

32

ANALYSIS OF METALS IN TATTOO COLORANTS

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Legal limits for chemical substances require these to be linked to an analytical method. Neither ResAP(2008)1 nor the new Danish Law (in force on 1. January 2014) mention analytical methods for the analysis of metals in tattoo colorants and therefore there is neither a right nor a wrong method for the determination of the set limits. Failing to provide an appropriate method leads to unqualified and questionable results, often leading to legal disputes and leaving it up to a judge to decide which method should have been applied.

Most analytical methods consist of two parts: the work-up and the detection of the substances themselves. Results vary depending on the applied method and are mainly due to variations in the work-up.

A method being used by several authorities in certain parts of the EU involves microwave digestion as a work-up. This is a well known and established method especially in the food industry. The limits being used for the metals are taken from ResAP(2008)1. The reason for this is quite straightforward: there are no other documents with limits for metals in such products. The digestion method fails for several metals mentioned in ResAP(2008)1. One example: Barium. This is used in tattoo inks as barium sulphate, which is completely harmless. Therefore, it is used for X-rays as a barium meal containing much greater amounts of barium than are present in a kilo of tattoo ink. The basic problem with the microwave digestion method is the lack of differentiation.

In 2009 CTL[®] devised a work-up using extraction with an artificial perspiration solution and micro filtration. The CTL[®] method does not fail here.

The use of microwave digestion has led to withdrawal attempts by authorities due to tattoo colors exceeding the limits of ResAP(2008)1 for barium. Why this should be the correct method for tattoo colorants is unclear.

Irrespective of which is the correct method for detecting metals in tattoo inks, focus should be on the actual amounts in the skin. CTL[®] have conducted experiments to determine these and they are crucial for toxicological evaluation and for setting legal limits.