ET-AAS DETERMINATION OF SOME METALS IN EXHALED AIR

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It is well known that human health is connected with content of metals in human body. Excessive amounts or deficiency of different metals may give rise to various types of diseases. Blood, urine, nails and hairs are used for control of metals content in human body as usual. Determination of metals in blood and urine gives more exact information. But the direct determination of trace metals in blood and urine using ET-AAS is a difficult problem due to a severe matrix interference.

Apparently the contents of metals in exhaled air will correlate with their contents in human body. It was found correlation between zinc contents in human serum and zinc contents in condensate of exhaled air during the investigation of patients with diseases of lungs (bronchial asthma) (1). In this connection it is very interesting to determine metals in such untraditional object as exhaled air.

At the same time method of Electrostatic Precipitation (EP) in combination with Electrothermal Atomization Atomic Absorption Spectrometry (ETA-AAS) is used for metals determination in ambient air (2,3).

One of the perspective ways of metals determination in exhaled air is a use of EP-ETA-AAS.

EP-device is a system of the "needle-cylinder" type, where cylinder is a standard graphite furnace (GF) for ETA-AAS. Exhaled air passes through GF inserted inside of EP-device a fixed time and metals precipitate on internal surface of GF. Then GF is removed carefully from EP-device and mass of metals is determined by ETA-AAS.

Determination of lead in exhaled air was carried out in this work. Atomic absorption spectrometers Shimadzu AA-6800 was used. High sensitivity of this instrument permits to determine lead in exhaled air in the concentration range from 22 ng/m³ to 31 ng/m³. Limit of detection in this case is 9 ng/m³.

References
1. Tajiev F., Panichev N., Pathological Physiology and Experimental Therapy, 1992, N2, pp.3-8