

X-RAY SPECTROSCOPY IN THE ANALYSIS OF TRACE ELEMENTS IN HUMAN BLOOD

N.Orlić

University of Rijeka, Faculty of Industrial Pedagogy

J.Dobrinić

University of Rijeka, Faculty of Technical Sciences

D.Grgičević

Institute of Immunology, Zagreb

A.Ljubičić

Institute "Ruđer Bošković", Zagreb

E.Mohorovičić

University of Rijeka, Faculty of Medicine

In this work the concentration of trace elements in a normal human blood was measured using X-ray fluorescence induced by a radioactive ^{109}Cd source. Induced x rays were detected in a high-resolution Si(Li) detector.

In preparing targets from blood samples three methods were tested. Firstly, the freeze-drying method was used to obtain dried plasma. 1 ml of dried blood plasma was prepared in the form of powder and deposited on Whatman filter paper. In the second case, 4 ml dried plasma was laid in ashes at a temperature of 450°C . The ashes thus prepared was also deposited on Whatman filter paper. The third method consisted in dissolving blood plasma ashes in HCl. Insoluble metal chelates formed via coordination with ammonium-pyrrolidine dithiocarbamat were filtered through Millipore filter paper and precipitation products were analysed. The results of the measurement are given in the table.

CONCENTRATIONS in ppm					
METHOD	Fe	Cu	Zn	Pb	Br
dried plasma	96 ± 10	80 ± 8	129 ± 12	19 ± 3	62 ± 7
ashes	105 ± 12	140 ± 11	117 ± 9	35 ± 5	—
APDC	95 ± 3	148 ± 6	168 ± 4	29 ± 2	—

It can be seen that no trace of Br was detected in blood plasma treated at 450°C . The APDC precipitation technique given errors, which are smaller (compared with those of the other two methods) due to the better homogeneity of the target.