

Quantification of metals in lipstick by Energy Dispersive X-ray Fluorescence.

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The objective of this work is to analyze lipstick and lip balm by Energy Dispersive X-Ray Fluorescence and verify if the concentration of the found elements are in accordance with federal rules. Two lip balm and 30 lipstick commercially available were analyzed without preparation. The samples were rubbed on a mylar film until they form a relatively homogeneous layer over entire surface of the film. The superficial density of the samples ranged from $0,0004$ to $0,015 \text{ g cm}^{-2}$, which characterize thin film geometry. Sensitivity values were determined using MicroMatter standards. The measurement system, from Applied Nuclear Physics Laboratory of UEL, consists in a Si-PIN X-ray detector (221 eV resolution for 5,9 keV line, $25 \mu\text{m}$ Be window) and a mini X-ray tube (4W, Ag target, $50 \mu\text{m}$ Ag filter). One of the lip balm presented $2620 \pm 477 \mu\text{g g}^{-1}$ of Ti and in the other sample none inorganic elements, which characterize a formulation based on organic compounds. In the lipstick were found the following elements and the number of samples in which it appears, with its respective range of concentration in $\mu\text{g g}^{-1}$: Ti (17) 691 to 12721, Fe (22) 237 to 16377, Zn (3) 105 to 2850, Br (2) 510 to 3097, Sr(4) 254 to 1170, Ba (2) 58170 to 90506 and Bi (1) 16275 ± 798 . According to Brazilian federal rules (Anvisa 79.094) it is not permitted the presence of As and Pb in the formulations. The methodology demonstrated to be suitable for quantification of metals at in natura samples of lipsticks, discarding sample preparation. In sequence a detailed study of the influence of these elements on human health will be performed.