Electronic Supplementary Material

Molecularly-imprinted technology for electrochemical sensing of kasugamycin in food products based on Cu^{2+}/Cu^{+} stripping current

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Preparation of samples

To analyze a meat sample, a 5.0 g portion was placed in a 50 mL centrifuge tube. Then, 10 mL of a 5% aqueous phosphoric acid solution was added to the tube, and the contents were thoroughly mixed. Next, 2 mL of trichloroacetic acid solution was added to the mixture. The tube was then subjected to centrifugation at 5000 rpm for 15 min. After centrifugation, the supernatant was evaporated to dryness using nitrogen gas in a water bath set at 60℃. The resulting residue was subsequently dissolved in 5.0 mL BR buffer with a pH of 6.0.

In the analysis of milk, 2.0 g of the sample was added to a centrifuge tube along with 10 mL of a 5% aqueous phosphoric acid solution. The tube was then subjected to sonication for 8 min. to facilitate the mixing process. Following this, 1.5 mL of trichloroacetic acid was added to the solution, which was further mixed for 1 minute using a vortex mixer. The resulting mixture was then centrifuged, and the supernatant was evaporated to dryness using nitrogen gas in a water bath maintained at 60℃. The resulting residue was subsequently dissolved in 5.0 mL of BR buffer with a pH of 6.0.

To analyze cucumber, a 5.0 g portion was placed in a 50 mL centrifuge tube. Then, 10 mL of a 5% aqueous phosphoric acid solution was added to the tube, and the contents were thoroughly mixed. The tube was then subjected to centrifugation at 5000 rpm for 15 min. After centrifugation, the supernatant was evaporated to dryness using nitrogen gas in a water bath set at 60℃. The resulting residue was subsequently dissolved in 5.0 mL BR buffer with a pH of 6.0.

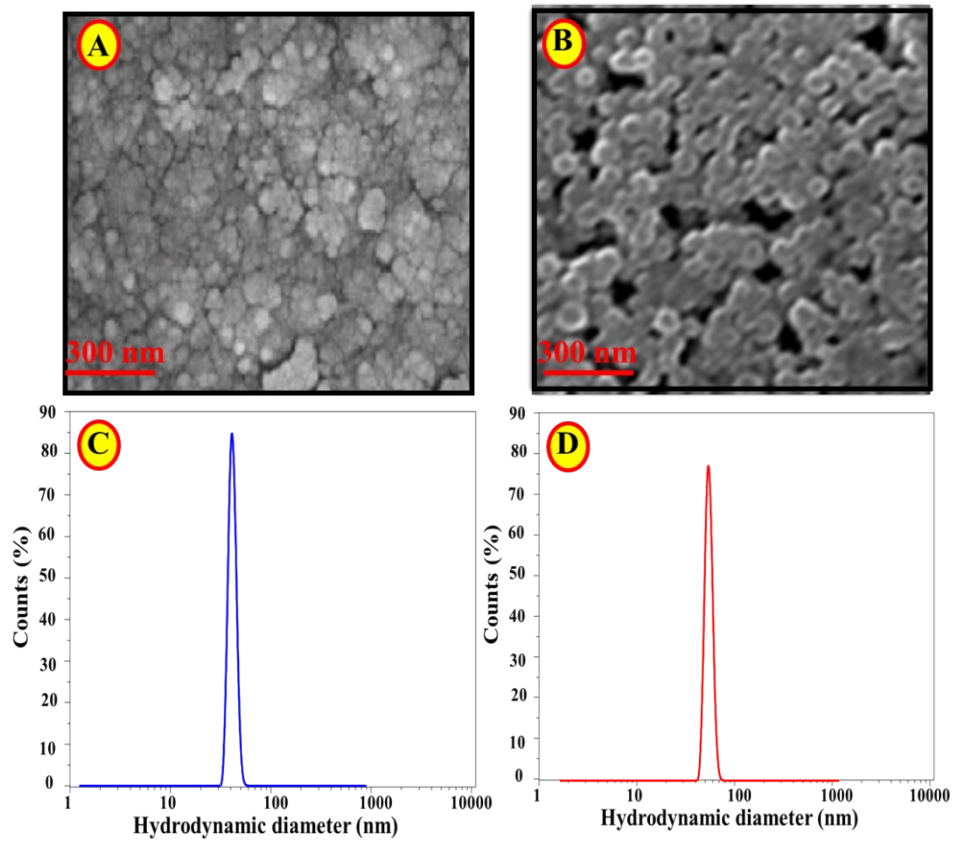


Fig.S1 SEM images of NIP (A) and MIP (B) while (C) and (D) are DLS of MIPs and NIPs, respectively.

