

The value of the hydro resources of Lake Zhalanashkol for the development of health tourism and recreation in the Republic of Kazakhstan

El valor de los recursos hídricos del Lago Zhalanashkol para el desarrollo del turismo de salud y la recreación en la República de Kazajistán

Kuat M. BAIMYRZAYEV [1](#); Yerlan S. ANDASBAYEV [2](#); Erkyn A. TOKPANOV [3](#)

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ABSTRACT:

In Alakol intermountain basin is a unique natural object of the Kazakhstan - lake Zhalanashkol. A special place is occupied by hydro resources of the lake, which should be used for the development of therapeutic tourism and recreation. The article presents the results of a study of the physico-chemical composition of the water and mud of the lake Zhalanashkol. Until recently, scientific researches and design elaborations not received enough data balneological properties of water and brine lake Zhalanashkol.

Keywords: Lake Zhalanashkol, balneology, minerals, health tourism.

RESUMEN:

En la cuenca de Alakol hay un sitio natural único de Kazajistán, el lago Zhalanashkol. Un lugar especial ocupado por los recursos hídricos del lago, que deben ser utilizados para el desarrollo del turismo terapéutico y la recreación. El artículo presenta los resultados de un estudio de la composición físico-química del agua y el lodo del lago Zhalanashkol. Hasta hace poco, las investigaciones científicas y elaboraciones de diseño no recibieron suficientes datos balneológicos propiedades del agua y salmuera del lago Zhalanashkol.

Palabras clave: lago Zhalanashkol, balneología, minerales, turismo de salud.

1. Introduction

Lake Zhalanashkol is closed Alakol intermountain trough in the South-East of the Republic of Kazakhstan. Included in the Alakol lake system. Geographical coordinates are 45°36' North

latitude, 82° 15' East longitude. The area of mirror surface of 37,5 km², length 9 km, width 5.5 km, shoreline length of 23.8 km, the water volume of 104 mm³ (Dzhetimov, 2014). Zhalanashkol formed in the trough filled with river sediments. The average depth of 2.6 meters.

In scientific research and project studies on the study of the formation, a diet of water and mud of the lake Zhalanashkol, in the conditions of arid climate has not received sufficient development, assess the suitability of the use of peloid muds and waters for the development of therapeutic tourism and recreation (Kuskov, 2004).

The absence in the literature a unified approach to the solution of sedimentation processes in continental reservoirs was the reason that since 2012 work has begun to study hydro resources of lake Zhalanashkol. The study of hydromineral resources is closely connected with the problem of establishing the need to define their degree of suitability for the development of therapeutic tourism and recreation.

1.1. Aspects of the research

The result of physico-chemical study and assessment of recreational waters and therapeutic mud's are defined:

1. Organoleptic characteristics of the declared sample of mud (color, smell, consistency, structure);
2. Physico-chemical characteristics of the declared sample of water;
3. Sanitary-microbiological characteristics of the declared sample of mud.

Revealed that such contaminants, detergents, heavy metals are present in peloide not exceeding the established norms. Mud treatment as a reservoir for these indicators can be described as environmentally friendly. In this regard, important is the study of the processes of formation, the power supply mode of the water and mud of the lake and their importance for the development of health tourism.

2. Methodology

In the process of the study were used General methods of research: methods of analysis of financial statements: horizontal, vertical, ratio, comparison, and other.

To study the tourism in Kazakhstan were used General scientific and special research methods:

- review of the regulatory framework;
- analytical method;
- economic-mathematical calculations.

2.1. Materials and methods

In the period 2012-2017 from the lake Zhalanashkol was selected 40 water samples from different depths of 15 points standing from each other at a distance of 120 meters and 20 samples of therapeutic mud.

Analytical work was carried out in laboratories chemical methods of research of the Institute of hydrogeology and Geoecology named after U. M. Akhmedsafin of the Committee of science of Ministry of education and science of the Republic of Kazakhstan. For obtaining analyses of samples of the used atomic absorption spectrometer "Hitachi", model 180-50 (Japan); - flame photometer PFP7 (great Britain) - optical emission spectrometer with inductively coupled plasma Optima 2000 DV (USA). Autoclave electric SOST 9586-61, a biological microscope according to SOST 8284-78 brand Leica DMLS with a digital camera Leica DC 300F.

3. Results

Mg++	93.9	7,7	14,7	Cl-	233,6	6,3	12,0
Fe (+3)	0,1	0,01	0,0	SO4-	633,6	13,2	25,2
ammonium	0,2	0,01	0,00	fluorides	4,35	0,23	0,01
				idity	0,55	0,004	0,000
				bromide	30,96	0,39	0,02
				Bor	9,00		

Comparative analysis of laboratory data water samples showed a seasonal difference in the number of detected kationov and anions in West and East part of the lake Zhalanashkol.

Composition of water of the Eastern part of the lake compared to the Western part dominated by the presence of Ca 10 mg/l (33,3%); magnesium and 4.9 mg/l (5,21%); HCO₃ of 30.5 mg/l (1,75,1%); sulfates of 43.2 mg/l (6,81%), and Na+ K decreases by 2.55 mg/l (0,24%); CO₃ 8 mg/l (5,79,2%) [table 2 and 3].

Water East of the lake Zhalanashkol, where pH=9.0, 3971,7 total mineralization, mg/l, dry residue 3,024 g/l, total costcost of 0.4 and 5.6.

