SEARCH AND STUDY OF TREATMENT SPRING WATER: A CASE STUDY OF GALLAARAL IN JIZZAKH, UZBEKISTAN

Sabokhat Tashpulatova Akbarovna
Department of Ecology and Environmental Protection, Jizzakh polytechnic institute, Jizzakh, Uzbekistan
sabo_8728@mail.ru

ABSTRACT

This study is based on the analysis of the physicochemical analysis of water sources (34 sources) in the Gallaaral district of the Jizzakh region, the purpose of which is to determine the presence of mineral springs useful for the human health in this area. The results of the chemical analysis of the springs are compared with the main criteria (requirements) of mineral waters of Uzbekistan as mineral treatment waters. According to the comparison results, none of the 34 springs investigated in the Gallaaral district has a content of medical mineral water. However, it was found that the content of iodine, organic substances, silicon and its compounds in the water of the Tamchibulak, Saad ibn Wakkas, Ugat 4 springs are close to the criteria. In future studies, the chemical analysis of these springs will be studied more deeply.

Keywords: spring water, treatment properties of spring water, water quality, rural health, Gallaaral, Jizzakh.

INTRODUCTION

Gallaaral os one of the largest districts of Uzbekistan, which is part of the Jizzakh region. In the mountainous and foothill areas of this territory there are many natural sources of water – springs that appeared many years ago. Most of the springs in Gallaaral are used as direct source of drinking water for the population and for a number of economic purposes. Water is the most important chemical for the human body, and its importance is growing every day. Especially in recent years, the growth of anthropogenic factors has a negative effect on water resources, especially on springs [2]. The quality of water, as well as the presence or absence of spring water is one of the important factors directly related to the fate of a person, especially to his health [3]. The waters of the Gallaaral spring have been described in many main literary sources as medicinal [4]. In order for spring water to have a therapeutic effect on the human body, it must contain a number of essential and useful mineral salts and chemical elements [5].

In the fall of 2020 (September, November), 68 samples were taken from 34 largest sources, which had been consumed by the population of the Gallaaral district for many years, and a physicochemical analysis was carried out. The results of the chemical analysis of spring water were compared and analyzed with factors assessing that the waters found on the territory of Uzbekistan are curative mineral water. These comparative factors include: content of free (dissolved) CO_2; content of H_2S generally (H_2S+HS^-); content of As; content of Fe ($Fe_2^+Fe_3^+$); content of Br; content of J; content of $H_2SiO_3+HSiO_3^-$; the content of organic matter (in terms of carbon - C); reaction of water (pH); temperature. Since the sources meet the demand for drinking water, this means that in-depth analysis and research is very important.

METHODOLOGY

1.1. Study Area

The study area is (Gallaaral) located in Jizzakh region in Uzbekistan. The studied 34 sources are located in the cities of the Gallaaral district (Marjonbulak, Koytash) and in many villages.

1.2. Research Design

The research was an experiment. Water samples were collected from Gallaaral in Jizzakh region in Uzbekistan and tested at the Jizzakh Regional Center of Sanitary-Epidemiology laboratory and the State Committee of "Uzbekhydrogeology", the laboratory of hydrochemistry.

1.3. Sampling Procedure

Samples were taken in sterile polyethylene bottles (1000 ml) in fall (September, November 2020). A total of 68 water samples from 34 sources were timely analyzed in the laboratory for physical (pH and hardness) and chemical analysis, respectively.

1.4. Data Collection and Analysis

All samples were analyzed physically and chemically. The data were analyzed using Microsoft Excel Computer Software.

1.5. Chemical Quality Analysis Methods

Chemical characteristics of water involve CO_2 (mg/l), H_2S (mg/l), SiO_2 (mg/l), H_2SiO_3 (mg/l), C organic matter (mg/l).

RESULTS

1.6. Chemical Quality Analysis Methods

Chemical characteristics of water involve CO_2 (mg/l), H_2S (mg/l), SiO_2 (mg/l), H_2SiO_3 (mg/l), C organic matter (mg/l) (Table 1). J (mg/l), Br (mg/l), B (mg/l) is showed in second table (Table 2). These substances were determined for comparison with the requirements for the medical properties of the sources.

Table 1

Chemical analysis of spring water in Gallaaral

№	Spring name	CO_2 (mg/l)	H_2S (mg/l)	SiO_2 (mg/l)	H_2SiO_3 (mg/l)	«C» organic matter (mg/l)
1	Tamchibulak	31	0	16	21	0,10
2	Kukbulak	40	0	2	2,6	0,20
3	Yonboshtut	31	0	2	2,6	0,31
4	Savruk ota	22	0	2	2,6	0,10
5	Karimsay	31	0	2	2,6	0,61
6	Hovuzbulak	18	0	2	2,6	0,92
7	Karimsay 1	22	0	2	2,6	0,32
8	Karimsay 2	26	0	2	2,6	1,74
9	Ugat 1	22	0	2	2,6	2,56
10	Ugat 2	35	0	2	2,6	0,61
11	Ugat 3	13	0	2	2,6	0,10
12	Ugat 4	22	0	2	2,6	0,10