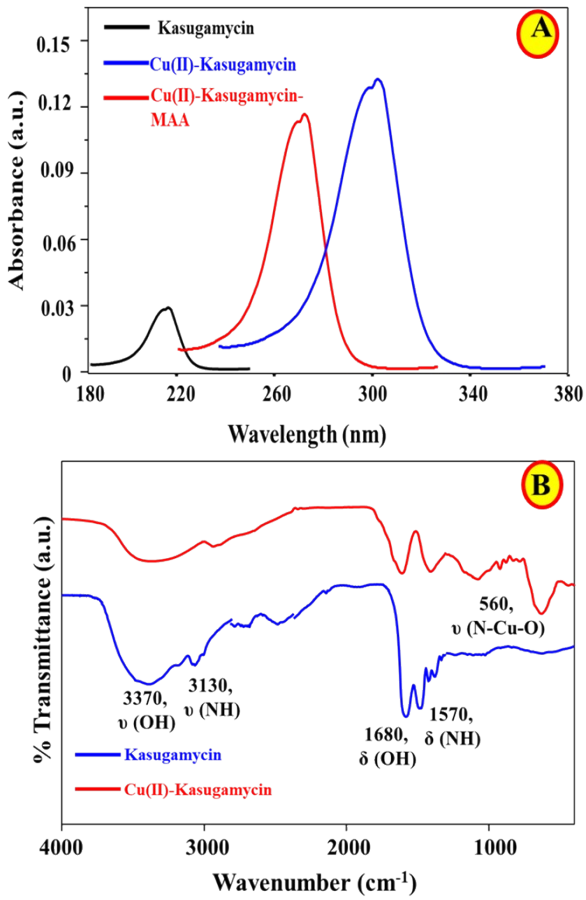


Fig.S2 (A) UV spectra of kasugamycin, Cu(II)- kasugamycin, Cu(II)- kasugamycin-MAA; (B) FTIR spectra of kasugamycin and Cu(II)- kasugamycin.

