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## GROUNDWATER QUALITY IN THE REPUBLIC OF MOLDOVA AND TECHNOLOGIES FOR THEIR POTABILIZATION

Tudor Lupascu, Oleg Petuhov, Tatiana Mitina, Nadejda Bondarenco, Diana Grigoras,  
Lucian Lupascu

Institute of Chemistry of the Moldova State University, 3 Academiei, MD-2028, Chisinau,  
lupascut@gmail.com, Republic of Moldova

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### **Introduction**

At present, humanity is facing great ecological problems, which the vast majority are the result of harmful human activity. Human-caused damage to the environment has created serious problems for people, which are now intensifying and exacerbating the negative effects. The most serious problems are global warming, the melting of glaciers, thinning of ozone layer, the pollution of natural waters and the consequent depletion of drinking water resources.

The supply of quality water to the population of the Republic of Moldova, as well as throughout the world, is a major problem. This problem has become urgent in the last seventy years due to the influence of the anthropic factor on the environment and especially on the pollution of surface and underground waters with ammonia and ammonium ions, hydrogen sulphide and soluble sulphides, pesticides, petroleum products, heavy metal ions, emergent compounds, etc. This deplorable situation is created due, on the one hand, to the intensive development of industry, agriculture and the standard of living of the population, and on the other hand, due to the fact that the previous governments invested insufficient material resources for the implementation of environmental treatment technologies.

The paper presents the results of scientific researches aiming to study the quality of groundwater from a chemical point of view in different geographical areas of the Republic of Moldova. Also, the results of the investigations regarding the technologies for removing pollutants from underground waters, which exceed the sanitary standards imposed by the "Drinking water" STAS are presented.

### **Materials and methods**

The water samples were collected directly from artesian and phreatic wells from different localities of the Republic of Moldova in plastic containers and transported in refrigerated boxes to the Water Chemistry Laboratory of the Institute of Chemistry for the determination of the main chemical components in accordance with the STAS "Drinkable water". The concentrations of chemical parameters were determined, namely: hydrogen sulphide and soluble sulphides, ammonium and ammonia ions, nitrites, nitrates, total hardness, sodium ions, iron ions, fluorides, sulphates, chlorides, oxidizability of permanganate, total dissolved solids (TDS). The mentioned indicators were determined using standard methods described in STAS "Drinkable water". Technologies for eliminating pollutants detected in quantities that exceed sanitary standards were developed using the pilot mobile

natural water treatment facility, developed in the Laboratory of Ecological Chemistry of the Institute of Chemistry, Republic of Moldova.

***Results and conclusions***

There were analyzed 111 water samples from different regions of the Republic of Moldova, including 58 water samples from artesian wells and 53 samples from phreatic wells. Of the 58 water samples from artesian wells, only 2 (3,4%) fully met the drinking water quality requirements in terms of chemical indicators. Of the water samples from phreatic wells, also only 2 (3,8%) meet the drinking water quality requirements according to the analyzed indicators and the rest of the samples do not meet the norms for one or more indicators. The results of the research showed that the highest number of exceedances of the maximum permissible concentration in water samples from artesian wells was for ammonia and ammonium ions in 75,8% samples, for hydrogen sulfide and dissolved sulfides in 58,6%, for sodium ions – 43,1%, for iron ions – 37,9%, the hardness exceeded the maximum permissible concentration in 31,0% of the samples.

Water samples taken from phreatic wells are characterized by excess of hardness in 82,8% of cases, nitrates in 62,1% of cases, dry residue in 13,8% of samples, sodium ions in 22,4% and sulfates in 8,6%; chlorides in 5,17%; ammonia and ammonium ions in 1,72% of cases. Hydrogen sulfide and dissolved sulfides did not exceed the maximum allowable values in any of the water samples analyzed from groundwater wells. The data obtained allows us to conclude that the composition of water from phreatic wells and artesian wells differs significantly in terms of chemical composition.

Research aimed at eliminating the excess pollutants has highlighted the fact that for the elimination of hydrogen sulfide, soluble sulfides, ammonia and ammonium ions, bivalent iron and manganese ions, the aeration process, oxidation with sodium hypochlorite is recommended. For the elimination of non-oxidized organic substances, the process of filtering water through an active carbon column is recommended. To remove the excess salts, the reverse osmosis process is recommended.

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