

## Development of new detection method for trichloroethylene metabolites in human plasma

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Trichloroethylene (TCE) is a common industrial chemical that has been widely used as metal degreaser for many industrial purposes and a well known carcinogen. TCE is metabolized into dichloroacetic acid, trichloroethanol and trichloroacetic acid. A simple, eco-friendly and sensitive method is developed for the determination of TCE metabolites in human plasma samples. TCE metabolites were directly derivatized into their methyl esters with methyl chloroformate (MCF) in presence of pyridine, methanol and water within 1 min at room temperature. Volatile derivatives were extracted by solid-phase microextraction (SPME) and subjected to gas chromatography-electron capture detector (GC-ECD) analysis. MCF derivatization conditions were optimized by one-variable-at-a-time (OVAT) approach. Factors which can influence the extraction efficiency of SPME were screened using 2<sup>7-4</sup> Plackett-Burman Design. The most significant factors such as ionic strength, pH and extraction time were optimized using response surface methodology. The optimum factors for the SPME extraction were found to be 562.5 mg of NaCl, pH at 1 and an extraction time of 22 min. Detection limits of all three metabolites were found to be in the range of 0.036 – 0.068 µg/mL in plasma. Recoveries were always higher than 92%. Intra and inter-day precision were found to be lower than 5 & 10% respectively. The major advantage of this method is that, MCF derivatization allows conversion of TCE metabolites into their methyl esters in very short time (≤30 s) at room temperature directly in the plasma samples, thus makes it a solventless analysis.

### Biography

I (Rajeev Jain) have completed my Masters in Forensic Science from Dr. H. S. Gour University, Sagar (MP), in 2008. Currently I am pursuing my Ph.D. in Analytical Chemistry under the supervision of Dr. M K R Mudiam from CSIR-IITR. My area of work includes the development of new chemical derivatization assays and microextraction techniques for the quantitative evaluation of chemical analytes with polar functional groups. I have published five papers in international journal of repute and I expect to have another three by the end of 2012.

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