# PHYSICO-CHEMICAL QUALITY OF WASTE WATER AND THE RISK OF POLLUTION OF BECHAR RIVER SOUTH WEST OF ALGERIA

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**Abstract -** In urban environment, the increase in population generates considerable quantities of waste water which is treated in the purification plants to specialize or reject directly without control in the courts of water case of Bechar River. Because of their various origins (domestic rejections), this water is generally charged in organic, mineral elements and in micro-organisms of which some could be harmful with health and strongly takes part in the degradation of the tablecloths which could be irreversible.

The town of Bechar (Southern Algerian West) which is in an arid Saharan area knows like all the Algerian cities of the problems of surface and underground pollution the waters, whose main causes are: the discharge of waste water in nature without purification and the absence of the systems of purification and depolution of waste water. The present study is undertaken on the course of Bechar River, carried out in April 2017 revealing a polluting load: (Nitrate 7.94 mg/l, Nitrite 0.6 mg/l, Ammonium 26.60 mg/l, NTK 62.18 mg/l).

In April 2014, of samplings of waste water noted Wi were realized according to the recommendations of WHO. The choice of the sites was fixed according to the direction of flow. The results obtained according to the study analyzes physic-chemical samples of the rejections testify in their majority that a contamination of subterranean water of the tablecloths by waste water of the river according to a process of infiltration which depends on several environmental and climatic factors is extremely probable and which an urban treatment of the rejections is paramount to protect the tablecloth and the ecosystem.

**Keywords -** Algeria, Bechar River, Environment, Urban Rejection, Contamination, Parameters Physico-Chemical

## I. INTRODUCTION

The city produces an impact on ecological resources, global systems and modifies the environment in all its components, physical and human. Today, the preservation of our environment and our water resources depends on our ability to clean wastewater at low prices before they return to nature.

The issue of sewage disposal has become increasingly important in the early seventies. Given the general concern expressed worldwide face the problem of growing pollution of the human environment as their name suggests. Wastewater is water that after domestic or industrial use, convey waste treatment is a necessity to preserve the environment and direct human preserve the rivers and especially groundwater.

The city of Bechar found in arid Saharan region, the total contribution of precipitation average is 72 mm, the volume of wastewater discharged through the sewerage system of the city is estimated to 25000$m^3$ /day (KENDOUCI 2012). It knows as all Algerian cities problems of pollution of surface water and groundwater, whose main causes are:

-The discharge of wastewater in nature without treatment;

-Absence of sewage systems and wastewater treatment;

-Presence of solid waste dumps near the river;

-Irrigation of agricultural land by the polluted wastewater.

The water supply of the city is provided by surface water and groundwater from aquifers and other groundwater unrecognized in the vicinity of the river source water discharges (risk of infiltration). (KENDOUCI 2012).

## II. MATERIALS AND METHODS

In April 2014, samples of wastewater noted Wi were performed according to the WHO recommendations. The choice of sites was determined according to the direction of flow.



W1



W2



W3



W4

**Fig.1. wastewater into the river of Bechar**

Samples of wastewater are collected in polyethylene bottles of 1.5 liters volume for the physicochemical analysis, in the laboratory it was the mixture of samples Wi to give a single sample called "wastewater ".

The measured physical parameters are: pH, salinity, conductivity and TDS. Chemical parameters determined are: chloride, nitrate, nitrite and phosphate according to standard analysis techniques. The assay methods used are as follows:

- pH, salinity, TDS and conductivity, potentiometric method (861 Consort)
- Nitrate is determined by the potentiometric method (HI 121) using a specific electrode;
- Ammonium AFNOR T90-015 on a filtered sample, blue methods indophenols;
- Nitrites, AFNOR, 1986; Phosphates, AFNOR NF T90-023 on a filtered sample by colorimetric method.
- •Sodium and potassium: flame spectrophotometer JENWA clinco LPFP7.
- COD : Eco thermo reactor VELP scientific. (RODIER J. 2005; DEGREMONT 1978; FRANCK.R. 2002)

## III. RESULTS AND DISCUSSION

The results of this study are explained in discussing the measured parameters, including measurements made in the laboratory

### 3.1. Conductivity, salinity and pH

Wastewater shown in Figure 1, show a significant electrical conductivity equal to 4.05mS/cm salinity of 2.02 g / l, which proves that wastewater is loaded. Wastewater from the river is characterized by a pH equal to 8.32.

