
Poster

[P25-11] P25-11: Clinical toxicology (1)

Chair: Kenji Ikeda, Japan

Mon. Sep 25, 2017 12:30 PM - 1:30 PM Annex Hall (1F)

(Mon. Sep 25, 2017 12:30 PM - 1:30 PM Annex Hall)

[P25-11-7] Evaluation of toxicological risk due to the presence of bisphenol A in thermal papers

Marina Venzon Antunes¹, Igor Mendes Kael², Caroline Carrer³, Giovana Piva Peteffi⁴, Rafael Linden⁵
(1.Universidade Feevale, 2.Universidade Feevale, 3.Universidade Feevale, 4.Universidade Feevale, 5.Universidade Feevale)

Keywords: Bisphenol A, Thermal paper, Risk assesment

Background

Bisphenol A (BPA) is a chemical compound present in thermal papers widely used in commercial applications. In 2015, EFSA performed a risk assesment, based on a recent toxicity data, and established a Tolerable Daily Intake (TDI) of 4 $\mu\text{g}/\text{body weight}/\text{day}$. The objective of this study was to evaluate the presence of BPA in thermal paper samples obtained in Brazil, establishing its potential toxicological risk in individuals highly expose to BPA.

Methods

The concentrations of BPA were determined in 20 thermal paper samples. An aliquot of 30 mg was placed in a screw glass tube and added with 2 mL of methanol, followed by 2 cycles of 30 seconds homogenization in vortex and 10 minutes sonication. After, 100 μL of the solution was transferred to a new tube and diluted with 5 mL of methanol. A 10 μL aliquot was analyzed into a HPLC-FL system with a Zorbax C8 column (150x4.6 mm, 5m) at 30 °C. Mobile phase was 1% of acetic acid in water, acetonitrile and methanol (60:35:5, v/v/v) at 0.9 mL/min. Daily BPA calibration curves were performed from 0.5-10 $\mu\text{g}/\text{mL}$. The estimated daily intake (EDI) was calculated as follows: $\text{EDI} = k \times C \times \text{HF} \times \text{HT} \times \text{AF} \times 10^6$ (ng/day); k is the paper-to-skin transfer coefficient (21522.4 ng/s); C is the concentration in thermal paper in $\mu\text{g}/\text{g}$; HF is the handling frequency; HT is the handling time (5 s); AF is the absorption factor of BPA by skin (27%).

Results

The limit of detection was 0.15 $\mu\text{g mL}^{-1}$, corresponding to a concentration of 0.05 mg/100 mg BPA in a 30 mg sample. The frequency of detection was 65%, with concentrations ranging from 16.43 mg/g to 20.2 mg/g. Considering a high frequency of thermal paper handling (1100 times/day), the exposure values ranged from 5,769.5 to 9,200.8 ng/kg body weight/day, being the lowest value over the maximum TDI level.

Conclusions

BPA risk evaluation is especially important for workers with extreme exposures, requiring more careful monitoring and exposure mitigation measures, such as the use of gloves and other protective measures.