

Supporting Information

Tea Polyphenol Increases Nanoplastics Release from Plastic Cups but Mitigates Potential Detrimental Effects during Simulated Tea Drinking

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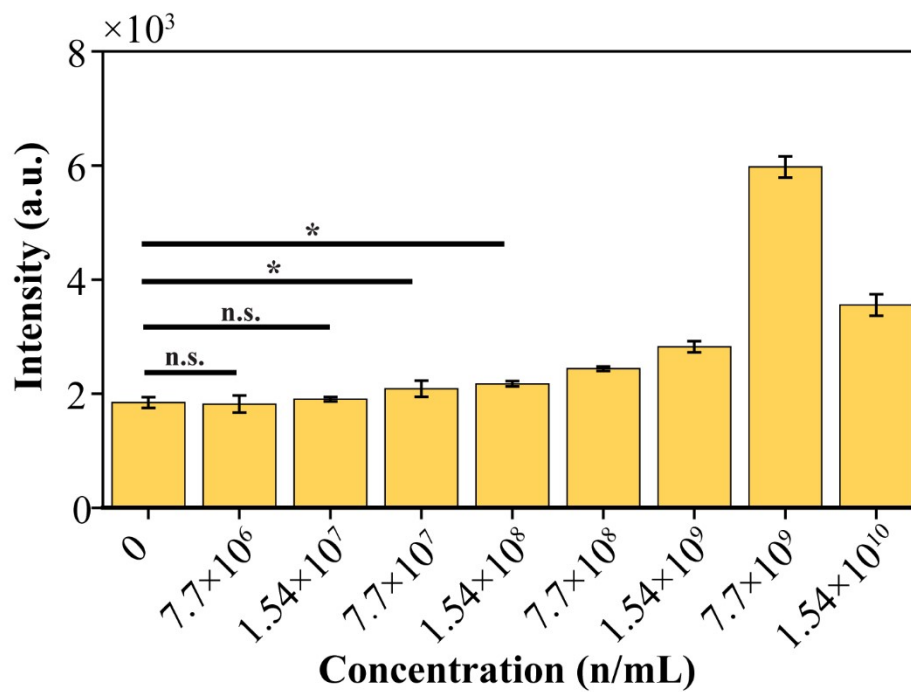


Figure S1. SERS detection of nanoplastics utilizing EGCG-based L-MPNs labeling method. Data are represented as mean \pm SD of three technical replicates. The label "ns" denotes no significant difference, whereas the asterisk "*" signifies a statistically significant difference with a p-value $<$ 0.05, as determined by the t-test.

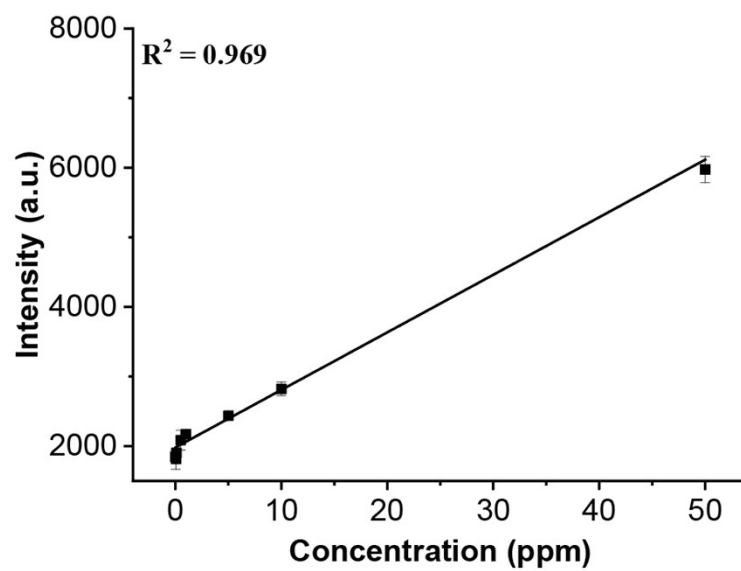


Figure S2. Investigation of the relationship between the concentration of NPs and the SERS characteristic peak intensity at 1357 cm^{-1} from L-MPNs employing linear regression model.

