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Determination of chromium by ETAAS in hair and urine of tannery workers: The interest of alternative biological matrices

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Introduction: The human hair occupies a prominent place as markers of exposure to xenobiotics in the domain of forensic toxicology. However, interest of using this matrix is a considerable improvement for the assay of metals; also, chromium has attracted the attention of toxicologists because the accidents observed in industrial settings using this metallic element (cement industry, paint, leather, automotive, etc.).

Objective: This study is related to the assessment of worker exposure in a tannery, located in Algiers, more accurately on the Rouiba-Reghaia industrial estate, by measuring the capillary and urinary chromium of the population groups investigated, and then study the correlation between total content of chromium in hair and urine.

Patients & Methods: The study was carried out in September 2012, and focused on 50 subjects exposed (49 men and 1 woman) and 16 controls. It was preceded by the establishment analytical development and validation of an analytical method for the determination of chromium in hair and urine by graphite furnace atomic absorption spectrometry (GFAAS). Statistical calculations were performed using the software LXSTAT MS Excel 2012.

Results & Discussion: The hair chromium average of the tanning workers were significantly higher (urinary Cr=2.48 µg/L, Cr capillary=4.93 ng/mg) than other groups. Washing the hair appears to be effective for decontaminating the exogenous chromium, this latter may reflect a recent exposure to chromium.

Conclusion: Human hair may offer the advantage for biological monitoring, first, to get information on the use of means of protection, and give some idea about the route of exposure (inhalation or ingestion).

Biography

Mohammed Riffi has completed his PhD from Tlemcen University and Post-doctoral studies from Algiers University School of Medicine. He has a membership of SoHT. He has published one paper in Toxicologie analytique et Clinique.

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