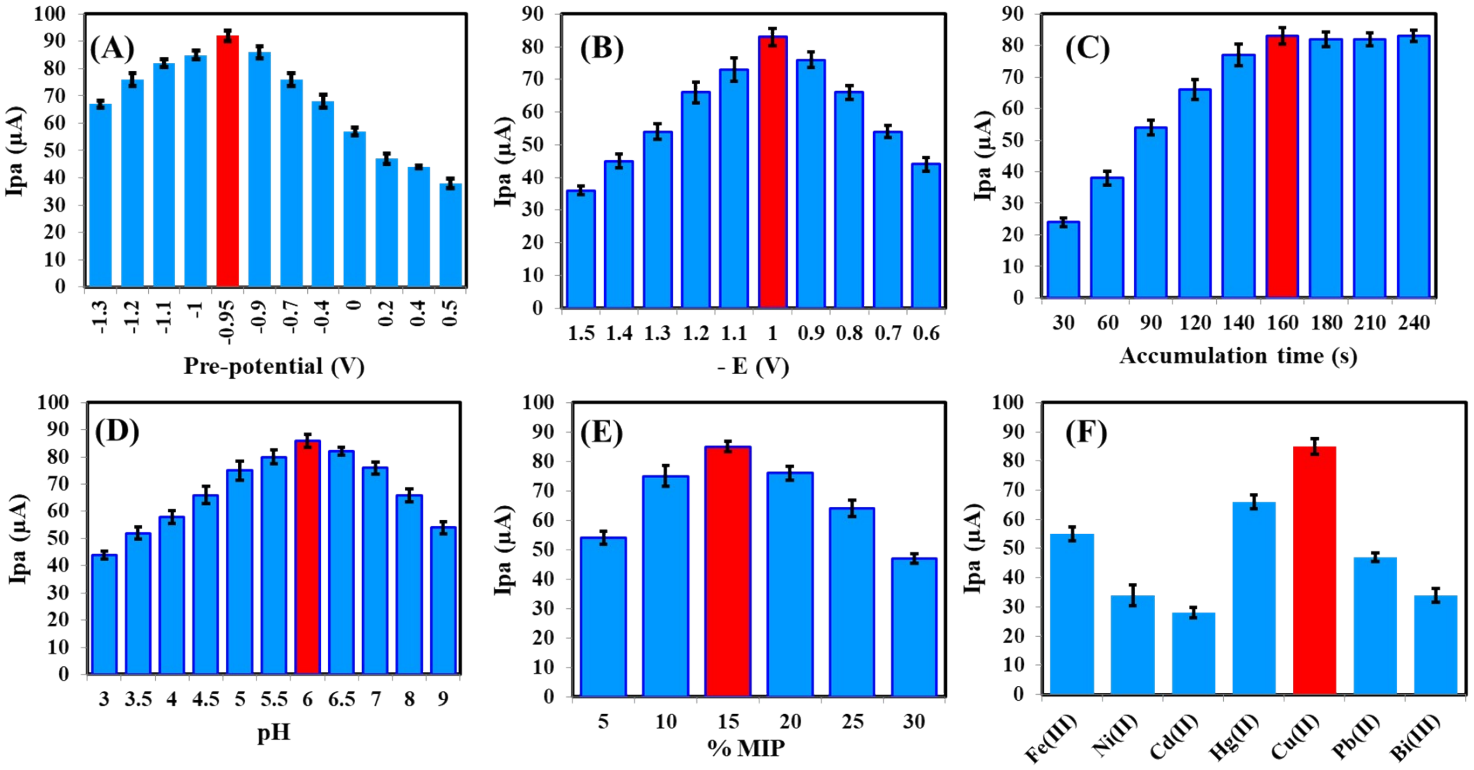