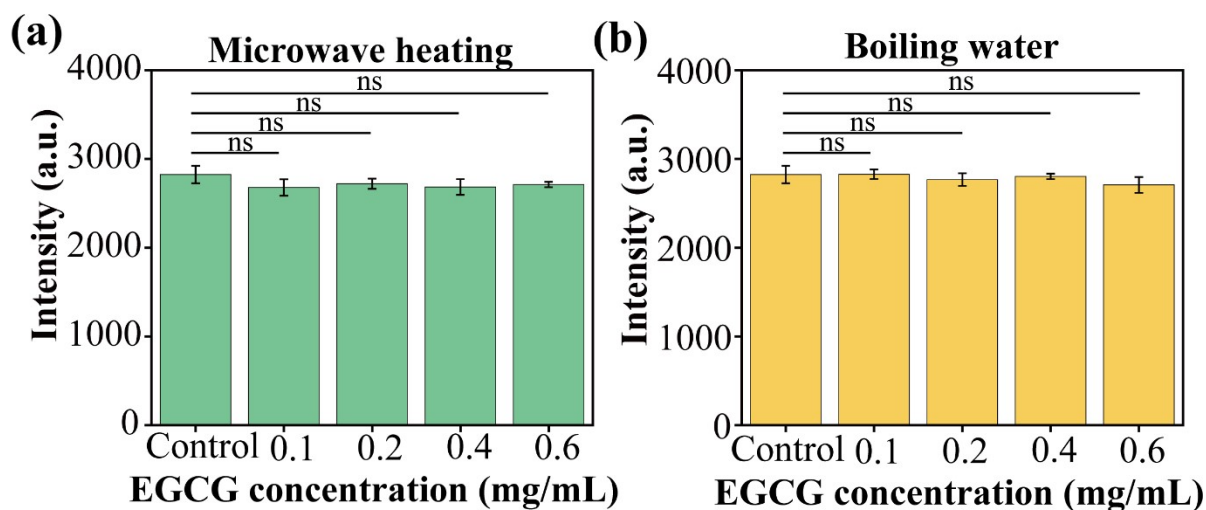


Figure S3. Impact of heating methods on SERS intensity using L-MPNs labeling during simulated tea consumption. (a) SERS intensity at 1357 cm^{-1} (from RhB) for PS NPs of 10 ppm, under varying EGCG concentrations (0.1, 0.2, 0.4, 0.6 mg/mL) using microwave heating for 180 s. (b) SERS intensity at 1357 cm^{-1} (from RhB) for PS NPs of 10 ppm, under varying EGCG concentrations (0.1, 0.2, 0.4, 0.6 mg/mL) using boiling water conditions. Post-heating, each sample was supplemented with additional EGCG to achieve a final concentration of 1 mg/mL. Data are expressed as mean \pm SD from three technical replicates. The notation "ns" indicates no significant differences as determined by a t-test.

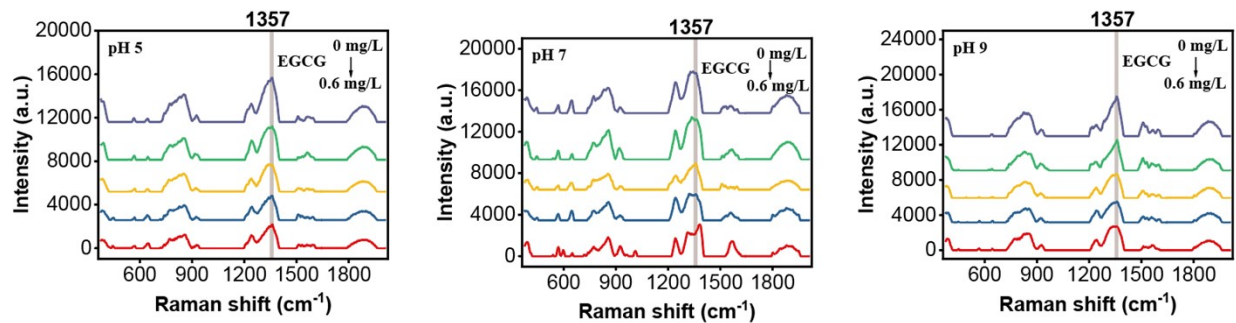


Figure S4. SERS spectra of NPs release across various EGCG concentrations (0, 0.1, 0.2, 0.4, 0.6 mg/mL) and pH conditions (5, 7, 9) in boiling water.

