Sensitive determination of nonsteroidal anti-inflammatory drugs in urine using 3-phase direct immersion single drop microextraction in-line coupled with capillary electrophoresis

Doo Soo CHUNG*

Seoul National University

Gold statement
A simple and efficient sample pretreatment method featuring direct immersion (DI)-single drop microextraction (SDME) in the three-phase mode was in-line coupled with capillary electrophoresis (CE) for the analysis of non-steroidal anti-inflammatory drugs (NSAIDs) such as ketoprofen (KTP), ibuprofen (IBU), and naproxen (NAP) in standard and real (human urine) samples.

Introduction
CE has the advantages of high separation efficiency, rapid analysis, and the requirement of only small amounts of samples and solvents; however, it also has the drawbacks of low sensitivity with absorbance detection and peak broadening for high conductivity samples. Therefore, pairing CE with more sensitive detectors or an appropriate sample pretreatment technique is desirable for physiological samples such as urine.

Body
Excellent sample cleanup and enrichment power was exhibited by 10-min DI-SDME with a small basic acceptor drop covered with a thin organic layer, attached to the tip of a separation capillary. Analytes in the acidified donor phase were preconcentrated into the basic acceptor drop, yielding enrichment factors (EFs) of 252 ± 16, 132 ± 11, and 257 ± 16 for KTP, IBU, and NAP, respectively, in standard samples (n = 4). On the other hand, the application of the method to human urine samples yielded EFs of 136 ± 16, 72 ± 10, and 140 ± 22 for KTP, IBU, and NAP, respectively (n = 4). The limits of detection were 20–90 nM (5–18 μg/L) for standard samples and 42–150 nM (10–31 μg/L) for urine samples.

Conclusion
Three-phase DI-SDME-CE is quite promising for the determination of low concentrations of NSAIDs in complex sample matrices.