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[Abstract Number:121] Title of Abstract: **Exposure Monitoring of Benzene for Workers in Petrochemical Factories**

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Abstract text

Workers’ exposure to benzene was measured by using thermal desorption tubes to take personal breathing zone air samples during an 8-hours work shift and by collecting urine samples at the beginning (pre-shift), noon and at the end (post-shift) of the work shift. A total of 564 personal exposure measurements and 338 urine samples were collected in this study. The air samples were analyzed by thermal desorption with a gas chromatograph-flame ionization detector to quantify benzene. The urine samples were analyzed by a high performance liquid chromatography tandem mass spectrometry (LC-MS/MS) to quantify the exposure biomarkers of benzene, t,t-muconic acid (t,t-MA) and S-phenylmercapturic acid (S-PMA) in the urine samples. Also, a headspace gas chromatography with mass spectrometry (HS-GC/MS) was used to measure the amount of benzene in the urine samples. After excluding the workers with smoking, 184 personal exposure measurements and 134 urine samples were left for data analysis. The mean (standard deviation) of 8-hour time-weighted average exposure concentrations (8-hr TWAs) of benzene was 4.84 (20.00) ppb. This value was far below the permissible exposure limit of benzene. Linear regression analyses were performed for the 8-hr TWAs and the concentrations of exposure biomarkers. The results showed that positive high correlations between the 8-hr TWAs and the urinary benzene concentrations at noon (r=0.91
and p-value <0.01) and the amounts of \( t,t \)-MA at post-shift (\( r=0.92 \) and p-value <0.01). The mean (standard deviation) of \( t,t \)-MA in the urine samples at noon was 229.40 (900.92) g/gCr which was the highest one among three shifts of urine samples. For S-PMA, the highest mean (standard deviation) was 0.51 (4.87) g/gCr of the pre-shift urine samples. More studies are required to elucidate whether \( t,t \)-MA in the urine sample at noon was a more sensitive exposure biomarker than S-PMA for low concentration benzene exposure.