



Biolog. Journal of Armenia, 2 (62), 2010

## ENVIRONMENTAL POLLUTIONS AND PHYSICOCHEMICAL PARAMETERS IN BALIQLY RIVER IN IRAN

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Baliqly river of Ardabil, With regard to existence of some factors – like intact green space and natural views, the limpid and cool mineral water with high oxygen content and proper fields for establishment of residential units, the red-spotted trout and sport tourism groups-the region around the origin of this river is of outmost importance. The river flows from the middle of the city and about 350-4000 tons/day of urban, rural and agriculture waste off loaded to the river. So the importance of studying the conditions of chemical and physical pollution is emerged. Factors like physical and chemical parameters, the amount of anion and cation, stiffness, discharge, TDS, BOD, fecal and total coli form bacteria, Ts (air temperature), Tw (water temperature) were evaluated. Based on the results of this experiment it is concluded that despite the increase of pollutants in downstream of city in comparison to the upstream, the amount of cations and anions, turbidity, TDS and stiffness were under the critical limit and mitted to the international standards. Additionally pH, the amount of total and fecal ColiForm did not increased significantly.

*Spring -Baliqly River – Pollution - Shoorabil lake*

Բալիքլի գետի ջրային ավազանը բնութագրվում է կանաչ տարածքների, որակյալ հանքային ջրերի, բնակավայրերի հաստատման համար բարենպաստ պայմանների, սպորտային տուրիզմի զարգացման համար հնարավորությունների առկայությամբ:

Արդաբիլ քաղաքի միջնամասում՝ օրվա ընթացքում գետ են թափվում մոտ 350-400 տոննա քաղաքային, գյուղական և գյուղատնտեսական թափոններ, ուստի գետի աղտոտվածության ուսումնասիրությունները հանդիսանում են հրատապ:

Մեր կողմից ուսումնասիրվել են գետի ջրերի կոշտությունը, հանքայնացման աստիճանը, ԹԿՊ-ն, կոլիֆորմ բակտերիաները, օդի ու ջրի ջերմաստիճանները և այլն:

Բացահայտվել է, որ գետի ստորին հոսանքում դիտվում է գետի ջրերի նկատելի աղտոտում, սակայն ուսումնասիրված ցուցանիշների արժեքները չեն գերազանցում միջազգային չափորոշիչները:

*Աղբյուր - Բալիքլի գետ - աղտոտում - Շուրաբիլ լիճ*

Бассейн реки Баликли характеризуется наличием зеленых территорий, качественных минеральных вод, благоприятных условий для развития населенных пунктов, возможностей для развития спортивного туризма. В средней части города Ардабил в течение суток в реку вливается около 350-400 тонн городских, сельских и сельскохозяйственных отходов. В связи с этим становится актуальным изучение степени загрязненности вод реки Баликли.

Нами изучены следующие показатели: жесткость и степень минерализации вод реки Баликли, динамика численности колиформных бактерий, БПК, колебания температур воздуха и воды.

Установлено, что в нижнем течении реки наблюдается заметное загрязнение воды, однако при этом, значения изученных показателей не превышают международные нормативы.

*Родник - река Баликли – загрязнение - озеро Шурабил*

Ardabil – with northern latitude of 38°,15', and eastern altitude of 48°,17', and with the height of 1450 m a.s.l – is one of the highest city of Iran. Ardabil Township – Center of a province by the same name – is the vastest township with an extent of 4071.1 square kilometers. On the west of Talesh mountains Astara and Hashtpar on the north Khalkhal and on the east of this city the 4811 m. Sabalan mountain arrogantly and gravely stand over the township like an eagle opening its wings [1].

The centre is the city of Ardebil at the height of 1450 meters from the sea level and all around there is a fertile and fecund prairie as vast as 45 km<sup>2</sup>, with much crops and diligent and skillful farmers.

Ardabil province due to its special geographical location having mountains and plains, prairies, rivers and being a neighbor to Gilan province and the Caspian sea and also being on the way of the Mediterranean and Siberian weather fronts, has a varying climate[2]. Shoorabil lake with an extent of 250 hectares and a height of 1364 meters from sea level lies in the form of a closed sedimentary basin in the south mountainsides of ardabil inside the city, and is surrounded by low hills (Fig.1, Image 1) [3].

Baliqly river is originated from Mt sabalan and alongside it's direction provide water for the fields of several villages. It's direction up to Fandogloo village is north to south after which it nearly turn to west – east direction – the length of it's main branch is 87 km. Highest point of this river, 4401m a.s.l, is located in the heights of Mt.Sabalan and its lowest point, 1444 m is located in the position where Hydro metering station exist (Image 3,4).

