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(Article begins on next page)

12 October 2024

P161

TOTAL CONCENTRATION AND BIOACCESSIBILITY OF POTENTIALLY TOXIC ELEMENTS IN AYURVEDIC FORMULATIONS

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Some metal-based preparations used in the ayurvedic medicine, an Indian system of medicine, have been suspected to be harmful because some patients were poisoned by heavy metals after the ingestion of these remedies [1]. On the other hand, ayurvedic medicines are being used by millions of people in India without apparent side effects. For these reasons it is interesting to determine the element content in ayurvedic medicines, taking into account that they are increasingly consumed also Western countries. Moreover, the total concentration of an element is not sufficient to assess its potential harmful effects, since not all the amount present in an ingested product is available for absorption by the organism; for this reason, it is useful to determine the amount assimilated after ingestion. This can be estimated *in vitro* by measuring the bioaccessibility, i.e. the fraction of a compound that is released from its matrix in the gastrointestinal tract.
In this work we have determined the total concentrations of 25 elements in 17 ayurvedic products sold in different distribution channels: Indian ayurvedic medical shops, an Italian pharmacy and on the Internet. Metal bioaccessibility was studied by extraction with solutions simulating gastric and intestinal fluids. Concentrations were determined by Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). Five medicines purchased in India contained very high total amounts of As, Cu, Hg, and Pb and two products had bioaccessible As concentrations greater than the corresponding maximum admissible daily intake level. Concentrations in the products purchased on the Internet and in the Italian pharmacy were lower than the safety limits fixed by the international authorities.

[1] P.I. Dargan, I.B. Gawarammana, J.R.H. Archer, I.M. House, D.M. Wood, Int. J. Environ. Health 2 (2008) 463–474.