

Konfrontácia poznatkov o koncentrácii alkoholu v krvi a vo vydychovanom vzduchu

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SÚHRN

Autori príspevku analyzujú príčiny numerických rozdielov výsledkov analýz pri dokazovaní alkoholu v krvi a vo vydychovanom vzduchu. Potvrdzujú presnosť analýz metódou plynovej chromatografie ako aj analyzátormi vydychovaného vzduchu. Navrhujú spôsob eliminácie ľudského faktora, najčastejšie zodpovedného za nepresnosti, na prípustnú mieru (bezpečnostný faktor) a potrebu analýzy dvomi od seba nezávislými metódami respektíve potrebu analýzy dvoch biologických materiálov.

Kľúčové slová: experimentálna alkoholológia – plynová chromatografia – analýza vydychovaného vzduchu – kontrola kvality – ľudský faktor – dychový analyzátor

Confrontation of knowledge on alcohol concentration in blood and in exhaled air

SUMMARY

The authors of the paper give a brief historical overview of the development of experimental alcoholology in the former Czechoslovakia. Enhanced attention is paid to tests of work quality control of toxicological laboratories. Information on results of control tests of blood samples using the method of gas chromatography in Slovakia and within a world-wide study "Eurotox 1990" is presented. There are pointed out the pitfalls related to objective evaluation of the analysis results interpreting alcohol concentration in biological materials and the associated need to eliminate a negative influence of the human factor. The authors recommend performing analyses of alcohol in biological materials only at accredited workplaces and in the case of samples storage to secure a mandatory inhibition of phosphorylation process. There are analysed the reasons of numerical differences of analyses while taking evidence of alcohol in blood and in exhaled air. The authors confirm analysis accuracy using the method of gas chromatography along with breath analysers of exhaled air. They highlight the need for making the analysis results more objective also through confrontation with the results of clinical examination and with examined circumstances. The authors suggest a method of elimination of the human factor, the most frequently responsible for inaccuracy, to a tolerable level (safety factor) and the need of sample analysis by two methods independent of each other or the need of analysis of two biological materials.

Keywords: experimental alcoholology – gas chromatography – analysis of exhaled air – quality control – human factor – breath analyser

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Permanently attractive topic of alcoholology is based on the majority of the knowledge obtained experimentally in the past few decades. This knowledge is used most frequently when determining the concentration of alcohol (ethanol) in biological materials. In concrete cases of alcohol intoxication, however, the responsibility for the result can be assigned only to the psychiatrist. The accuracy and reliability of the toxicological-chemical analysis is required also by the requesters of the analysis (authorities active in the criminal proceedings, employers and others), while the numerical evaluation of the result represents only one criterion from the wide range of factors, which reflect the actual state of alcohol intoxication.

Specificity and accuracy of the toxicological-chemical analysis of biological materials when determining the alcohol intoxication

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is a single domain of analytical chemistry, or it is the toxicologist, the analyst or the forensic doctor, who specializes in toxicological analysis.

Requesters of the analysis usually do not take into account the possible errors (laboratory error and human factor), or the circumstances, which can lead to a radical change in the result (influence of disease, drugs, etc.).

Publications from the field of alcoholology are increasing, but most of them are only compilations of known facts. More often we meet with those, which solve actual problems of alcoholology. Published facts represent most of them only different statistical confrontations of the results of the analysis, without the results of the own research.

The aim of this paper is to look for the origin of the discrepancy of the results, obtained by the analysis of exhaled air and by the analysis of blood by the method of gas chromatography.

Specificity of the alcohol analysis in the current time is solved. The determination of alcohol in exhaled air by the help of the detection tubes is replaced by the analysis of the breath by the digital output and the registration of the result. The evidence of alcohol is separated from the other volatile reducing substances by the gas chromatography with the registration of the results, but also the possibility