Biomonitoring of alkylphenols exposure for textile and housekeeping workers

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Abstract

4-Nonylphenols (NP), 4-tert-ocytylphenols (OP), and 2,4-di-tert-butylphenols (BP) are ubiquitous in daily foodstuffs. These alkylphenols are widely used in industry, and NP and OP are endocrine disruptors. This study involved biomonitoring of the alkylphenols in plasma and urine from textile and housekeeping workers. The objective was to measure the internal level of alkylphenols and clarify the occupational exposure of alkylphenols for these two working groups. Forty textile workers and 33 housekeeping workers were recruited in this study. Urine and plasma samples were enzymatic deconjugation, followed by cleanup with solid-phase extraction. After extraction, the samples were analysed with reverse-phase high-performance liquid chromatography coupled with fluorescence detection. The method was validated with the recovery and reproducibility test. The measurement results demonstrated apparent occupational exposure, since the urinary alkylphenols were significantly higher in the end-of-shift samples, 42.06 ± 46.63 ng/mL, than in the preshift samples, 23.50 ± 17.34 ng/mL, for the textile exposed workers. Meanwhile, the three kinds of alkylphenols were commonly detected in the biological samples. The plasma concentrations were higher than the urine concentrations. The average plasma concentrations of NP, OP, and BP were 53.21 ± 49.74, 16.02 ± 2.81, and 25.83 ± 7.10 ng/g for the housekeeping workers and 6.25 ± 4.83, 6.52 ± 8.67, and 6.47 ± 13.34 ng/mL in urine, respectively. The results of this study suggest that multiple exposure routes, including dietary intake, inhalation, and skin absorption, might contribute to the internal alkylphenol dose. The potential adverse effects caused by exposure of occupational workers is concerned.