



## Physico-chemical parameters and environmental pollution in the Aghlaghan Chie river of Ardabil province in Iran

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### Abstract

Aghlaghan chie river of Nir city, is formed by confluence of 5 Bolaughlar springs, two of these springs provide potable water of Nir city. Various physico-chemical and biological parameters were taken into consideration during the course of study these includes DO, BOD, COD, pH, CaCO<sub>3</sub>, Total dissolved solids, Total coliforms and Fecal coliform. Based on the results of this study it is concluded that there is slight increase of pollutants in downstream of city in comparison to the upstream, hence it is an alarming positing of increasing pollution load in the river.

**Keywords :** *Aghlaghan river, Bolaughlar, Pollution, Spring*

### Introduction

Nir city – with northern latitude of 37° 47' to 38° 9' and eastern altitude of 47° 51' to 48° 21', and with the height of 1687 m a.s.l – is one of the highest city of Iran. The city nearly 35km from the Ardabil is located beside the main road of Ardabil east Azerbaijan. Aghlaghan Chie River is originated from Mt. Sabalan and alongside its direction provides water for the fields of several villages (Fig. 1). Its direction up to Fandoghloo village is north to south after which it nearly turn to west east direction the length of its main branch is 37 km. Balikloo River is formed by the joining of Aghlaghan river's branches which joins 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 Esmali (2005). It flows down from the mountains with stony and sandy beds (Fig. 2) The river flows from the middle of the city and about 35 ton/day of urban, rural and agricultural waste offload to the river. So the importance of studying the conditions of chemical and physical pollution is emerged.

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### Materials and Method

For controlling and specifying some factors such as the degree of elements, anions and cations and physical and chemical parameters, 2 stations (sampling points), with the observance of required standards were established. Then by means of Nansen, sampling equipment the sampling was performed. After sampling some factors like external condition of weather, place, time and hour of sampling, geographical and physical position, primary weight and the dimensions of the soils' sampling area, sample's weight at Aven phase, drying, shifting and sizing (size 200) were controlled. Then for stabilizing the sample and for preventing the growth of micro-organisms, it submerged into 65% nitric acid till the pH of the sample reduced to 2-2.5. The physico-chemical and biological parameters were analyzed following the standard methods of APHA (1998) and Khanna and Bhutiani (2004).

### Results and Discussion

The results of various parameters studied are given in Fig. 3 to Fig.10. During the course of study it was observed that most of the microbial pollutions of the river's water is reported from April to June month of each year. Although the amount of nutrient is not high but it can be maintained by temperature variations Ardakani (2008).

In general bacteria in slimes are more than water it-self. According to Daneshvar (2005) the sedimentary slimes of this region include Methane

and Hydrogen oxidizing bacteria fermentative non-atmospheric and azotes stabilizing bacteria.

