM was added in 50.0 mL TYL solution with concentration of 0.1 μg/mL and the MRAM was then taken at defined intervals (1 min) and the eluted TYL amount was determined by HPLC.

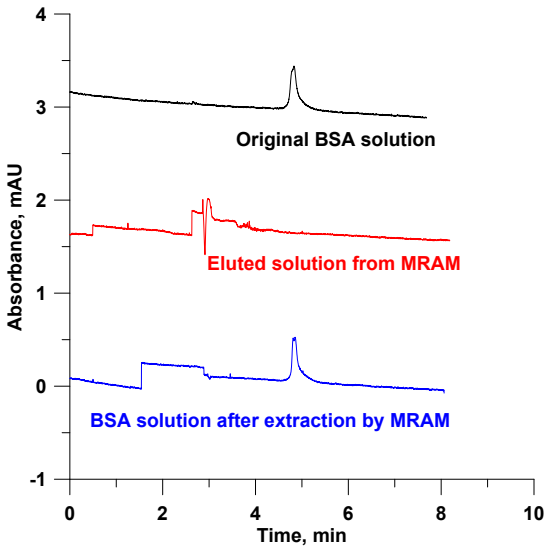


SI-Fig. 1 SEM images of the synthesized MRAM

Note: the particles look like agglomeration while they are easily dispersed in the solution via ultrasonic treatment.

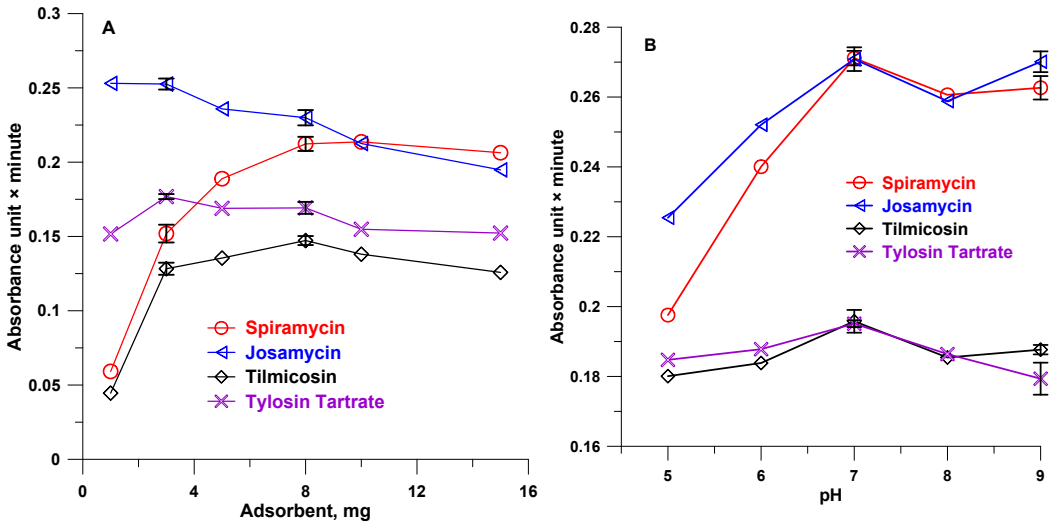


SI-Fig. 2 FT-IR spectra of a, Fe_3O_4; b, Fe_3O_4@SiO_2 and c, MRAM.



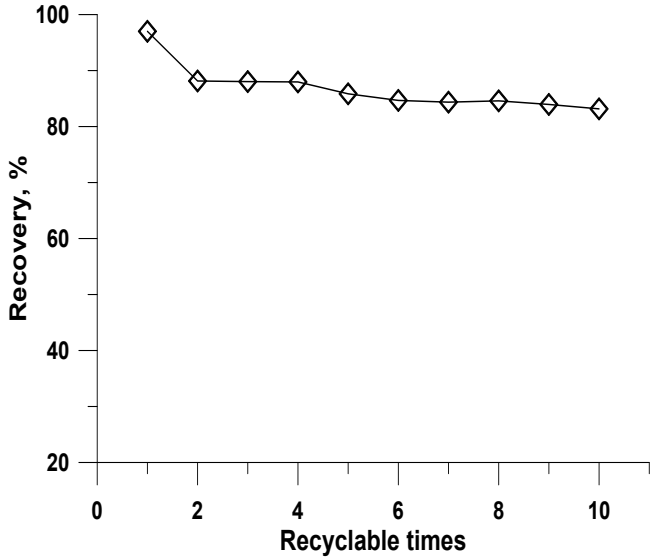
SI-Fig. 3 Protein exclusion by MRAM

Conditions: sorbent amount, 50 mg; sample volume, 20 mL; BSA concentration, 100 μg/mL (PBS=7.6); sonication time, 10 min; fused silica capillary, 50 μm; Effective length, 50 cm; voltage, 25 kV; Injection time:10 s; UV detection wavelength, 214 nm; 10 mM PBS for equilibrium and 20 mM PBS for analysis. Note: to make convenient comparison, the y-axis of each chromatogram was artificially adjusted.



SI-Fig. 4 Optimization of extraction conditions

(A) The effect of adsorbent amount; (B) the effect of pH value of sample matrix Conditions: A, sample volume, 20 mL; MACs concentration, 0.1 μg/mL ; B, sorbent amount, 8 mg; sample volume, 20 mL; MACs concentration, 0.5 μg/mL; Other conditions same as Fig 4.



SI-Fig.5 Recyclable use of MRAM

Conditions: sorbent amount, 8 mg; sample volume: 50 mL; TYL concentration, 0.1 μg/mL; other conditions same as Fig. 4.

Reference

1. S. L. Ji, F. F. Zhang, X. Luo, B. C. Yang, G. W. Jin, J. Y. Yan and X. M. Liang, *J. Chromatogr. A*, 2013, 1313, 113-118.