

Heavy metals contamination in eye shadows sold in Malaysia and user's potential health risks

ABSTRACT

Background: Nowadays, eye shadows have become common cosmetics used by consumers. Previous studies proved that some of the eye shadows used had excessive levels of heavy metals. **Objectives:** The aims of this study are to (i) quantify the heavy metals concentration of lead and chromium in the eye shadows based on the color categories and types of eye shadows and (ii) assess potential non-carcinogenic health risk due exposure to heavy metals concentrations in eye shadows by using Hazard Quotient (HQ). **Methodology:** A conventional method using oven heating was applied to extract heavy metals from the samples. The analysis of heavy metals in the samples was performed using the Graphite Furnace Atomic Absorption Spectrophotometer (GF-AAS). The chronic non-carcinogenic health effect was evaluated quantitatively using HQ. **Results:** Both lead and chromium concentrations were found to be the highest in blue color category with the mean concentration of $161.8 \pm 101.6 \mu\text{g kg}^{-1}$ and $149.4 \pm 53.1 \mu\text{g kg}^{-1}$, respectively. The chromium levels were higher in the shimmering shade compared to the matte shade. The lead concentrations in all the samples analyzed were below the standard set by Health Canada (10 mg kg^{-1}) and United States Food and Drug Administration (20 mg kg^{-1}). The HQ values for chromium in all samples were less than 1. **Conclusion:** Lead concentrations were present within the permitted levels stated by the international standards in cosmetics intended for external use. The HQ values for chromium were less than 1 in all samples, indicating there was no significant chronic non-carcinogenic health risk to eye shadow users.

Keyword: Eye shadows; Graphite Furnace Atomic Absorption Spectrophotometer (GF-AAS); Health risk assessment; Heavy metals