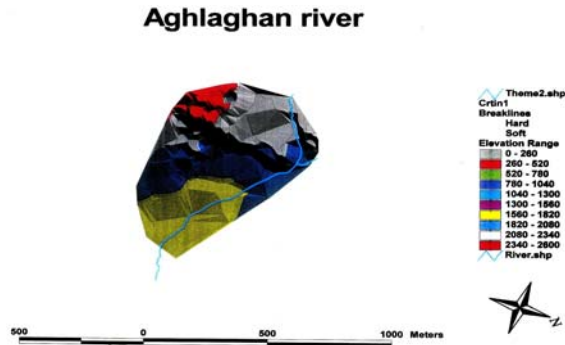


Fig. 1: Map showing Aghlaghan river



Fig. 2: Photo showing sampling site

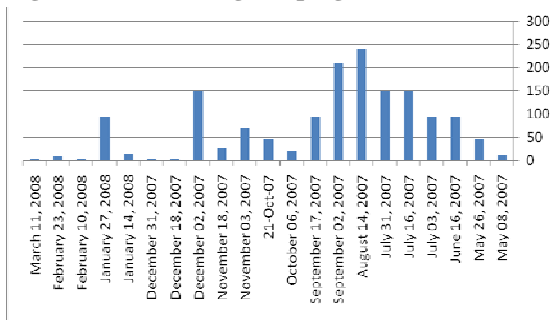


Fig. 3: Fluctuation of Total coliform /100ml

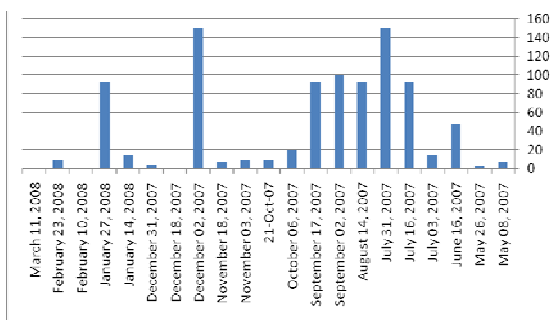


Fig. 4: Fluctuation of Fecal coliform/100ml

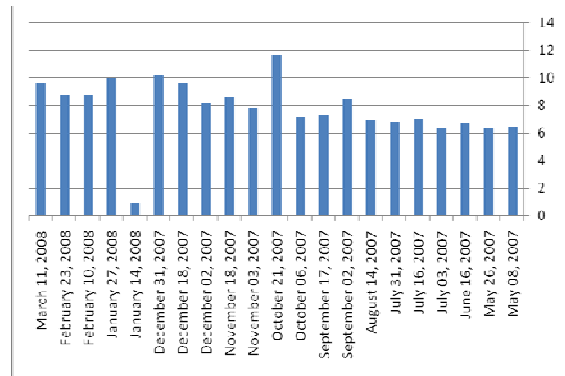


Fig. 5: Fluctuation in value of DO (mg/l)

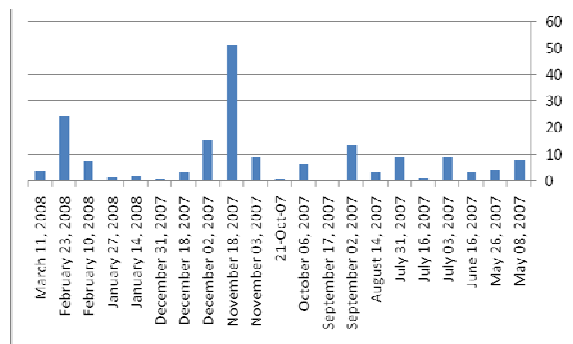


Fig. 6: Fluctuation in value of COD (mg/l)

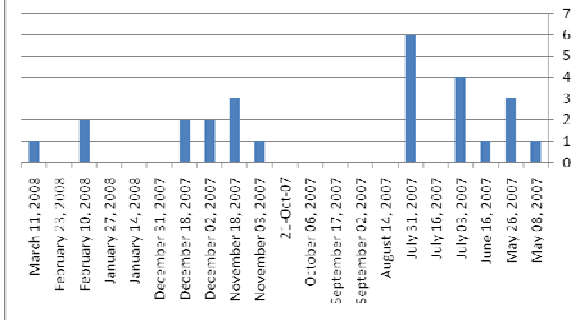


Fig. 7: Fluctuation in value of BOD (mg/l)

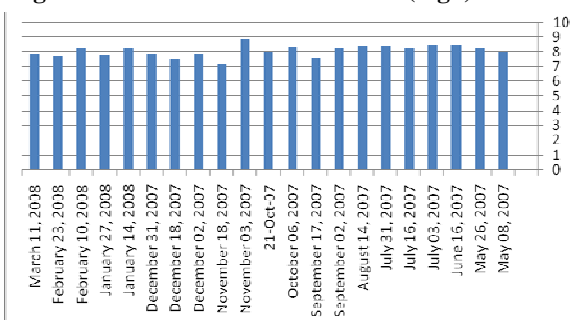
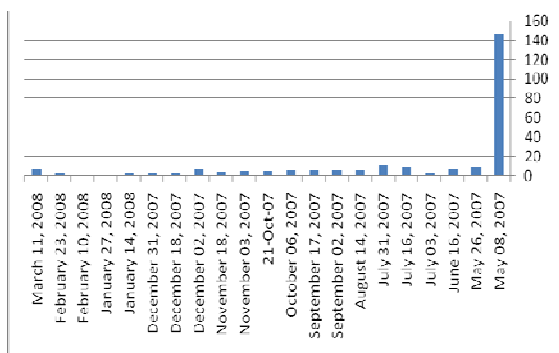
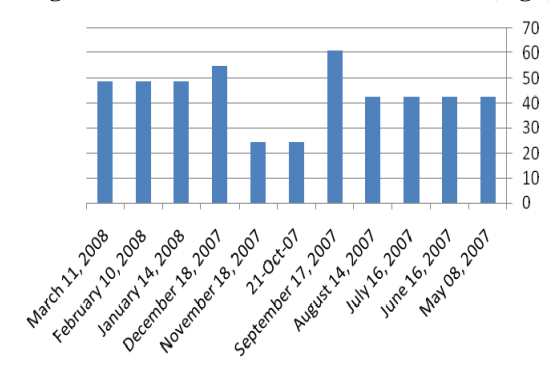


Fig. 8: Fluctuation in pH value



**Fig. 9: Fluctuation in total dissolved solid (mg/l)**



**Fig. 10. Fluctuation in calcium carbonate (mg/l)**

pH was observed above 7.2 during course of study and it reaches a maximum limit of 8.45. The degree of dissolved oxygen in all points of the river is above 6.3 mg/l. Khanna and Bhutiani (2003) and Khanna *et al.* (2007) observed similar findings.

Due to the low density of organic materials it includes high dissolved oxygen, in a way that it shows 4mg/l BOD during study.

Discharge of corruptible and biological material to the Aghlaghan chie river caused 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 Aghlaghan's ecology.

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