

## عنوان مقاله:

Dispersive solid phase microextraction based on aminefunctionalized bimodal mesoporous silica nanoparticles for separation and determination of calcium ions in chronic kidney disease

## محل انتشار:

فصلنامه روش های تجزیه در شیمی محیط زیست، دوره 1، شماره 1 (سال: 1398)

تعداد صفحات اصل مقاله: 10

## نویسندگان:

Sara Davari - *Islamic Azad University of Pharmaceutical Sciences (IAUPS), Medical Nano Technology Tehran, Iran*

Farnaz Hosseini - *Islamic Azad University of Pharmaceutical Sciences (IAUPS), Medical Nano Technology Tehran, Iran*

Hamid Shir Khanloo - *Research Institute of Petroleum Industry (RIPI), West Entrance Blvd., Olympic Village, P.O. Box: 14157-33111, Tehran, Iran*

## خلاصه مقاله:

The ultrasound assisted- dispersive solid phase microextraction method (USA-SPME) was used for in-vitro study on separation/extraction of calcium ions in human blood of chronic kidney disease (CKD). In this procedure, amine-functionalized bimodal mesoporous silica nanoparticle (NH<sub>2</sub>-UVM7) as a solid phase was used for in-vitro separation/extraction of calcium from blood/serum samples. Moreover, a mixture of NH<sub>2</sub>-UVM7 with ionic liquid and acetone (S/IL/Ac) was added to serum/blood sample containing of Ca (II) at pH of 7.3. After ultrasonic bath and centrifuging, NH<sub>2</sub>-UVM7/ IL settled down in bottom of tube, which was extracted Ca (II) ions by binding to amine group ([Ca]<sup>2+</sup> → :NH<sub>2</sub> — UVM7). The concentration of Ca (II) was determined by flame atomic absorption spectrometry (FAAS, N<sub>2</sub>O, C<sub>2</sub>H<sub>2</sub>) after back extraction remained adsorbent in IL by 0.5 mL of HNO<sub>3</sub> (0.5 M). The results showed us, the NH<sub>2</sub>-UVM7 is a powerful adsorbent for decreasing and controlling of high level calcium concentration in human body and can be used for in vivo study on decreasing calcium concentration in hypercalcemia patient with CKD. The capacity absorption of NH<sub>2</sub>- UVM7 in blood and water samples was obtained 258.5 mg g<sup>-1</sup> and 267.2 mg g<sup>-1</sup> at room temperature (25°C). The characterization of NH<sub>2</sub>-UVM7 (SEM, TEM, FTIR and XRD) and comparisons between proposed method and previous methods showed us, the NH<sub>2</sub>-UVM7 as effectiveness sorbent for decreasing calcium concentration level in blood of hypercalcemia patients. Validation of methodology was confirmed using standard reference material (NIST, SRM). Finally, the LOD and %RSD was obtained 3.0 mg L<sup>-1</sup> and 3.6, respectively.

## کلمات کلیدی:

Calcium, Amine-functionalized bimodal, mesoporous silica nanoparticles, Ionic liquid, Human Blood, Ultrasound assisted- dispersive, solid-liquid multiple phase, microextraction

## لینک ثابت مقاله در پایگاه سیویلیکا:

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