

LEA-S500 Elemental Analyzer for Analysis of Hair

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Determination of concentration of both vital (essential) and toxic elements in hair allows to diagnose mineral exchange violations, to reveal necessary and toxic microelements ratio in a human body, to establish the hidden reasons of diseases, the acquired diseases of metabolism, influence of toxins on a human body during a manufacturing process and in everyday life, at criminal poisonings. The LIBS method can be successfully used for this purpose.

The procedure of measurements (quantitative determination) of 25 macro - and microelements (Ag, Al, Ba, B, Be, Ca, Cr, Cu, Fe, F, K, Mg, Mn, Li, Na, Ni, P, Rb, Si, Sn, Sr, Ti, Y, Zn, Zr,) in ppm in biosubstrata (human hair) for various gender and age groups of children and adults with the laser elemental analyzer LEA-S500 has been reported. Accuracy of the analysis results for various elements makes 10-15%.

A hair lock of 50 mg - 100 mg is enough for carrying on the analysis. The minimum sample preparation consists in preliminary washing (according to the IAEA guidelines) and pasting of a lock of hair by specially selected means. The offered method allows to get the average results according to three measurements of the prepared sample within 15 minutes. The express method of analysis allows to study the evolution of elements concentration of the examined human body within small periods of time.

The instrument calibration has been performed using the international certified reference materials of Human Hair NCS DC 73347a and NCS ZC 81002b (the producer is the Chinese National Analytical Center of iron and steel).

The advantages of the offered method in comparison with other currently applied methods for analysis of biosubstrata are as follow:

- express analysis with total time of analysis of no more than 30 minutes, with sample preparation included (the most important advantage);
- there's no need in a sample ashing (dry or wet) what excludes loss of time and uncontrolled loss of volatile elements;
- there's no need in use of special devices for sample preparation, ultrapure reagents and materials.

The offered technique possesses unique properties allowing of monitoring the temporal dynamics of accumulation of essential elements along a hair lock in the process of growth.

Such kind of investigations allow to judge about an organism health state, its metabolism, to determine deficiency of vital elements and make all necessary corrections in proper time in food, to carry out a treatment complex, if required.

The LIBS method can be also used for a hygienic assessment of chemical elements balance in a biosystem on basis of a regional microelement certificate of population.