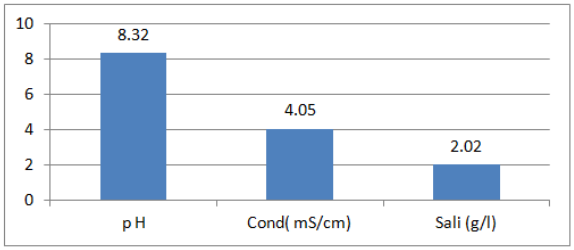



***Figure 2. Values of Conductivity, Salinity and pH.***

### 3.2. COD, BOD and suspended solids

The biochemical oxygen demand (BOD) of wastewater is 168 mg/l, by convention, the BOD necessary conditions for the test was determined after incubation for 5 days at 20 ° C in the dark, the chemical oxygen demand oxygen demand (COD) is 220mg/l. The determination of the content of suspended solids in the wastewater is filtered and gives a level of 180 mg/l. (KENDOUCI 2012)

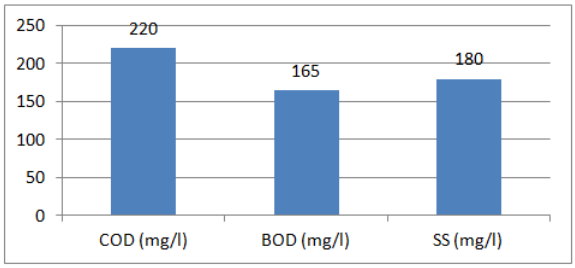



***Figure 3. Values of COD,BOD and SS.***

### 3.3. Sulfate and chloride

Sulfates and chlorides present in very high concentrations, 792 mg / l and 938mlg / l respectively these levels may be due because of the discharges are likely urban use based detergents sulfites (met stable state) that this transforms (oxidation) sulfate.

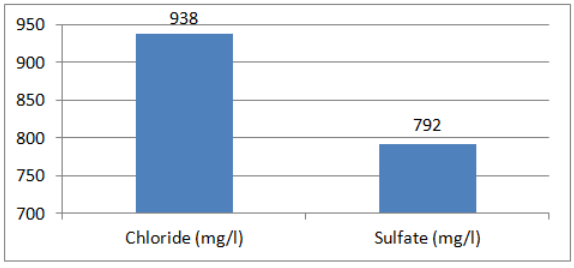



***Figure 4. Values of sulfates and chloride.***

### 3.4. Kjeldahl nitrogen (TNK) ammonium, nitrate and nitrite

Urine is the main indicator of the presence of nitrogen in urban waste water and detergent is ammonium, ammonification reactions may occur that transform organic nitrogen to ammonium $NH_4^+$ (reduced form of nitrogen), in fact the demand for oxygen by ammonia is very high they are molecules (nitrogen compound) odor causing odors. The

maximum value of nitrate is 7.94 mg /l. The Kjeldahl nitrogen has concentrations alarming is the maximum observed in the rejection (62.18 mg /l), the values of the ammonium and nitrite are respectively 26.6 mg /l, 0.6mg /l.

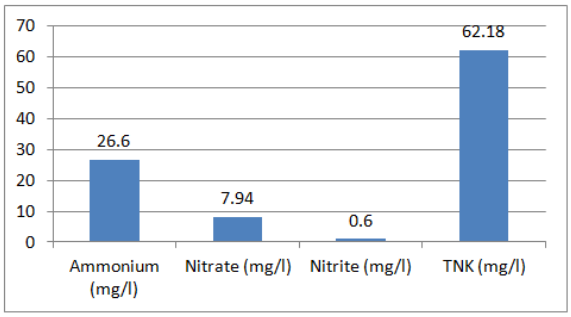



***Figure 5. Values of ammonium, nitrate, nitrite and TNK.***

## CONCLUSION

The results of analysis of wastewater carried by the river of Bechar show the existence of a nitrogenous organic pollution, clearly shows that the technical standards required in sanitation was not respected at all levels. Regulation was not applied that indicates a degraded situation wastewater of the city, this degradation reveals that the city is facing a problem of pollution and nuisance mainly related to urban wastewater effluents without treatment.

The results obtained from the study physic-chemical analysis of samples of discharges (W) show that groundwater contamination by wastewater from the river by a process of infiltration depends on several environmental and climatic factors is very probable that urban waste treatment is essential to protect the water and the ecosystem.

There is much to do to stop the drift aquifers, groundwater and agricultural land, which will probably be polluted and have a solution to this problem can be used in solutions that address "the same time" to different levels and in different sectors such as the installation of pollution control systems (sewage, lagoon or settling basin) to reduce pollution and urban wastewater reuse in irrigation.

## ACKNOWLEDGEMENTS

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