

Evaluation and Risk Assessment of Heavy Metals in Blood Samples of Leather Tanning Industry Workers in Bangladesh

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Abstract

This study was carried out during February, 2023 in four tanneries of Savar, Bangladesh aiming at quantifying 14 heavy metals by ICP- MS in blood samples of 54 tannery workers with the age range of 18-66 years. The mean blood levels of As, Be, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, V and Zn were 16.4 ± 2.17 , 0.10 ± 0.08 , 0.93 ± 1.37 , 0.43 ± 0.19 , 24.7 ± 13.9 , 692 ± 158 , 467 ± 134 , 11.56 ± 10.9 , 13.1 ± 5.43 , 3.52 ± 1.11 , 54.9 ± 21.5 , 24.0 ± 6.52 , 31.0 ± 6.17 and 380 ± 81.1 $\mu\text{g/L}$, respectively. Average Cr level (24.7 $\mu\text{g/L}$) was 17 times higher than the WHO guideline (1.4 $\mu\text{g/L}$). Male workers were more susceptible to all the heavy metals than female workers, except Be and Cu. The smokers were exposed to higher levels of As, Cd, Co, Cr, Ni and Pb in blood than the non- smokers. Blood level of Cd, Cr, Co, Hg, Ni and V increased with age, whereas As, Be, Co, Fe, Mn and Zn showed highest concentration at age ≤ 25 years and decreased with age. Strong and positive correlation was observed for Co – Mn, Co – Pb, As – V, Mn – Ni, Mn – Pb, Ni – Pb and Hg – V pairs, which indicated emission from common anthropogenic sources, like coal-combustion and tannery pigments. This study indicated alarming exposure of tannery workers towards heavy metals, so necessary measures should be adopted to ensure chemical safety in leather tanning industries.

Early Career Scientist

YES, I am an early career scientist.

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