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Study of Water Quality in Kor River, West Southern of Iran

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ABSTRACT

Water is only naturally pure occurring inorganic fluid in the universe but most of the surface water sources are no more inorganic, since the generated wastewaters polluting the freshwater sources and rendering them unfit for various purpose. Though, the problem of water pollution is worldwide, it is surprising that it draws the attention of scientists only when it becomes hazardous for human health. With this view, an attempt was made to evaluate the quality of water in Kor river in Fars province, Iran. Water samples from different locations in the course of Kor river were collected to check the suitability of water for human use. The parameters like, Cl^-, alkalinity, TSS, TDS, pH, EC and temperature were measured. The amount of them was compared with standard threshold. Some stations showed that water was just suitable for agriculture for some products like wheat and barley. The self purification model of river is shown for EC and alkalinity of water.

INTRODUCTION

Humans are appropriating 54% of all the accessible freshwater contained in surface waters and underground aquifers. About 70% of the world's water is used in agriculture to grow food and fibre. Kor river is one of the most important rivers in Fars Province, and most of agricultural zones of Fars are irrigated by this river. Actually, Bakhtegan lake is also fed by this water, which is one of the most important wetlands. This river has an important role in forming industrial, residential and agricultural activities near it. But, by extending industries around Kor river and entering agricultural runoff and industries wastewater in it, pollution threats it. Hence, the study of water pollution becomes necessary. The study area lies between 50°44' to 53°30' east longitudes and 29°15' to 30°59' north latitudes and covers an area of 10800 sq km.

MATERIALS AND METHODS

As regards the pervious studies and need of comparison between the past and present data, ten monitoring stations were chosen. They are:

Station 1: Drodzan Dam
Station 2: Imam zade Mohammad Bridge
Station 3: Before Petrochemical
Station 4: Khan Bridge
Station 5: Amir Dyke
Station 6: Feiz Abad Dyke
Station 7: Rahmat Abad Bridge
Station 8: Hassan Abad Dyke

Station 9: Mozaffari Dyke
Station 10: Doshakh karbal

Water samples were collected from Kor river from these 10 stations. Physico- chemical parameters of waters were analysed by the methods of APHA (1998). These data were compared with pervious existing data of Kor river to find the trend of pollution. In this study parameters like Cl^-, alkalinity, TSS, TDS, pH, EC and temperature have been measured because of effects of them on the salinity of water and soil. Discharge of wastewater from industry, agriculture and also domestic wastewater can change the quality of water at first step and finally causing the salinity of water and decrease of agriculture produce (Metecalf & Eddy 1979).

RESULTS AND DISCUSSION

Concentration of Cl^- depends on different compounds of chloride, but most of these compounds can be formed with sodium at first and then by Ca^{2+} and Mg^{2+}. In most of the river, concentration of Cl^- is less than 50 mg/L and every increase shows pollution in the river. Concentration of chloride was measured at least 53mg/L and maximum 4452 mg/L in Mozaffari dam.

Alkalinity showed minimum 30 mg/L and maximum 305 mg/L in whole of the river. The amount of TDS has a direct relation with increasing dissolved ions. Minimum 50 mg/L and maximum 3575 mg/L were measured in the river. All the factors like alkalinity, TDS and Cl^- have showed increasing trend from the upstream till downstream of river. Most of this pollution is related to fall and summer season because the volume and flow rate of water in these seasons are low. This volumes of water has not enough for self purification. The pervious researches about quantity of pollution in the Kor river showed that agricultural run off and industrial wastewater are the most important sources of Kor river pollution.

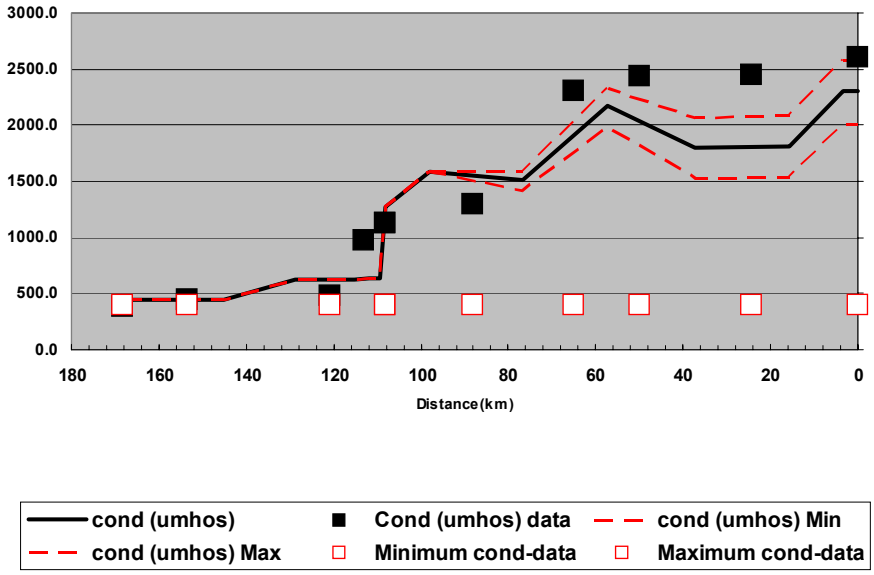

Fig.1: Self purification of conductivity.

