

On the presence of heavy metals in ayurvedic preparations: analytical problems and toxicological aspects

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Objective

Ayurveda is a traditional form of Indian medicine that is practised mostly in many countries in the Asian Pacific Region. In addition to the use of herbs having medicinal properties, the Ayurveda uses minerals and metals. The aim of this work was to assess the presence of some heavy metals, namely arsenic, cadmium, chromium, iron, mercury and lead in a series of ayurvedic preparations present in the Italian market.

Materials and methods

Thirty-five samples of ayurvedic preparations were collected for analysis. The determinations of As, Cd, Cr and Pb were performed by graphite furnace atomic absorption spectrometry, whereas iron was determined using the flame method. The mercury was analysed by means of a specific hydride generation apparatus.

Results

An improved digestion method using a high-pressure microwave system is here described and compared with other digestion procedures. The analytical problems related to the application of atomic absorption spectroscopy techniques, either flame (FAAS) or flameless (ETA-AAS) methods, as well as the mercury determination, are also discussed. The results demonstrated that the concentrations of the examined metals are always within limits of safety, with the exception of some high values found for mercury (8400 mg/Kg) and lead (145000 mg/Kg).

Conclusions

The method proposed is suitable for the determination of metals in herbal preparations. The investigation permitted to evidence that during the last two years the quality of the Ayurvedic preparations imported in Italy underwent an improvement. However, an aspect not negligible is represented either by the presence of metals not intentionally added but naturally present in the herbs, or resulting by a casual contamination during the productive cycles.