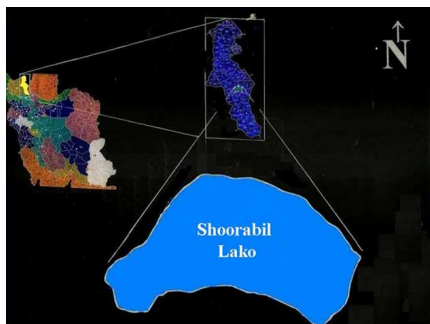
Wind direction is south west-north- East during the cold months. And it has 96 frozen days in a year. Its coldness reach to -38° and has a relative humidity of 51 to 81 [4].

Baliqly formed by the joining of Aghlaghan river's branches and join to karasu and Aras river's valley and finally pour to Caspian sea. Its water is supplied by the springs of mountainous area and melting of snow[5].

**Material and Methods.** For controlling and specifying some factors such as the degree of elements, anions and cations and physical and chemical parameters sampling points, with the observance of required standards were established. Then by means of Nansen, sampling equipment, in 9 given month and at 3 different depths (sea level, 35cm, and bottom of the sea) the sampling performed. After sampling some factors like external condition of weather, place, time and hour of sampling, geographical and physical position. Then for stabilizing the sample and for preventing the growth of micro-organisms, it submerged into 65% acid nitric till the PH of the sample reduced to 2-2.5 [6].

Water samples were send to the contracted laboratory in dark containers, respectively.

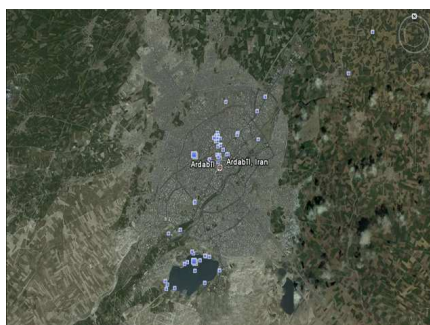
We take some photographs from the natural condition of the river and the spring beside it and then primary and required data were classified and evaluated. In field operations we use multy- parameter instrument of US HACH inc, with special electrodes of session [7].



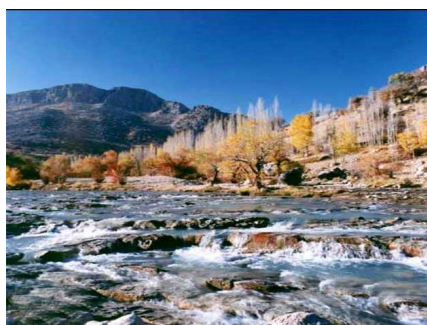
**Fig.** Local Lake Shoorabil the Ardabil province and country



**Image 2:** Photo river in the city of Ardabil Baliqly



**Image 1:** Satellite Images Shoorabil lakes and rivers across the city Baliqly goes.



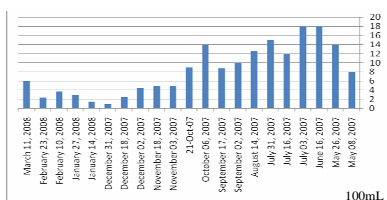
**Image 3:** Photo river before Baliqly to Ardabil

***Hypotheses and primary questions of research are:***

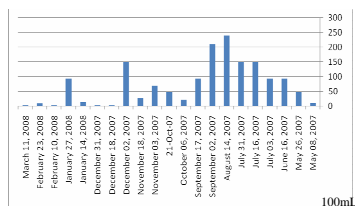
- 1-Does the ecosystem and natural condition of the region is intact or not?
- 2-Which factors threaten the natural condition of Baligly chay River?
- 3- How we can remove or reduce the visible pollutions of the region?
- 4- Where is river polluted with demestic and human waste waters.

**Results and Discussion.** Most of the microbial pollutions of the river's water is reported from the April to June month of each year.

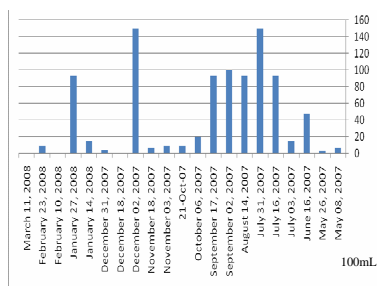
The sedimentary slimes of this region include Methane and Hydrogen oxidizing bacteria fermentative non-atmospheric and azotes stabilizing bacteria and etc. World health organization has announced the suitable temperature of surface waters between 10 – 20° C based on the results of this experiment it was concluded that the temperature of Baliqly chay River is inside the normal range of cold and mountainous regions (Chart 1-3).