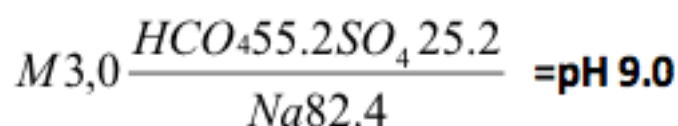
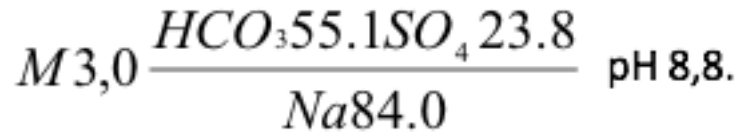


Table 3

The results of spectral analysis of the chemical composition of water of the Western part of the lake Zhalanashkol

Cations				Anions			
components	mg/l	mg/EQ/l	% mg/EQ	components	mg/l	mg/EQ/l	% mg/EQ
Na++ K+	1041,6	43,4	84,0	CO ₃ -	138,0	4,6	89
Ca++	20,0	1,0	1,9	HCO ₃ -	1738,5	28,5	55,1
Mg++	89,0	7,3	14,1	Cl-	233,6	6,3	12,0
ammonium	0,2	0,01	0,00	SO ₄ -	590,4	12,3	23,8
				fluorides	4,06	0,21	0,01
				idity	1,47	0,012	0,001
				bromide	39,53	0,49	0,02
				Bor	9,00		

Water the Western part of the lake, where pH 8.8, total mineralization 3851.1 mg/l, dry residue 3,024 g/l, total hardness of 0.4 and 5.6.



Comparative analysis table 2, 3 enables us to conclude that the composition of water than magnesium and calcium, the concentration of potassium, sodium, chlorine, sulfate, gidrokarbanatno more. Conducted laboratory analysis of water for the presence of mineral salts sources of underground waters of the lake, showed a fluctuation of chemical composition depends on the evaporation, the amount of spring melt water under the condition of arid climate (Tokpanov, 2017).

In the course of a field study hydro resources of lake Zhalanashkol studied the regularities of formation of therapeutic mud. According to the materials collected and laboratory analysis of samples of therapeutic mud to the following conclusions: in the arid summer climate increases the evaporation of water and increases the concentration of dissolved chemical elements and on the bottom of the pond forms a highly mineralized layer of dirt, which is called brine or brine. The concentration and composition of brine varies depending on meteorological conditions and time of year. The salinity of the brine can be very high and often reaches 300-350 g/l (Kuskov, 2004).

The results of the analysis of brine and water showed that the composition of 1 dm³ brine fraction of manganese, copper, lead, nikel, cadmium, stronza, chromium is from 0.0007 - 0.1 mg/dm³, which corresponds to sanitary-and-epidemiologic requirements.

In the composition contains ions of sulphate (62,38 g/100g), chlorides (1.90 g/100g), potassium (0.02 g/100g) calcium (0.21 g/100g) and salt CaSO₄ (0,62%), MgSO₄(0.83 Percent), NaCl (2,78%), KCl (0,03%), MgCl₂ (92,35%) [table 4].

In the composition of the therapeutic mud is dominated by bischofite (MgCl₂). According to scientists balneologists bishofit is used in diseases of musculoskeletal system (with deforming arthrosis, rheumatoid arthritis, radiculitis, lumbodynia and other chronic inflammatory and degenerative diseases of the musculoskeletal and neuromuscular apparatus), in the pathology of Central and peripheral nervous system, in dermatology, in the treatment of diseases of the cardiovascular system biopirateria.

Table 4

The chemical composition of the therapeutic mud of the lake Zhalanashkol

Cations		Anions			
Component	г/100 г	Component	г/100 г		
Sodium	30,20	Chlorides	1,90		
Potassium	0,02	Sulfates	62,38		
Calcium	0,21				
Magnesium	0,18				
The salt content, %					
CaSO ₄	0,62	MgSO ₄	0,83	MgCl ₂	92,35
NaCl	2,78	KCl	0,03	The insoluble residue, %	3,39

Bishofit used in an external agent and has anti-inflammatory, regenerative and analgesic effect (Kuskov, 2004).

4. Conclusions

The composition of the therapeutic mud of the lake Zhalanashkol is dominated by ions of magnesium, calcium, sodium. Analysis of the results showed that the physicochemical composition of water and brine meets the regulatory sanitary-epidemiological resolution of the government of the Republic of Kazakhstan No. 104 dated 18 January 2012 is used in spas and physical therapy.

From the analysis it can be concluded that the lake Zhalanashkol has a unique diversity of recreational resources of Georgia. Unfortunately, the use for recreational and therapeutic purposes is not at the desired level. Therefore, it is necessary to develop therapeutic and recreational infrastructure as well as the optimization and increase of efficiency of use of recreational resources of the lake.

4.1. Proposals for the development of health tourism and recreation in the Republic of Kazakhstan

For the development of sanatorium-and-Spa market of Kazakhstan should:

- the companies in this sphere to participate in annual international exhibitions and fairs held in Kazakhstan, with the aim of attracting customers;
 - to build and strengthen the legislative base regulating activity of the sanatorium-resort institutions, as well as the support of this sector during the economic crisis (reduction of tax payments);
 - to adjust the display of statistical data in the health resort area, with the aim of strengthening and enhancing the effectiveness of scientific research in this field.
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1. The geography of tourism. **Doctor of geographical Sciences, Professor, Academic of KAO n.a. Altinsarin, the Rector of Zhetysu state University n. a. I. Zhansugurov.** Taldykorgan. king_bara@mail.ru

2. Mathematical research methods in tourism. Academician of the International Academy of Informatization (2011), corresponding member of the Russian Academy of natural Sciences (2013). Zhetysu state University named after I. Zhansugurov. The physics and mathematics faculty. Taldykorgan. king_bara@mail.ru

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