Nineteen petrochemical factories in the Mailiao Industrial Complex were recruited for conducting workers' exposure to volatile organic compounds (VOCs), including acetone, n-hexane, tetrahydrofuran, benzene, toluene, butyl acetate, m/p-xylene, o-xylene, 1,2-dichlorethane, methyl isobutyl ketone, 1,3-butadiene, ethylbenzene, acrylonitrile, styrene, vinyl chloride, formaldehyde and ethylene oxide. A comprehensive exposure assessment strategy was used to design and implement personal and environmental exposure measurements of VOCs. For each factory, similar exposure groups (SEGs) of the workers' VOCs exposure were established and a simple random approach was applied for each SEG to select the workers for personal exposure measurements. Active sampling onto sorbent tubes including thermal desorption and other sorbent tubes was used to measure personal and environmental exposure to VOCs. A total of 1897 exposure measurements for all factories were obtained in two consecutive years. Descriptive statistics of the personal exposure measurements in each factory showed that the means of the 8-hour time-weighted average exposure concentrations of the VOCs were less than one-tenth of permissible exposure limits (PELs). This indicated that the workers' exposure to the VOCs in the factories was well-controlled. Under the assumption of the worker's exposure to VOCs following a lognormal distribution, the workers' exposure similarity of each SEG for each chemical in the factories with more than 30 exposure measurements was assessed by
calculating the ratio of the 97.5th percentile to the 2.5th percentile. The results showed that most of the SEGs had good exposure similarity. After taking account of exposure variability of the workers in each SEG, the probability of the 95th percentile of exposure profile of each chemical for the SEG exceeding the PEL was still in the 5% range of acceptable exposure risk. In conclusion, the petrochemical factories in this Industrial Complex provided good occupational health practices for controlling the workers’ exposure to VOCs.