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EXAMINATION OF THE CHEMICAL COMPOSITION OF SPRING WATERS IN AKETI VILLAGE OF LANCHKHUTI MUNICIPALITY

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ABSTRACT

For the first time the hydrochemical examination of the spring waters of the village of Aketi of Lanchkhuti municipality was conducted. The content of magnesium and calcium ions, hydrocarbonate ions, chloride ions, sulfate ions, dry balance, permanganate oxidation, total iron ions, dissolved oxygen and carbon dioxide is determined. The content of total iron ions, dissolved oxygen and carbon dioxide. Relatively simple and fast chemical and physico-chemical methods with good reproducibility were selected for determination. Biogenic substances were determined by the photometric method.

Objective: We aimed to study the chemical composition of the spring waters of Aketi village of Lanchkhuti municipality. We determined the following: the content of magnesium and calcium ions, hydrocarbonate ions, chloride ions, sulfate ions, dry balance, permanganate oxidation, total iron ions, dissolved oxygen and carbon dioxide in the spring waters of Aketi village of Lanchkhuti municipalityThe relevance of the issue lies in the fact that the content of the above-mentioned ions was determined for the first time in the given waters, for which highly sensitive methods were selected.

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Introduction.

Today, the greatest attention is paid to the rational usage and protection of water resources. Currently, the water is being cleaned and disinfected, as a result of which it is used for drinking and for centralized water supply.

Chemically pure water does not exist in nature. As water moves through the Earth's crust, it touches many minerals, dissolves them, and carries them along the circulation path. Natural water is a solution containing substances of various nature. Therefore, the study of natural waters requires knowledge of the basic properties of solutions. The main component of natural and wastewater is water itself.

Water is a good solvent and dissolves the substances it touches in its circulatory system. Gases are mainly transferred from the air, and solid substances (minerals) from the rocks. Many substances that are insoluble in water are mechanically mixed with it and adhere to colloidal state. When water reaches the deep layers of the earth, it is affected by high temperature and pressure, which helps to dissolve substances [1].

Natural waters contain almost all chemical elements, but in different concentrations, calcium, magnesium, sodium, potassium and iron cations are usually found in fresh waters, chloride ions, sulfate ions and hydrocarbonate ions are mainly obtained from anions. Many biogenic elements are found in living organisms in very small amounts and are called trace elements. The trace element increases the activity of the enzyme [4].

Lanchkhuti district is bordered on the east by Samtredia and Chokhatauri districts, on the west by the Black Sea, on the north by Khobi, Senaki and Abasha districts, on the south by Ozurgeti district. The Lanchkhuti region has a plain and hilly terrain, the northwestern part is occupied by Guria plains, and the southeastern part by Guria - Nigoeti hills.The plains are flat accumulation plains built with quaternary sediments, cobbles, sandstones and loams. The middle part of the district is the lowest place. Sea dunes are spread along the sea coast, which prevent surface water from flowing into the sea, which is one of the reasons for the emergence of swamps and forests. The terrain of the foothills is highly fragmented and stepped. It is characterized by sea and river terraced surfaces. On the plains and hills of Guria up to 200 metres there is humid sea air. It is characterized with warm winters and the hot summers. The largest and well-watered river is Supsa, it is nourished by rain, snow and underground water. Flooding is known in spring and autumn, water scarcity in the second half of summer and winter [7].

Judgment of the experiment.

The following were determined for the first time in the spring waters of Aketi village of Lanchkhuti municipality: magnesium and calcium ions, hydrocarbonate ion, chloride ion, sulfate ions, dry balance, permanganate oxidition, dissolved oxygen and carbon dioxide content. The results of the analysis are given in Table #1.

The spring waters studied by us are low in mineralization, which is why their reaction is almost neutral (6.12 – 6.74). The ion content is variable.

Magnesium ion is contained in the largest amount in Shukhuti spring - 2.22 mg/l. And its content is the smallest in Megreladze spring 0.34 mg/l.

The Ca^{2+} ion content is also variable. A relatively large amount of it was recorded in Shukhuti spring at 2.46 mg/l, while its content was low at 0.38 mg/l in Doghadze spring.

The HCO_3^- ion content is the highest in Gujabidze spring at 3.62 mg/l, the content of hydrocarbonate ions is the smallest in Megreladze spring at 2.04 mg/l.

The Gujabidze spring contains relatively large amounts of chloride ions, 1.54 mg/l. And its mass content is small in Megreladze spring at 1.06 mg/l.

The content of carbon dioxide is the highest in Gujabidze spring at 0.98 mg/l. Doghadze spring contains a small amount of carbonic acid gas, 0.78 mg/l.

