

Urine biomarker for benzene exposure and precancerous chromosome damage among gas station attendants in Bangkok, trend after implementation of declaration of standards for control of air quality

DOI: 10.4103/2278-330X.143002

Dear Editor,

The benzene is an important volatile hydrocarbon, which is the present environmental problem. Benzene is considered toxic and carcinogenic.^[1] It is accepted that many occupations are at risk to get high benzene exposure and take risk for cancer development.^[1] Of several occupations, gas station attendant is the group with an extremely high risk.^[2] The precancerous chromosomal damage risk of these workers is significantly higher than controls.^[3] To manage the problem, it is recommended that closed monitoring of the risk workers is needed. Of several techniques, the use of standard urine biomarker, trans, trans-muconic acid is acceptable.^[4] In addition to this, the legal implementation of standards for control of air quality is needed. In Thailand, the problem of benzene can also be seen. The declaration of standards for control of air quality was proposed by Thai National Environment Board in 2006. According to the standard, the benzene is controlled to be below 1.7 µg/m³. Here, the author discusses on the experience from Thailand on following up a group of gas station attendants in Pathumwan District Bangkok in a 10-year period, 5 years before^[5] and 5 year after^[3] implementation of the standard for control of air quality. In 2001 and 2011, the ratio of urine biomarker average level between gas station attendants and controls are equal to 33.3 and 2.3,

respectively. Based on this observation, it can imply that the ratio decreased 14.4 times within 10 years, under the condition of the standards for control of air quality. Based on the observation on the risk for chromosomal damage that doubled the urine biomarker corresponding to 1.3 times, increased the risk of precancerous chromosomal damage risk. The estimated decreased precancerous damage risk is equal to 18.72 times after implementation of the standards. This observation can guarantee that the legal method for control of benzene in atmosphere is a good mean to reduce the risk of cancer among the workers.

Viroj Wiwanitkit^{1,2,3,4}

¹Visiting Professor, Hainan Medical University, China, ²Adjunct Professor, Joseph Ayobabalola University, Nigeria, ³Visiting Professor, Faculty of Medicine, University of Nis, Serbia, ⁴Professor, Senior Expert, Surinrajabhat University, Surin, Thailand

Correspondence to: Prof. Viroj Wiwanitkit,
E-mail: wviroj@yahoo.com

References

1. Huff J. Benzene-induced cancers: Abridged history and occupational health impact. *Int J Occup Environ Health* 2007;13:213-21.
2. Wiwanitkit V. Classification of risk occupation for benzene exposure by urine trans, trans-muconic acid level. *Asian Pac J Cancer Prev* 2006;7:149-50.
3. Tunsaringkarn T, Suwansaksri J, Soogarun S, Siriwong W, Rungsiyothin A, Zapuang K, *et al*. Genotoxic monitoring and benzene exposure assessment of gasoline station workers in metropolitan Bangkok: Sister chromatid exchange (SCE) and urinary trans, trans-muconic acid (t, t-MA). *Asian Pac J Cancer Prev* 2011;12:223-7.
4. Wiwanitkit V, Suwansaksri J, Nasuan P. Feasibility of urinary trans-, trans-muconic acid determination using high performance liquid chromatography for biological monitoring of benzene exposure. *J Med Assoc Thai* 2001;84:S263-8.
5. Wiwanitkit V, Suwansaksri J, Nasuan P. Urine trans, trans-muconic acid as a biomarker for benzene exposure in gas station attendants in Bangkok, Thailand. *Ann Clin Lab Sci* 2001;31:399-401.

Author Help: Reference checking facility

The manuscript system (www.journalonweb.com) allows the authors to check and verify the accuracy and style of references. The tool checks the references with PubMed as per a predefined style. Authors are encouraged to use this facility, before submitting articles to the journal.

- The style as well as bibliographic elements should be 100% accurate, to help get the references verified from the system. Even a single spelling error or addition of issue number/month of publication will lead to an error when verifying the reference.
- Example of a correct style
Sheahan P, O'leary G, Lee G, Fitzgibbon J. Cystic cervical metastases: Incidence and diagnosis using fine needle aspiration biopsy. *Otolaryngol Head Neck Surg* 2002;127:294-8.
- Only the references from journals indexed in PubMed will be checked.
- Enter each reference in new line, without a serial number.
- Add up to a maximum of 15 references at a time.
- If the reference is correct for its bibliographic elements and punctuations, it will be shown as CORRECT and a link to the correct article in PubMed will be given.
- If any of the bibliographic elements are missing, incorrect or extra (such as issue number), it will be shown as INCORRECT and link to possible articles in PubMed will be given.