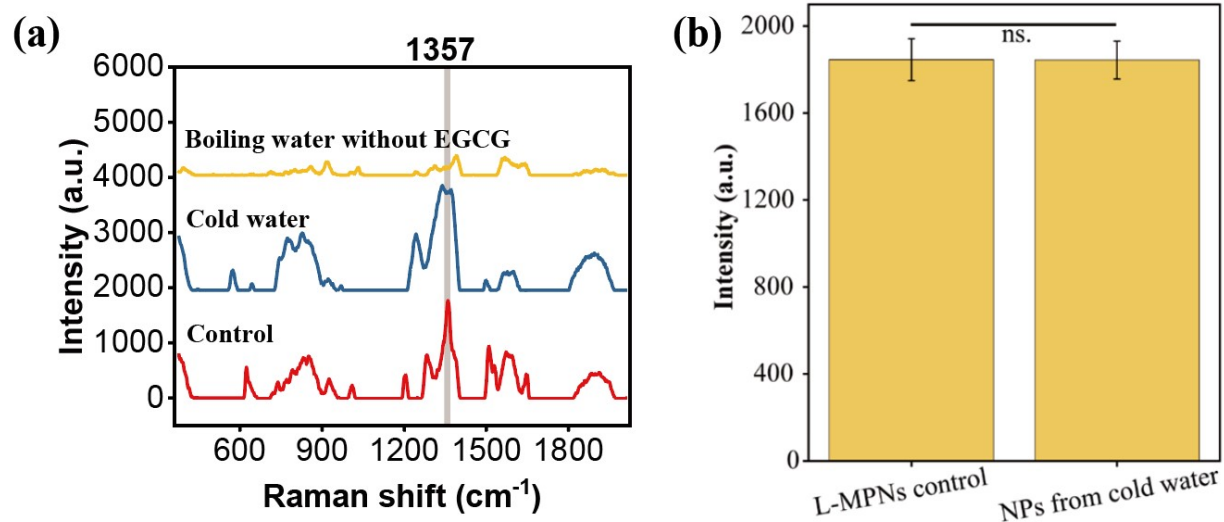


Figure S5. Control study. (a) SERS spectra of L-MPNs control, NPs from cold water following L-MPNs labeling and boiling water samples from PS cups without EGCG added. (b) SERS intensity at 1357 cm⁻¹ for L-MPNs control, NPs from cold water following L-MPNs labeling. "ns" indicates no significant difference as determined by a t-test.