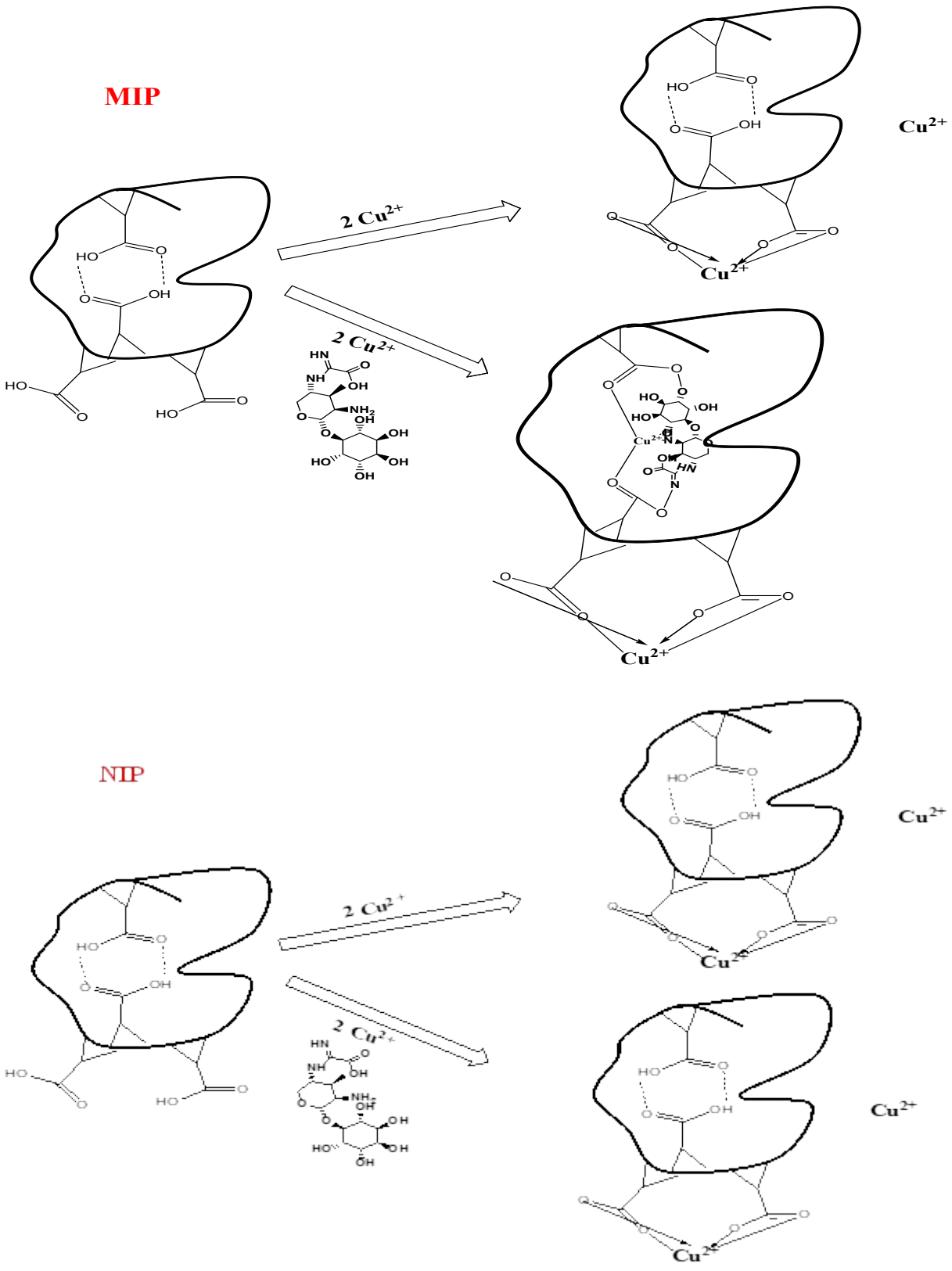


