

ABSTRACT

DETERMINATION OF LEAD IN WAX CRAYON USING FLAME ATOMIC ABSORPTION SPECTROMETRY

The method for the determination of lead in wax crayon by Flame Atomic Absorption Spectrometry was adopted from Health Canada Safety Program (HCSP), Product Safety Laboratory, 'Determination of Total Lead in Wax Crayon by Closed Vessel Microwave Digestion' and verified. The parameter of method verification such as accuracy, precision, limit of detection, limit of quantitation and linearity were studied. Three colours from 10 boxes of wax crayon samples were analysed. Microwave digestion method was used to extract the lead prior to analysis. The concentration of lead in red, blue and orange colour wax crayon was $25.23 \pm 3.26 \text{ mg kg}^{-1}$, $21.21 \pm 3.44 \text{ mg kg}^{-1}$ and $32.15 \pm 0.35 \text{ mg kg}^{-1}$ respectively. Our results also indicate that, there is no significant different in lead content between blue and red colour wax crayon. However, there is significant different in amount of lead in orange colour compared to blue and red colour wax crayon. Previous study had estimated that a greater than 15 ug/day intake of available lead could cause a previously normal child to exceed a 10 ug/dl blood level which gave toxic effect to children.

ABSTRAK

PENENTUAN LOGAM PLUMBUM DI DALAM KRAYON LILIN MENGGUNAKAN TEKNIK NYALAAAN PENYERAPAN ATOM

Kaedah penentuan logam plumbum di dalam krayon lilin menggunakan teknik nyalaan penyerapan atom telah diadaptasikan daripada Makmal Keselamatan Produk, Program Keselamatan dan Kesihatan Kanada, 'Penentuan Jumlah Logam Plumbum di dalam Krayon Lilin menggunakan Penghadaman Vesel Tertutup Gelombang Mikro'. Verifikasi ke atas kaedah ini dijalankan. Kriteria verifikasi seperti ketepatan, kejituan, had pengesanan, had kuantitasi dan kelinearan dikaji. Tiga warna daripada 10 kotak krayon lilin dianalisa. Teknik penghadaman gelombang mikro diaplikasikan untuk mengekstrak logam plumbum sebelum analisis dijalankan. Kandungan logam plumbum di dalam warna merah, biru dan jingga adalah $25.23 \pm 3.26 \text{ mg kg}^{-1}$, $21.21 \pm 3.44 \text{ mg kg}^{-1}$ dan $32.15 \pm 0.35 \text{ mg kg}^{-1}$. Berdasarkan keputusan tersebut, didapati kandungan logam plumbum di antara krayon lilin berwarna merah dan biru adalah tidak menunjukkan perbezaan yang signifikan. Walau bagaimanapun, terdapat perbezaan yang signifikan terhadap kandungan logam plumbum di dalam krayon lilin berwarna jingga apabila dibandingkan dengan warna merah dan biru. Kajian terdahulu menganggarkan, pengambilan logam plumbum sebanyak lebih daripada 15ug/hari boleh menyebabkan tahap darah kanak-kanak yang normal mencapai tahap toksik iaitu melebihi 10ug/dl.