Estimation of Daily Bisphenol A Intake of Japanese Individuals with Emphasis on Uncertainty and Variability

Ken-ichi Miyamoto* and Mari Kotake

Research Center for Chemical Risk Management, National Institute of Advanced Industrial Science and Technology
16-1 Onogawa, Tsukuba, Ibaraki 305-8569, Japan

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The purpose of this study was to comprehensively assess the exposure of Japanese individuals to bisphenol A (BPA) with emphasis on uncertainty and variability in available information. The uncertainty and variability in parameters were numerically analyzed using Monte Carlo simulation. The uncertainty in the functional relationship between sources and exposure was treated by comparing two approaches: one was to aggregate ingestion and inhalation through all possible exposure pathways and the other was to estimate the intake from urinary excretion by backward calculation. For individuals aged 6 months or above, food was the most significant source of intake. The alteration of the method used in inactivating the inside surface of drink cans slightly contributed to the decrease in daily intake. By the backward calculation approach based on urinary excretion, 95% confidence intervals for the daily intake for high-exposure populations were estimated to be 0.037–0.064 µg/kg/day for males and 0.043–0.075 µg/kg/day for females. Even conservatively estimated daily intakes were lower than the EU’s temporary tolerable daily intake (TDI) of 10 µg/kg/day as well as the U.S. Environmental Protection Agency (US EPA)’s reference dose (RfD) of 50 µg/kg/day. Thus, it is unlikely that humans, including infants and young children, are at unacceptable risk from possible BPA exposure.

*E-mail: ken-ichi.miyamoto@aist.go.jp