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## SPRING WATER: TO DRINK OR NOT TO DRINK?

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### **Annotation**

*This article deals with the topic the significance of which has not been appreciated yet, but it is steadily increasing throughout the world. It is a topic of unhealthy drinking water. It is fresh water that gradually comes out on the top in the list of the most valuable natural resources, and it will overtake leaving far behind such titans of the economies of all countries as oil and gas without which there is no one can see the future now.*

*Much attention is given to the research and the study of the quality of spring water in a concrete example.*

### **Actuality**

The interest to the springs has increased recently. The springs are natural way out of groundwater on the surface and are an important component of the natural environment and geographical situation. Spring water from the pure source does not almost need to be cleaned: getting up from the depth of the Earth's surface and passing through the sand and gravel, it is subjected to natural and perfect cleaning.

The problem of water resources is one of the most important environmental issues as water is not only public health, but also the life of the animals and plants. In addition, spring waters are the most important strategic resource aimed at supplying the urban residents with water in case of emergencies that require detailed monitoring studies, as well as a qualitative and quantitative analysis of the springs.

In my opinion, this problem is very urgent, because water is the most important substance in the world, without which no one living organism can exist and no one biological, chemical reactions and processes can go on. I had a task to study the problem of the quality of spring water in our city, whether it is possible to use it in everyday life, whether it does not cause harm to the residents, what diseases may occur using unhealthy water.

### **Project.**

The human body is more than half is made of water, so the quality of drinking water and the health are directly proportional. Scientists all over the world confirmed the fact that more than 80% of all diseases of the world population due to the consumption of unhealthy drinking water.

Residents of the regional center of Vladimir believe that natural water healthier and purer than that one that runs from the tap. Is this true, and what is a quality of drinking water in our city?

There are 21 Vladimir spring in the city and the most intensively used source is in Mira street, which is a way out of groundwater of descending type. Unloading groundwater is concentrated, the operation mode is constant, the estimated water consumption is 0.2 l/d.

The purpose of my visiting the spring is to study water and environment of the spring. The spring is equipped with the well pipe, over which a gazebo is erected. An asphalted path

and staircase lead to the spring. The area is surrounded with crossings over the creek and benches. Appearance has to be trusted, but what is about the water?

I put this question to a specialist of water quality laboratory at MD of Vladimir Water Channel.

The experts took water sample and announced the results of the study:

Table 1

<i>No.№</i>	<i>The name of ingredients</i>	<i>The limited maximum, sanitary codes mil/dec<sup>3</sup></i>	<i>The limited maximum of Council of EU</i>	<i>The results of quantitative chemical analysis, mil/dec<sup>3</sup></i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
<i>1</i>	pH, unit. pH	6-9	6,5-9,5	6,43
<i>2</i>	The turbidity of the kaolin	1,5	1,0	<0,5
<i>3</i>	Coloration, degree	20	-	5.88
<i>4</i>	Smell, mark	2,0	-	20 <sup>0</sup> -0; 60 <sup>0</sup> -0
<i>5</i>	Taste, mark	2,0	-	0
<i>6</i>	Total hardness, mil-equiv./dec <sup>3</sup>	7,0	2,5	6,88
<i>7</i>	Calcium, mil/dec <sup>3</sup>	300-400	50	90,2
<i>8</i>	Magnesium, mil/dec <sup>3</sup>	20-85	-	28,4
<i>9</i>	Nitrogen amonini	1,5	1,5	<0,04
<i>10</i>	Nitrogen nitrite	0,99		0,007
<i>11</i>	Nitrogen of nitrates	10,35		2,91
<i>12</i>	Phosphate ion	3,5		0.52
<i>13</i>	The dry residue	1000		392,0
<i>14</i>	Sulfate ion	500	250	62,4
<i>15</i>	The chloride ion	350	250	110,45
<i>16</i>	The oxidation permana room	5,0	5,0	0,25
<i>17</i>	The total iron	0,3	0,2	<0,1
<i>18</i>	Copper	1,0	2,0	0,005
<i>19</i>	Zinc	5,0	-	0,003
<i>20</i>	Manganese	0,1	0,05	0,052
<i>21</i>	Nickel	0,1		0,005
<i>22</i>	Cadmium	0,001		<0,0005
<i>23</i>	The fluoride-ion	1,5		0,1
<i>24</i>	Lead	0,03	-	0,005

