Biomarker Concentration Acting as the Indicators for Chemicals Health Risk Assessment

The Case Study in Thailand



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Introduction

- **In the field of prevention and control of occupational and environmental diseases has been used to use the biological exposure indices of workers recommended by ACGIH to be the safety value for people's risk exposure to chemicals pollution.**
- **This study was aimed to compare the BEIs of urinary t,t-muconic acid (TTMA), metabolite of benzene [an volatile organic compound (VOC) & an human carcinogen for Leukemia], with baseline urinary TTMA of people in community to adjust risk people in case of chemicals incidents.**

Methods

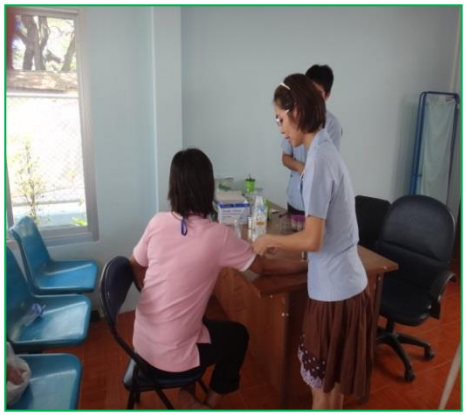
- **The study of average urinary TTMA, an metabolite of benzene, to set the baseline metabolite concentration of general population who had no exposure to chemicals in the workplace with the informed consent form in Rayong Province, the chemicals risk area in Thailand was proceeded during the year 2012-2014.**





Methods (cont'd)

- **The selected 402 volunteers in the range of age 15 years old to 60 years old were collected urine accompanied with in-depth interviewed for identification of interference of metabolite concentration caused by behavior and other chemicals exposure. The urine samples were analyzed by HPLC-analysis. The average concentration of urinary TTMA obtained result was 191 µg/g Cr.**





Methods (cont'd)

- **In the year 2014, the urinary TTMA of the 300 people who exposed to benzene surrounding the area of incident of oil spill leak out at Samet Island, Rayong Province, were also analyzed by HPLC- analysis in laboratory of Rayong Occupational Health and Environmental Development Center (ROHED CENTER).**





Methods (cont'd)



Exposed People



Urine Sample



HPLC-analysis

Comparative adjustment of risk people

- **Usage of baseline urinary TTMA**
- **Usage of BEIs of ACGIH**

Methods (cont'd)

- **In the year 2015-2016, the comparative adjustment of risk people between usage of baseline urinary TTMA and usage of BEIs of ACGIH were studied. The percentage of number of risk people was presented.**

Results

- urinary TTMA concentration of 300 samples were in the range N/A - 459 µg/g Cr
- urinary TTMA concentration of 16 exposed people were in the range 193 µg/g Cr - 459 µg/g Cr
- their urinary TTMA concentration were higher than urinary TTMA baseline concentration (191 µg/g Cr)
- the usage of baseline TTMA concentration showed adjusted 5.33% (n= 16) of exposed people to be the risk people

Table of the Different Number of Risk People

caused by the different health surveillance adjustment concentration

Range of urinary TTMA concentration of 300 exposed workers	Number of risk people [adjusted by workers' TTMA BEIs (500 µg/g Cr)]	Number of risk people [Adjusted by baseline TTMA concentration of general population (191 µg/g Cr)]
N/A µg/g Cr - 459 µg/g Cr	0 (0%)	16 (5.33%)

Conclusion

- **The baseline concentration of general population should play role on planning of health surveillance of risk group.**
- **The risk group should be taken care of chemicals concentration level in their body even less amount of concentration**

Discussion & Suggestion

- **The workers' BEIs should not be the reference value for adjustment the risk group exposed to chemicals in the community.**
- **It is necessary to establish the reference value of general people in community for health surveillance system.**

Acknowledgement

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