Innovation and Commercialization

UNIVERSITY OF TEXAS ARLINGTON

Derivatization kit for the enhancement of specificity and sensitivity to BTEX compounds

Tech ID: UTA 16-47

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TECHNOLOGY NEED

Environmental pollution is a major concern both in developed and developing countries. Some of the prevalent environmental pollutants that are hazardous to health upon exposure are benzene, toluene, ethylbenzene and xylenes (BTEX). Because of toxic and carcinogenic effects of BTEX, the American Conference of Governmental Industrial Hygienists (ACGIH) has recommended the biological monitoring of occupational human exposure to BTEX using their biological samples such as urine. Existing analytical methods lack specificity and are limited to detection of some metabolites of these compounds from the biological samples. Also, some fail to detect low concentration metabolites at low exposure level. This can cause a gap in understanding the mechanism of toxicity and metabolite formation caused by single or co-exposure to BTEX compound. Therefore, an efficient, high throughput, sensitive, reliable and highly specific bio-monitoring tool is required to simultaneously detect metabolites at both low and high exposure levels to BTEX compounds in routine screening programs in order to establish stable and safe exposure levels.

INVENTION DESCRIPTION/SOLUTION

UTA researchers have developed a robust bio-analytical, liquid chromatography-tandem mass spectrometry method for the simultaneous quantification of BTEX metabolites in human urine (and other biological fluids). This bio-monitoring tool consists a biomarker derivatization kit which enhances specificity and sensitivity of detection. This technology can be implemented as an effective and valuable tool for routine wellness screening programs for BTEX exposure in work areas, urban areas and other suspected exposure areas. This will help to obtain a metabolite profile of exposed individuals using a single platform and to study co-exposure interaction effects on the delay, suppression, or enhancement of formation of these urinary metabolites. This method overcomes the limitation of existing analytical methods and detects even the trace levels of compounds in the sample. Thus, the developed method is a highly reliable and ultra high-sensitive bio-monitoring tool which can be broadly used in screening programs, toxicological and clinical studies.

APPLICATIONS

- Routine screening programs
- Routine medical surveillance programs
- Occupational safety and health risk assessment
- Epidemiological, Toxicological and Clinical studies

KEY BENEFITS

- Accurate simultaneous detection of BTEX metabolites in biological fluids at low and high exposure levels (co-exposure interaction)
- Detection of trace quantities of target analytes
- Short analysis time, less sample preparation steps and high throughput method

STAGE OF DEVELOPMENT

Prototype

INTELLECTUAL PROPERTY STATUS

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