

عنوان مقاله:

Determination of TiO₂ nanoparticles in cosmetic wastewaters by acid digestion coupled with ICP-MS

محل انتشار:

اولین کنفرانس ملی شیمی کاربردی و نانوشیمی (سال: 1397)

تعداد صفحات اصل مقاله: 5

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خلاصه مقاله:

A rapid, simple and novel analytical method for the determination of traces amounts of TiO₂ in cosmetic wastewaters has been developed. The sensitivity of ICP-MS for direct determination of the elements of periodic table is more than most other techniques. Thus, ICP-MS is used as an effective analytical tool to measure very low concentrations. Some of its other advantages include high linear dynamic range, high precision and accuracy in measurement and minimum interferences [1]. The treatment method is based on acid digestion. The variables involved in the treatment process were studied to provide the best extraction recovery. Around 5 mL of sample were treated with 500 μL of HNO₃, 50 μL of H₂O₂ and 200 μL of HF using the following temperature program: up to 200 °C (30 min), stabilization 1 h at 200 °C, up to 250 °C (15 min), and stabilization at 250 °C during 1 h. Ultrapure water was added to all digested samples up to 10 mL in order to decrease the HNO₃ and HF concentration in the solution before ICP-MS analysis. The method was successfully validated showing good linearity, limits of detection and quantification of 0.5 and 5.0 ng mL⁻¹, respectively, and good repeatability (RSD < 7%). Finally, the proposed analytical method was applied to the determination of TiO₂ in different cosmetic wastewater samples with good relative recovery values (86–93%) thus showing that matrix effects were negligible. The good analytical features of the proposed method besides of its simplicity and affordability, make it useful to carry out the quality control of cosmetic wastewater.

کلمات کلیدی:

TiO₂ nanoparticles, Cosmetic wastewaters, Acid digestion, ICP-MS

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