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### MICROELEMENTS IN GROUNDWATER

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## MICROELEMENTS IN GROUNDWATER

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Groundwater monitoring has been performed in Lithuania for the last 50 years. Hydrochemical monitoring of groundwater was initiated 20-25 years ago. Water was investigated only in respect of ground water level registration and general chemical composition while investigation of microelement content was not paid adequate attention. However, concerning confined aquifers, statistical analysis of distribution of microelements was carried out. It has been serving as the basis while measuring the background values of microelement content in groundwater. Shallow groundwater was investigated only in respect of general chemical composition with rather random tests for microelements. There were only a few attempts made to measure the background values of microelements as well as to determine their origin.

In recent years, hydrogeological mapping, groundwater monitoring and additional specialized environmental hydrogeology tasks accounted for a considerable share of the projects undertaken by the Geological Survey of Lithuania. Also more data on microelement concentration in shallow groundwater was collected. In 1993-1996, more than 400 samples of water were collected at geological mapping and other test sites and investigated in respect of microelement composition. For the purpose of the study, the term "microelement composition" means determination of the content of each following chemical element in the water: zinc, manganese, copper, lead, chromium, cobalt, cadmium, nickel, iron, fluor, strontium and aluminum. Out of these, lead, cadmium, nickel and chrome are understood to be trace metals. Maximum Admissible Concentration of each of the above elements in potable water is very restrictive.

Groundwater has been used by over 1 million people and will be consumed long into the future. This makes the information on microelement content in shallow groundwater to be very important.

**Table. Results of statistical evaluation of microelements in groundwater(mg/l)**

Value	Zn	Mn	Cu	Pb	Cr	Co	Cd	Ni	Fe	F	Sr	Al
Average	0.502	0.454	0.033	0.015	0.039	0.009	0.023	0.042	1.225	0.123	0.148	0.054
Std. error	0.083	0.043	0.004	0.001	0.010	0.001	0.019	0.016	0.401	0.020	0.011	0.029
Mean	0.071	0.154	0.006	0.009	0.006	0.007	0.000	0.010	0.142	0.073	0.127	0.017
Modal	0.040	0	0.003	0	0	0	0	0	0.100	0	0.090	0.008
Std. deviation	1.61	0.83	0.09	0.02	0.19	0.02	0.37	0.31	4.88	0.17	0.08	0.21
Dispersija	2.58	0.69	0.01	0.00	0.03	0.00	0.13	0.10	23.80	0.030	0.01	0.04
Minimum	0	0	0	0	0	0	0	0	0	0	0.036	0.001
Maximum	19	6.4	0.9	0.125	2.6	0.185	7	6	38.39	0.795	0.366	1.5
Total	187.7	169.4	12.20	5.71	14.62	2.78	8.44	15.56	181.2	8.71	7.71	2.83
No. of samples	374	373	375	375	373	309	366	370	148	71	52	52

The data provided in the Table represent concentrations of evaluated microelements in shallow ground water without standpoint in what lithological conditions it occur.