Fig.S3 The influence of pre-potential (A), accumulation potential (B), accumulation time (C), pH value (D), percentage of MIP (E), and metal type (400 µL, 0.45 mM) (F) on the electrochemical determination of 60 µM kasugamycin using MIP@CP.



Scheme S1 Schematic representation of kasugamycin signal creation in the MIP@CPE and NIP@CP.

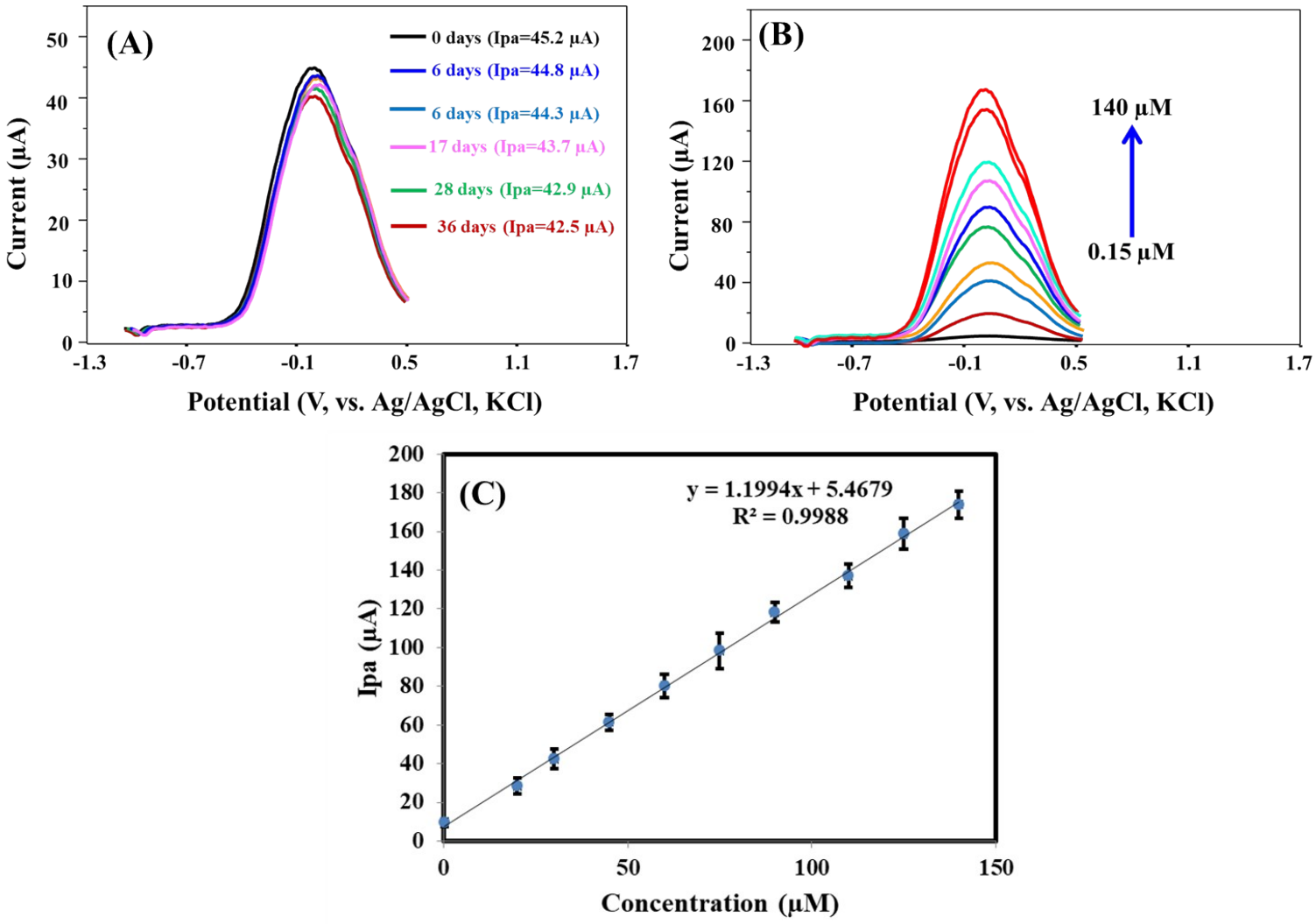


Fig.S4 (A) DPV scans of Cu(II)-MIP@CP sensor for determination of 30 µM kasugamycin over a period of 36 days; (B) DPV scans of Cu(II)-MIP@CP sensor for determination of kasugamycin (0.15-140 µM) after 36 days; (C) Calibration plot between Ipa and concentration of kasugamycin after 36 days. Optimized conditions used for DPV are accumulation time, pulse-width, pulse-period, step-height, pulse-height, and quiet-time, which are set at 160 s, 25 ms, 0.5 s, 30 mV, 20 mV, and 10 s, respectively.

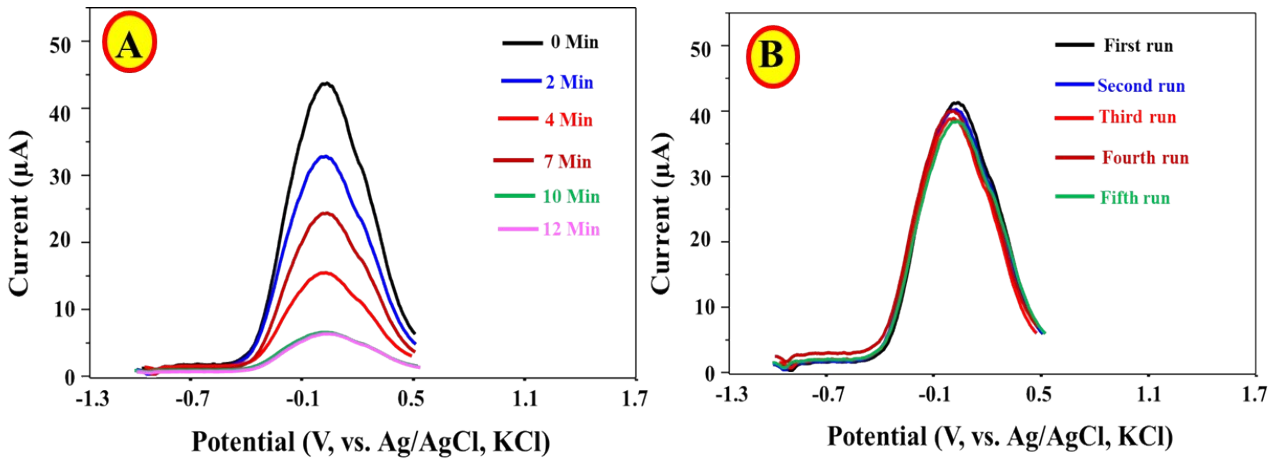


Fig.S5 (A) DPV scans of MIP@CP sensor for removal of Cu(II)- kasugamycin at different times (0-10 Min) after washing with a mixture of H_2O and 0.2 M HCl (95:5, v/v). (B) Reusability of the proposed sensor for determination of 30 µM kasugamycin for five runs. Optimized conditions used for DPV are accumulation time, pulse-width, pulse-period, step-height, pulse-height, and quiet-time, which are set at 160 s, 25 ms, 0.5 s, 30 mV, 20 mV, and 10 s, respectively.