

Monitoraggio ambientale e biologico dell'esposizione ad idrocarburi policiclici aromatici in lavoratori di una acciaieria elettrica

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KEY WORDS

Polycyclic Aromatic Hydrocarbons (PAHs); occupational exposure; steel foundry; biological monitoring; 1-hydroxypyrene (1-OH-P)

SUMMARY

«Environmental and biological monitoring of exposure to Polycyclic Aromatic Hydrocarbons in workers of an electric steel foundry». **Aims:** To assess and classify exposure to Polycyclic Aromatic Hydrocarbons (PAHs) in some specific working areas of a steel foundry operating with a continuous casting process and evaluate biomonitoring data in different job tasks. **Methods:** Exposure to dusts and six PAHs classified as carcinogenic by EU directives was studied in a cohort of 35 male foundry workers (aged 41.1±6.9 years), who were examined both prior to and at the end of the work-shift (06:00 a.m. - 02:00 p.m.) in two different periods. The urinary excretion of 1-hydroxypyrene (1-OH-P) was measured as a biomarker of exposure to pyrene. **Results:** PAHs concentrations ranged from 461.8 to 935.6 ng/m³ near the continuous casting area, whereas lower values were measured near the ladle furnace. End of shift 1-OH-P values were higher in 11 non-smoking workers involved in continuous casting process as compared to those employed in maintenance and furnace areas (median of the second determination: 5.70 µg/g creatinine - range: 1.24-21.24 vs 1.17 µg/g creatinine - range: 0.23 - 4.49; p<0.001). 1-OH-P excretion was significantly correlated with both the sum of six carcinogenic PAHs and pyrene airborne concentrations. In two biomonitoring sessions, 9.1% and 34.3% of the workers respectively showed end-of-shift 1-OH-P values exceeding the occupational exposure limit (OEL) (4.4 µg/g creatinine or 2.3 µmol/mol¹ creatinine) recommended for coke-oven workers. **Conclusions:** 1-OH-P is a useful biomarker in assessing PAH exposure and is associated with job category at a steel plant. Due to exposure variability, to assess risk associated with PAHs exposure, biological monitoring should be carried out periodically.