

Development of a sensitive analytical method for serum bisphenol A using liquid chromatography-tandem mass spectrometry

Dae-Hyun Ko¹, Hyun-Ki Kim¹, Sun-Hee Jun², Tae-Dong Jeong¹, Woochang Lee¹, Sail Chun¹, Junghan Song², and Won-Ki Min¹

¹Department of Laboratory Medicine, University of Ulsan Asan Medical Center, Seoul, Korea

²Department of Laboratory Medicine, Seoul National University Bundang Hospital, Seongnam, Korea

Introduction: Bisphenol A (BPA) is a carbon-based synthetic compound and it is employed to make a variety of common consumer goods. Despite its various commercial uses, BPA exhibits hormone-like properties that raise concern about its suitability in some consumer products and food containers. Usually, BPA has been measured in urine where it presents at high concentration. In this study, we developed a sensitive assay for serum BPA.

Materials and Methods: Serum specimens from 20 healthy people (10 male and 10 female) were analyzed and BPA-d12 was used as an internal standard. All vials and glassware were cleaned with hexane before the analysis. BPA in serum were extracted with toluene and derivatized with dansyl chloride. After derivatization, the samples were analyzed by liquid chromatography-tandem mass spectrometry.

Results: BPA and internal standard were separated clearly. The running time for one sample was less than 10 minutes. The assay was linear in a range from 0.05 ng/mL to 5.0 ng/mL. Within-run precision was 9.2% to 12.0%, and between-run precision was 3.8 % to 12.2%. There were no significant matrix effects. The median BPA concentration was 0.044 ng/mL (range: 0.003 to 0.551 ng/mL) in male and 0.029 ng/mL (range: under detection limit to 0.055 ng/mL) in female.

Conclusions: We have successfully developed a sensitive assay for measuring serum BPA. This method is simple, rapid and readily available in clinical laboratories; also, it can be applied to serum with even low BPA levels. Our study suggested that this method would help us to determine the level of BPA exposure more accurately and provide a valuable tool for public health studies about BPA exposure.