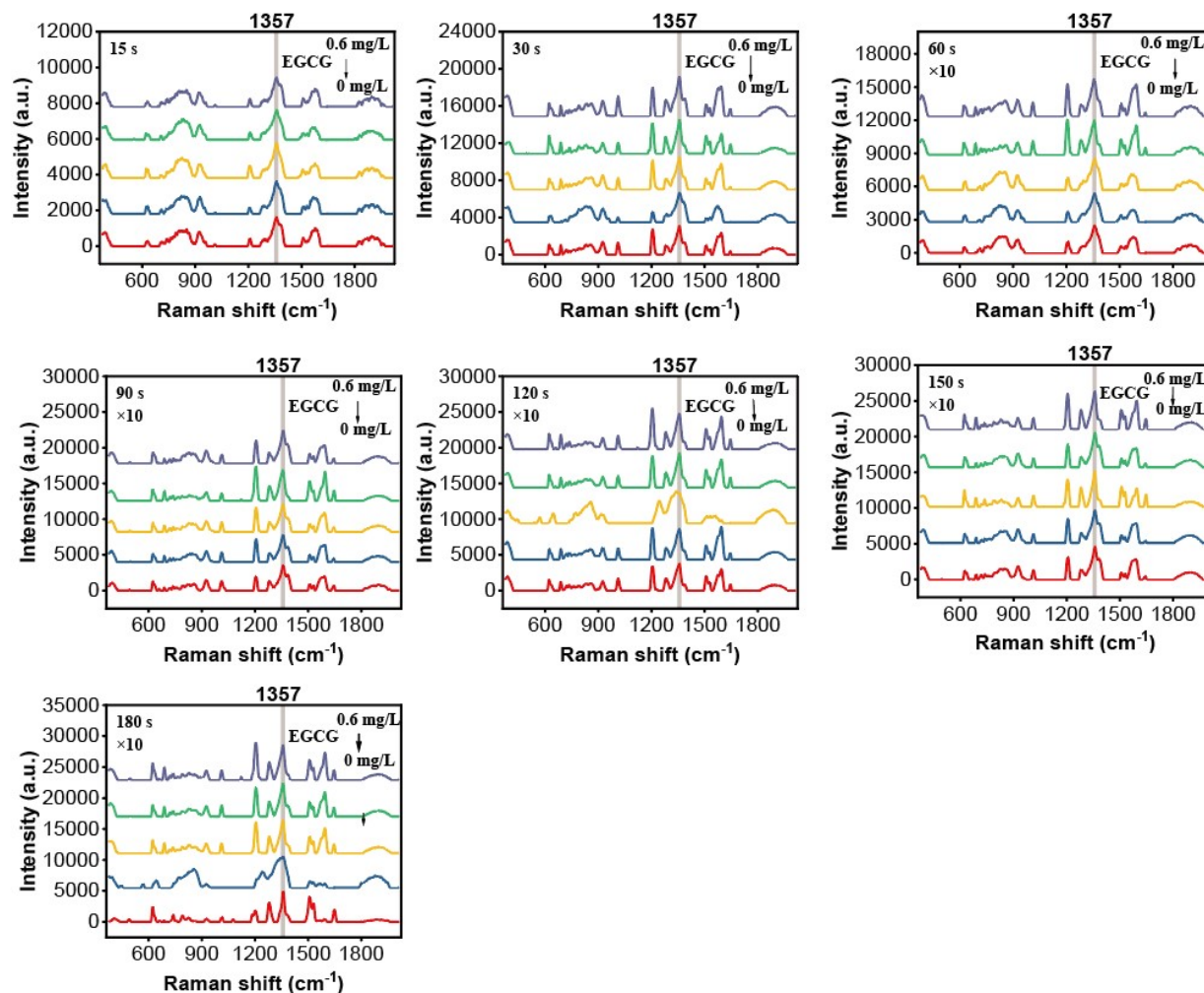


Figure S6. Raw SERS spectra of NPs release samples at different EGCG concentrations (0, 0.1, 0.2, 0.4, 0.6 mg/mL) subjected to various microwave heating durations (0, 15, 30, 60, 90, 120, 150, 180 s).

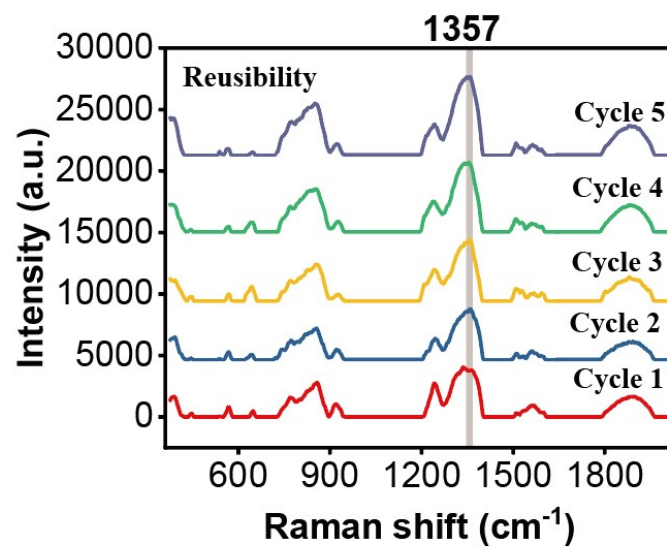


Figure S7. Raw SERS spectra of NPs release samples over various reuse cycles.