

# 6<sup>th</sup> International Conference and Exhibition on **Analytical & Bioanalytical Techniques**

September 01-03, 2015 Valencia, Spain

## Combination of solid-phase and liquid phase microextraction for pre concentration of impurities from air

P V Mosyagin<sup>1</sup> and V A Krylov<sup>1,2</sup>

<sup>1</sup>N I Lobachevsky State University, Russia

<sup>2</sup>Russian Academy of Sciences, Russia

The new high sensitive method of determination of toxicants in air has been developed. The combination of solid phase microextraction and liquid phase microextraction is in the base of the method. At first it is necessary to carry out pre concentration of impurities from the air to crystal structure of ice, which is formed from atmospheric moisture. Thus, the water contained in the analyzed air, acts as a collector of impurities. Condensation concentration is carried out by aspiration of air through the tubes of cryoconcentrator. The formed ice has been thawed and water condensate, containing air pollution, has been collected. Pre concentration of impurities from the condensate was carried out by liquid-phase micro extraction with ultrasonic nano dispersion of extractant. This approach is based on the distribution of trace amounts of suspended submicron particles of extractant throughout the volume of the analyzed sample. Due to the increase of the mass transfer surface in 10<sup>4</sup>-10<sup>5</sup> units of magnitude, the equilibrium in the water-extractant system was established almost immediately. Aggregation of extractant phase was carried using centrifugation. Analysis of the extract was carried out by gas chromatography-mass spectrometry. Obtained integral coefficients concentration of impurities from the air to the extract is 10<sup>4</sup>-10<sup>5</sup>. Reached the limits of detection of high toxic impurities (such as benzo (a) pyrene) is at the level of 10-5 µg m<sup>-3</sup>, which is at the level of the world's leading results. The developed method will solve many problems of traditional methods of sample preparation of air samples. Using of a condensation method solves typical for solid-phase extraction techniques problem of sorbent background. In this case, the adsorbent is moisture of analyzed air, i.e. a substance known to not contain impurities. Thus, there is no need for the procedure of desorption, which is time-consuming and requires expensive extractants. Impurities from the volume sampled air moving in a few micro liters of extractant. Due to this, 20-25% of the sample, containing the impurities of analyzed air enters to gas chromatography-mass spectrometer. In traditional methods of solid-phase extraction, this value is 0.01-0.001%. This fact has allowed to reduce the amount of volume sampled air, to increase the speed of analysis and to reduce the detection limit. The developed method is consistent with the concept of "green chemistry" because one solves the problem of disposing of toxic extractants.

[mospv@mail.ru](mailto:mospv@mail.ru)