

5th International Conference and Exhibition on Analytical & Bioanalytical Techniques

August 18-20, 2014 DoubleTree by Hilton Beijing, China

Speciation of chromium in medicinal plants from selected farms in the vicinity of ferrochrome

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Chromium (Cr) is one of the most and important trace metals which can be present in two oxidation states: toxic Cr(VI) and non-toxic Cr(III). Cr(III) is an important microelement for plant and animal nutrition and essentials for the maintenance of glucose as well as for the lipid and protein metabolism. With regard to human health, Cr(III) is a required nutrient, with 50-200 µg per day recommended for adults. On the contrary, Cr(VI) is toxic and carcinogenic, leading to lung cancer, skin allergy and probably also to asthma and renal diseases. A toxic effect for the biological systems is attributed to the ability of Cr(VI) to migrate across the cell membrane, thus enhancing the intracellular chromium concentration. Hexavalent chromium is rarely found in nature and is generally man-made, especially in fumes generated during the ferrochrome production. The permissible exposure limit (PEL) of chromium in air is 5 µg m⁻³ measured as Cr(VI). The dust with Cr(VI) could be a source of contamination of medicinal plants. Therefore, it is essential to monitor the concentration of Cr(VI) in the environment, to determine the risk of Cr(VI) to human health, not only from air breathing, but from the dust which settles on agricultural products grown in vicinity of chromium smelters and when into medicinal plants. For these studies, the samples of industrial dust, soil, bark of trees and medicinal plants samples were collected in the vicinity of chromium smelters and from local market. All measurements were carried out using a Perkin Elmer atomic absorption spectrometer model AAnalyst 600 with Zeeman background correction.

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