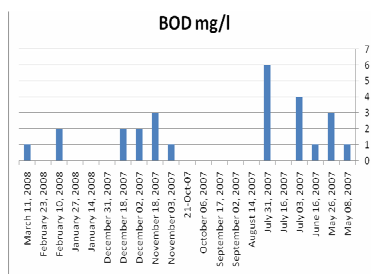
**Chart 1:** The amount of Water temperature in water Baliqly chay .°/



**Chart 2:** The amount of total coliform in water Baliqly chay .



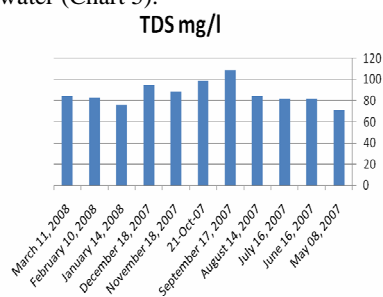
**Chart 3:** The amount of total coliform fecal in water Baliqly chay



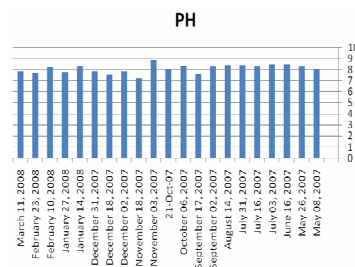
**Chart 4:** Value BOD River water Baliqly chay

Chemical Oxygen Demand (BOD) measured during the year indicates the proper status of BOD and plenty of oxygen available effectively have prevented the increase of BOD (chart 4).

Total Dissolved Solids (TDS) is higher than standards and it's minor changes can be due to seasonal winds that carry the dust into the river and increase suspended solids in water (Chart 5).



**Chart 5:** Value TDS River water Baliqly chay.



**Chart 6:** pH value of water Baliqly chay

In all of the sampling stations PH was above the 7.1 during a total year and its maximum amount was 8.85 (chart 6).

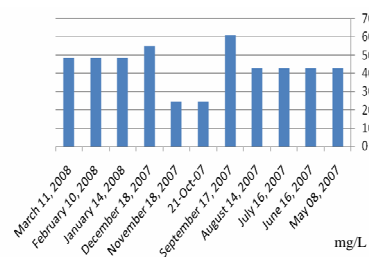
Uniform during the year and in September and October in the amount reaches the river offers the World Health Organization acceptable levels for hardness 100 mg is (chart 7 and 8) [8].

The amount of phosphate had not a considerable fluctuation during the year and observed sudden increase can be a result of application of phosphate fertilizers and leakage of their residuals into the river ( chart 9 ).

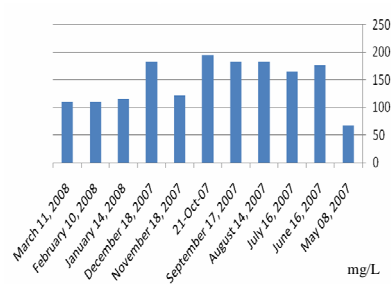
The amount of chlorine in nearly all of months and years was not less than 70 mm that can be an indicator of suitable self-purification for river (chart 10).

Discharging of corruptible and biological material to the Baliqli chay river cause variation in the density of oxygen and some other physical, chemical and biological changes.

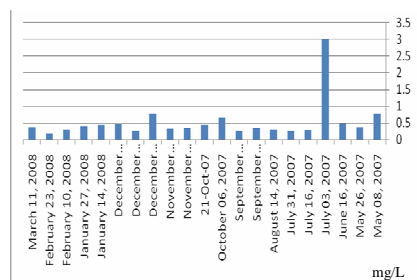
Thus these processes and their products along with oxygen resource effect significantly Aghlaaghaan's ecology[8].



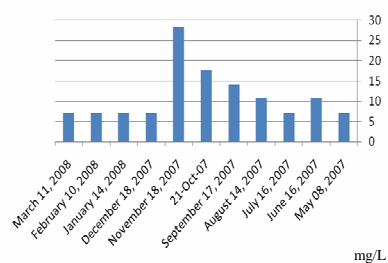
**Chart 7:** Amount of calcium carbonate upstream Baliqli chay



**Chart 8:** Amount of calcium carbonate downstream Baliqli chay



**Chart 9:** Amount of phosphate in water Baliqli chay



**Chart 10:** Amount of chloride in water Baliqli chay

#### ***Results of studying the measured parameters are:***

There is no evidence of carbonate and its amount was zero.

Total stiffness of the river before and after reaching to Ardabil is quite different; and total stiffness of its exit point is nearly twice bigger than its entrance point.

In the months when the amount of fecal cloniom is very high at the same time and place the amount of total cloniom is also high.

The solutions proposed.

Following actions is effective to protect rivers from pollution:

1. preventing discharge of untreated urban and industrial wastes to the river
2. training and information the People through different ways
3. Dredging the river path in some a reassesses, especially in entry and exit locations to the city
4. Preventing the construction of contemning factories in River privacy
5. Necessary to create green space along the river

6. Prevent from entering the contaminated pesticides and fertilizers into the river
7. Changing and reform traditional irrigation methods
8. Prevention of waste discharge in River.

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*Received 15.10.2009*