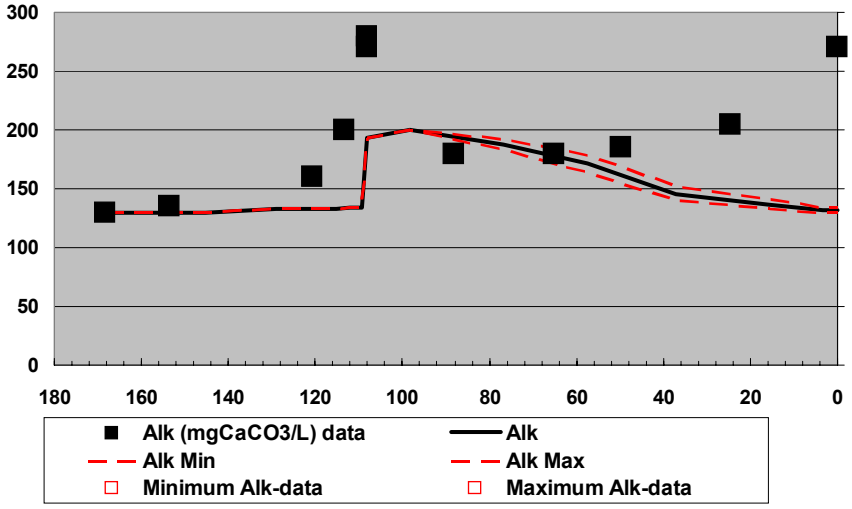

Fig. 2: Self purification of alkalinity.

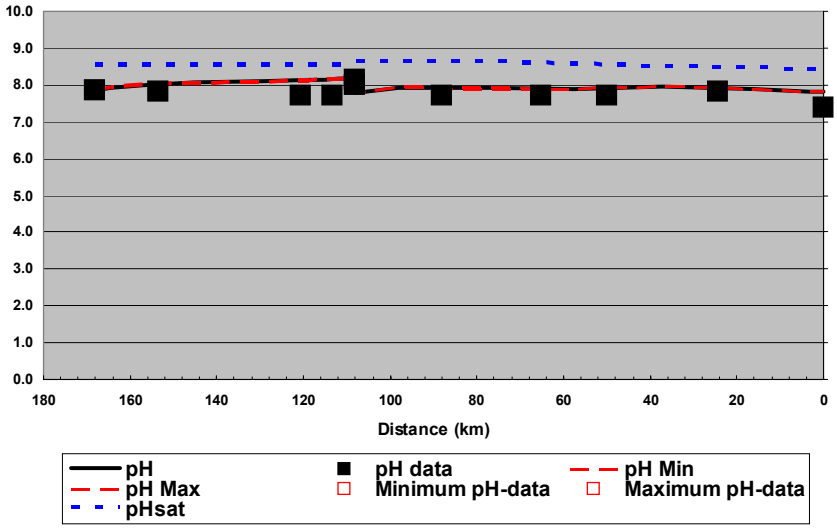

Fig. 3: Self purification of pH.

After comparing the present data with the pervious data, EC showed 21 percent decrease (below dam) but in stations 5 and 10, it shows increase. The amount of TDS in 2003 as compared with pervious years has been decreased around 23 percent. Alkalinity has been decreased around 28-41.5 percent. Chloride from station 4 to station 10 has showed around 24 percent decrease during last 10 years. Self-purification of the river with regard to EC, alkalinity and pH is presented in Figs. 1, 2 and 3.

It is seen that these parameters change with distance (zero showed downstream of river, Station number 10). Quality of water from station 1 (168 km) till station 3 (118km) has a sufficient status. Therefore, this zone can be called as healthy zone of river. After station 3, alkalinity increased till

station 4 (98km). It seems that petrochemical effluent has the main role in pollution of this zone. Stations 4 and 5 are the critical points of pollution in this river. After these stations, velocity of river is decreased and self purification can not treat whole the input of pollution of Kor river.

Protection of self purification of river needs total treatment of wastewater of factories that are located around the river before discharging it into the river. Treatment of domestic wastewater before discharge, also controls and prevents pollution to enter the river.

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