

Preparation of isotopically labelled standarts of creatinine via H/D exchange and their application in quantitative analysis by LC-MS.

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Streszczenie

Kidneys play a crucial role in maintaining metabolic homeostasis in a body. Serum creatinine concentration is a simple test used as an indicator of renal function. One of the known ways of quantifying creatinine concentration is the liquid chromatography-mass spectrometry (LC-MS) method, using an isotopically labeled analog of creatinine as an internal standard. Unfortunately, such isotope-labeled analogs are expensive and their synthesis is complex. Here we demonstrate a facile preparation of deuterated analogues of creatinine, via the H/D exchange of hydrogens located at the α -carbon (α -C) of the N-methylated amino acid part, under basic conditions. The stability of retrieved isotopologues was analyzed under both neutral or acidic conditions, and the results revealed that the introduced deuterons do not undergo back-exchange. In addition, the coelution of deuterated and non-deuterated forms under acidic and neutral conditions was observed. The prepared isotopologues were successfully applied in the quantitative LC-MS analysis of urine samples, and the results demonstrated that the presented strategy is novel and inexpensive, and that the quantification correlates with the commonly used Jaffe test method.

Słowa kluczowe

creatinine, hydrogen-deuterium exchange, isotope dilution, liquid chromatography - mass spectrometry

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