

Use of new polymeric composites for preconcentration of trace Ag⁺ ions from the selected mushroom/vegetables by ultrasound-assisted cloud-point extraction coupled to microvolume UV-Vis spectrophotometry

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Abstract

The magnetic nano-composites based on the tris(hydroxymethylmethyl)aminomethane-modified maleic anhydride-co-styrene copolymers and Fe₃O₄ nano-particles were prepared as new potential chelating agents for ultrasound-assisted-cloud point extraction (UA-CPE) and pre-concentration of trace levels of Ag⁺ ions from aqueous solutions. The structures of the nano-composites were characterised via FT-IR, H-1-NMR and XRD analysis. After structural characterisation of composites, Ag⁺ ions were detected by micro-volume UV-vis spectrophotometry at 347 nm. The variables affecting complex formation and extraction efficiency for separation/pre-concentration of the Ag⁺ ions from various food matrices were evaluated and optimised in detail. Under the optimised conditions, the method shows a good sensitivity with linearity range from 10 to 350 µg L⁻¹ and 4 to 160 µg L⁻¹ for amidic and imidic composites, respectively, with a better correlation coefficient than 0.9825. The limits of detection, intra- and inter-day precision (as RSDs%) and recovery rates for six replicate determinations of Ag⁺ ions at levels of 25 and 100 µg L⁻¹ were 4.28/1.21 µg L⁻¹, 2.4-4.1% and 92-98% for the modified copolymers, respectively. The pre-concentration factor for Ag⁺ ion from pre-concentration of 35-mL sample was 70. A significant matrix effect was not observed for the triplicate



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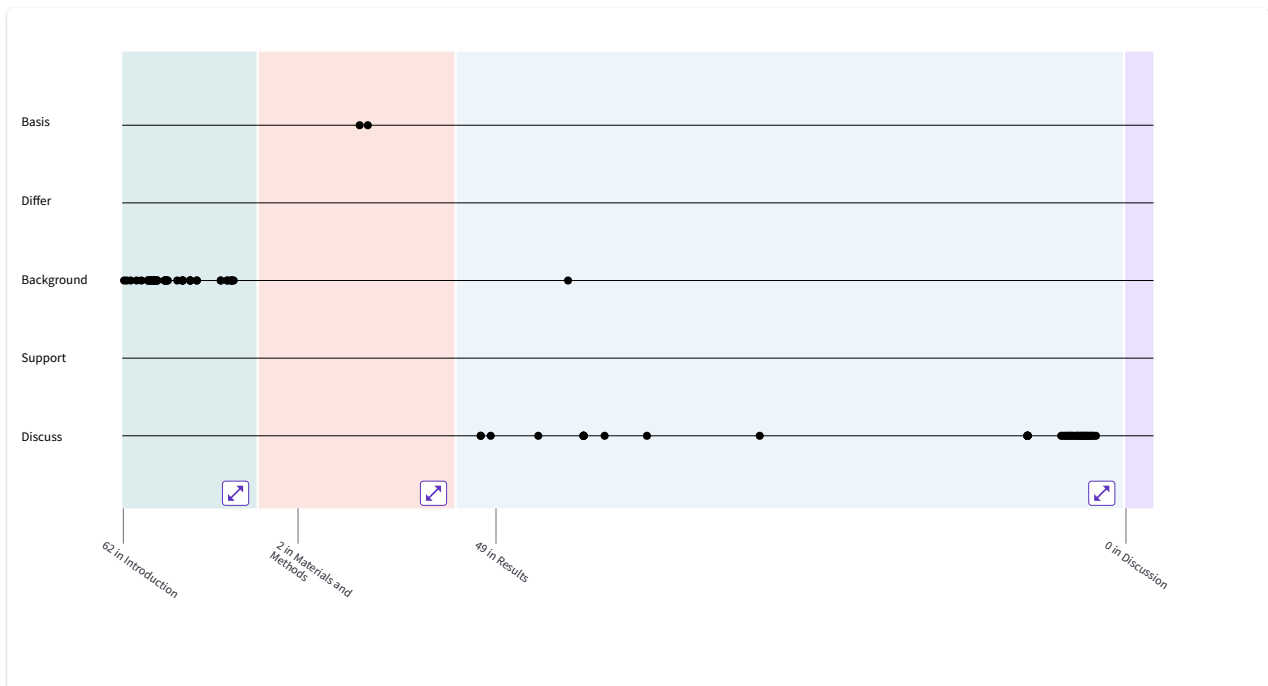
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