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DETERMINATION OF METALS IN TATTOO AND PERMANENT MAKE-UP INKS

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Aim: The aim of this paper is to put emphasis upon the influence of different methods of preparation of inks for determination of metals on the obtained results.

Method: Study included 17 tattoo and make-up ink samples, analysed on Pb, Cd, Ni, Cu, Zn, Sn, and Ba by flame atomic absorption spectrometry (FAAS), As by hydride generation AAS, and Hg by cold vapor AAS, following two methods of sample preparation: microwave oven decomposition with strong acids, and extraction with artificial perspiration solution (1 hour, 40°C) [1]

Results / Discussion: Analytical method including microwave preparation revealed presence of nickel in all ink samples, in concentration ranging from 1.2 to 48.2 mg/kg, while preparation by extraction resulted with no quantifiable quantities of nickel. Other analysed metals were not detected by any of applied methods./ For safety evaluation, laboratory uses microwave digestion, though this method does not take bioavailability into account. Legal limit for nickel content in inks is not established, but if safe allergological limit of 1 mg/kg is considered, all analysed samples might pose a risk for the development of dermatological reactions. In 35% of samples, nickel concentration was even above 5 mg/kg. However, based on extraction method, all samples would be considered as safe.

Conclusion: To avoid this ambiguity, it is necessary to agree upon appropriate analytical methods.

[1] Prior G. Tattoo inks. EpubliGmbH, Berlin