25	Aluminum	0,5	0,2	0,051
26	AND-DETERGENTS	0,5		<0,025
27	N-SURFACTANTS	0,1		<0,1
28	Chrome 6+	0,05		<0,05
29	Coliphages, FIGHT in 100 mil	Absent	-	Not found
30	Total coliform BAC the criteria(OKB),CFU in 100 mil	Absent	-	Not found
31	Cauley plate thermotolerant bacteria (TCB)	Absent	-	Not found
32	Total bacterial count (TBC), CFU in 1 mil	100	-	Not found

*In the second column the limited maximum of the ingredients according to of Council of EU is reflected. The fourth column shows the results of the quantitative chemical analysis of water in the spring.*

*After some investigation, I came to conclusion: the water here is of hard property.*

*Water hardness is determined by the content of salts in the water (calcium and magnesium). It is expressed in milligram equivalents per liter (mEq/L).*

*In assessing water hardness it is usually characterized as follows:*

*Table 2*

Water	Hardness, mEq/l
Very soft water	to 1,5 mEq/l
Soft water	from 1,5 to 4 mEq/l
Water of medium hardness	from 4 to 8 mEq/l
Hard water	from 8 to 12 mEq/l
Very hard water	over 12 mEq/l

*According to sanitary standards 2.1.4.1074-01 hardness of drinking water should be not higher than 7 (10) mEq / L, (or more than 350 mg / l). [2]*

*Hard water is just unpleasant to the taste, it has too much calcium. Continual ingestion of water with high hardness leads to a decrease in gastric motility, to the accumulation of salts in the body and, ultimately, a joint disease (arthritis, polyarthritis) and the formation of kidney-stone and the bilious tract.*

*Although very soft water is not less dangerous than too hard. The most active is soft water. Soft water can flush out calcium from the bones. A person may have rickets, if you drink this water since the childhood, the adult will have fragile bones. There is one negative aspect of soft water. It runs through the digestive tract and it not only leaches minerals and useful organic substances, including nourishing bacteria. The water should be hard not less than of 1.5-2 mEq / L. [1]*

*Water in the studied spring refers to the medium level of hardness: in dimension -: 6.88 mEq / L. This corresponds to the sanitary standards, though this value is close to the critical.*

*This water can be drunk, if only there is no rust and chlorine in the tap. No harmful bacteria were found. Water is epidemiologically pure and there is no radiation in it, water has harmless chemical composition and favorable organoleptic properties. Spring water corresponds to GOST 2874-82 "Drinking water", but it is necessary to use heat treatment.*

*State standard specifies that drinking water is water, which in its natural state or after heat treatment meets the hygienic standards 2.1.4.1074-01 and it is intended for the drinking and household needs of the people or for the human consumption of manufacturing goods (food, beverages or other products). [3]*

*In the Russian Federation, the quality of drinking water must satisfy the requirements of sanitary standards 2.1.4.1074-01 "Drinking water. Hygienic requirements for centralized drinking water supplying systems. Quality control." [4] In accordance with the study of the tables it is clear that the European standards are stricter than that of Russian ones, and it is necessary to try to attain them, otherwise the trend of pollution and dumping of waste into water will go on.*

*The audit showed that the quality of water in the spring in Mira street is trustworthy. But how long will it last? The quality of water in springs can vary greatly depending on the season, the presence or absence of precipitation, the soil pollution near the springs. And the water samples taken today may differ greatly from that one which will be selected tomorrow, next week, next month. It is better to protect yourselves and your loved and it is necessary to boil water - both the tap and spring one.*

*In order not to depend on the weather conditions and the human factor, the spring must be modernized. Water needs continuous disinfection with the use of spring filters.*

*With sufficient funding and proper native landscaping, the dream of a sufficient amount of fresh water in all areas of the Earth will become true. But, unfortunately, not for all countries the purification and extraction of fresh water is a priority. Perhaps it seems that the regions with the "water shortage" are too far from us, but the moment when this problem will be actual to everyone is just a matter of time. Therefore, today it is necessary to start with small, that is to reduce water waste and to care of the invaluable gift of nature. Save and increase water supplies is in our power.*

### **Literature**

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