13	Ugat 5	26	0	4	5,2	1,00
14	Ugat 6	26	0	4	5,2	0,20
15	Kelitosh	31	0	4	5,2	0,20
16	Mixliboy	31	0	8	10,4	1,70
17	Saad ibn Waqqos	13	0	4	5,2	3,60
18	Saroybulak	31	0	4	2,6	3,20
19	Gumsay	13	0	2	2,6	0,20
20	Tog` olmali	13	0	2	2,6	3,30
21	Solin	26	0	2	2,6	0,50
22	Moybulak	22	0	2	2,6	3,25
23	O`rta olmali	18	0	6	8	0,09
24	Gubdin	18	0	6	8	1,72
25	Tog` olmali 2	26	0	4	5,2	0,19
26	Kichkina Solin	22	0	4	5,2	0,09
27	Katta Kitayis	18	0	6	8	0,67
28	Tolisay	13	0	6	8	0,09
29	O`ymovut	18	0	2	2,6	1,15
30	Shodibobo	22	0	10	13	1,43
31	Kucharbuloq	13	0	2	2,6	0,57
32	Mullabuloq	18	0	4	5,2	1,24
33	Katta buloq	26	0	2	2,6	2,20
34	Xujakobud	18	0	2	2,6	1,62

Table 2

Chemical analysis of spring water in Gallaaral

№	Spring name	J (mg/ l)	Br (mg/l)	B (mg/l)
1	Tomchibuloq	0	0,96	1,74
2	Ko`kbuloq	0	1,44	1,74
3	Yonboshtut	0	2,88	3,47
4	Savruk ota	0	1,92	1,74
5	Karimsoy	0	0,96	3,47
6	Hovuzbuloq	0,16	0,96	1,74
7	Karimsoy 1	0	0,48	1,74
8	Karimsoy 2	0,60	0,48	1,74
9	O`gat 1	0	0,48	1,74
10	O`gat 2	0	0,96	1,74
11	O`gat 3	0	0,96	1,74
12	O`gat 4	2,20	0	1,74
13	O`gat 5	0	0,96	1,74

14	O`gat 6	0	0,96	0
15	Kelitosh	0	0,96	1,74
16	Mixliboy	0	3,36	0
17	Saad ibn Wakkas	0	3,36	0
18	Saroybuloq	0	1,90	1,72
19	Gumsoy	0	0,96	1,74
20	Tog` olmali	0	1,44	1,74
21	Solin	0	0,48	0
22	Moybuloq	0	2,40	3,47
23	O`rta olmali	0	2,40	3,47
24	G`o`bdin	0	2,88	1,74
25	Tog` olmali 2	0	1,44	0
26	Kichkina Solin	0,80	0,48	1,74
27	Katta Kitayis	0,60	2,40	3,47
28	Tolisoy	0,20	3,36	1,74
29	O`ymovut	1,20	0,48	1,74
30	Shodibobo	0,40	1,44	5,30
31	Ko`charbuloq	0,40	2,88	3,47
32	Mullabuloq	1,20	0,48	1,74
33	Katta buloq	0	1,44	1,74
34	Xo`jakobud	0	1,44	1,74

DISSCUSSION

Samples were taken from natural spring water in Gallaaral district of Jizzakh region and the results of physical analysis were studied. The amount of dissolved (free) CO_2 in these sources does not meet the requirements of medical sources for this indictor. The criterion for assessing the amount the CO_2 should be 0, 5 g/l. H_2S (mg/l) should be 10 mg/l, however not detected in any of the spring water sample examined. The total amount of SiO_2 and H_2SiO_3 was in Tamchibulak (37 mg/l), followed by Shodibobo (23 mg/l) and less in Mixliboy (18, 4 mg/l). And all other sources showed even lower values (14, 9, 6 and 4 mg/l).

According to the requirements for evaluating medicinal mineral water, the amount of Si compounds in the water should be 50 mg/l. The amount of carbonaceous organic matter also showed different results in all samples of spring water. The maximum results was obtained for a sample of spring water Saad ibn Wakkas (3, 60 mg/l), as well as Tog olmali (3, 30 mg/l), Moybulak (3, 25 mg/l), Saroibulak (3, 20 mg/l) were also relatively high. All other sources were found to have lower organic matter levels. According to the requirements for assessing mineral waters, the amount of organic matter should be 5 mg/l. Spring containing iodine have also been found in

the Gallaaral area. The maximum values are Ugat 4 (2, 20 mg/l), Oymovut and Mullabulak (1, 20 mg/l), Kichkina Solin – 0, 80 mg/l. It turned out that most of the remaining spring water is practically nonexistent. According to the criteria for evaluating medical mineral water, its content in water must be at least 5 mg/l. It has been shown that the chemical element bromine is present in water in very small amounts (Table 2). According to the assessment criteria, the bromine content in medical mineral water should be 25 mg/l. Mineral medical water must contain 35 mg/l to be «available», but springs in the Gallaaral area have been found to contain very small amounts of this chemical element and its compounds (Table 2).

CONCLUSION

The results of chemical analysis of samples taken from springs in the Gallaaral district showed that none of the springs meets the standards specifies in the requirements for the assessment of medical mineral waters in Uzbekistan, but in terms of the amount of silicon compounds, iodine and organic matter are in demand turned out to be close to the specified value. In the future, more samples will be taken from these sources and chemical, physical and microbiological analyzes will be carries out.

REFERENCES

1. Sabokhat Tashpulatova Akbarovna. Physical and chemical analysis of springs in Gallaaral, Uzbekistan. International Engineering Journal for Research & Development. E-ISSN NO: - 2349-0721. Page 1. 2020.
2. Apec Water, (2016). What is spring water and how is it so safe? http://www.freedrinkingwater.com/water_quality/quality1/1-define-spring-water-why-safe.htm. Accessed June, 2016.
3. Sabokhat Tashpulatova Akbarovna. Treatment properties of the springs in Jizzakh region, Uzbekistan. International Engineering Journal for Research & Development. E-ISSN NO: - 2349-0721. Page 1. 2020.
4. Encyclopedia of Uzbekistan.
5. S. A. Tashpulatova. Search and study of treatment spring water: A case study of Jizzakh region in Uzbekistan. IOP Conf. Series: Earth and Environmental Science 614 (2020) 012134. ICECAE 2020.