The content of dissolved oxygen is high in Megreladze spring, 5.76 mg/l. A relatively small concentration of dissolved oxygen is recorded in Khukhunishvili spring at 3.46 mg/l.

Permanganate oxidition is relatively high in Cold spring at 2.18 mg/l, its small amount is shown in Bzanara spring at 0.48 mg/l.

A high concentration of SO_4^{2-} ions is recorded in Doghadze spring at 0.65 mg/l, a small amount of sulfate ions is found in Khukhunashvili spring at 0.012 mg/l.

The total iron ion content is relatively high in Nani spring at 0.042 ml, while the total iron ion content is low in Gujabidze spring at 0.026 mg/l.

The dry balance is the highest in Megreladze spring at1.63 mg/l. Its content is the smallest in Kukuladze spring at 1.32 mg/l.

The content of biogenic elements NO_2^-, NO_3^-, NH_3, PO_4^3 is smaller than the detection limit.

Table N 1. Results of the analysis of the chemical composition of the spring waters of Aketi village, Lanchkhuti municipality.

N	Regional names of spring waters	*pH*	Mg/l									
			Ca^{2+}	Mg^+	HCO_3^-	SO_4^{2-}	Cl^-	Dissolved oxygen	Permanganate oxidation	CO_2	Total Iron	Dry balance
1	Megreladze spring	6,12	0,64	0,34	2 ,04	0,045	1,06	5,76	1,14	0.94	0.028	1.63
2	Doghadze spring	6,24	0,38	0,52	2,24	0.065	1,46	4,48	3,04	0,78	0.034	1.57
3	Gujabidze spring	6,53	0,94	1,06	3,62	0,008	1,54	5,12	0,48	0.98	0,026	1,55
4	Shukhuti spring	6,74	2,46	2,22	6,06	0,037	1,52	3,58	0,56	0,92	0,038	1,59
5	Nani spring	6,44	0,58	0,92	4,62	0.021	1,53	3,71	0,96	0,82	0.042	1,45
6	Khukhunashvili spring	6,67	1.02	0.66	2,86	0.012	1,36	3,46	0,52	0,86	0.037	1,41
7	Kukuladze spring	6,06	1,08	0,74	3,28	0,016	0,84	3.84	1,12	0,94	0,030	1,32

Experimental part. Methodology of determining chemical elements in water.

The analyzes were carried out in the Analytical Chemistry Laboratory of Kutaisi Akaki Tsereteli State University. Methods tested in hydrochemical practice were used for the analysis [5, 6].

The acidity rate was measured by the potentiometric method (Potentiometer pH 673 - M) The mercurimetric method was used to determine chlorides (titrant 0.01 $Hg(NO_3)_2$, indicator (diphenyl carbazole). Hydrocarbons were determined by the acidimetric method (titrant 0.1-0.01 N HCl indicator methyl orange.

The content of calcium and magnesium, as well as the total hardness of water in the investigated waters is determined by the complexonometric method (titrant 0.01N Complexon III. To determine the magnesium ion content, we used eriochrome black as an indicator, we created the recommended area with an ammonium buffer, and to determine the calcium ion, murexide was used as an indicator. We created an alkali area with 2N sodium alkali).

Carbon dioxide was determined by the alkalimetric method. Titrant 0.1-0.01N $NaOH$. Indicator Phenophthalein. Oxidability was determined by the permanganatometric method (oxidizing agent 0.01 N $KMnO_4$, in acidic area. Titrant 0.01 N $H_2C_2O_4$). Oxidability was determined by the permanganatometric method (oxidizing agent 0.01 N $KMnO_4$, in acidic area. Titrant 0.01 N $H_2C_2O_4$) [2].

The oxygen content was determined by the iodometric method (titrant 0.01 N $Na_2S_2O_3$. In an alkaline environment $Mn(OH)_2$ is oxidized by oxygen dissolved in water and passes into a tetravalent manganese compound, I_2 is formed by acidifying KI solution in excess).

Sulfate ions and dry balance were determined by classical gravimetric method. Total iron content was determined photometrically after pre-oxidation in the alkaline zone (photometric regent sulfosalicylic acid) photoelectric colorimeter. Biogenic substances were determined by the photometric method: NO_2^- membrane reagent, NO_3^- sodium salicylate, NH4+ - Nessler's reagent, - PO_4^{3-} ammonium phosphorolybdate [3].

Conclusion.

The content of calcium, magnesium, chloride ions, dissolved oxygen and carbon dioxide, dry balance, sulfate ions, permanganate oxidition of common iron ions and hydrocarbonate ions in the studied spring waters of Aketi village, Lanchkhuti municipality is within the norm, and its use for drinking and agricultural purposes is appropriate.

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