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MEASURING THE EXTENT THE ENVIRONMENTAL POLLUTION OF THE WATERS OF THE DIWANI RIVER SOME TRACE ELEMENTS RESULTING FROM DIWANI TEXTILE FACTORY USING SOME SPECTROSCOPIC METHODS

S u m m a r y

The concentrations of some trace elements cobalt, nickel, lead, mercury cadmium, copper and Iron as well as pH value and the conductivity were determined in the samples of water which input and output (waste) from AL-Diwani textile factory and the effect of it on the AL-Diwani river water which is nearest from the factory through one month. The concentrations of above elements were determined in the samples by two methods. The flame Atomic absorption spectrophotometry and the spectrometry method which is satiable for each ion and making Analytical comparative between them from some analytical values like correlation coefficient(r), relative standard error E_{rel}%, recovery value Re% and relative standard deviation RSD% for each ion. It is found that the first method is more accuracy for measuring the all elements concentrations except measuring of Iron. From results we show that the Lead element is more concentration among other elements which was the middle concentration was 3.3 ppm. The cobalt element is less concentration from other elements which was the middle of it concentration was 0.043 ppm in the waste water samples and other elements have concentration between them in the different samples. We show the increasing on the acidity and Conductivity for waste samples as comparative with the other samples which were pH between 6.5-7.2 and the Conductivity from the instrument directly in between 1210-1913 mS·cm^{-1} and the measuring was making at the room temperature.

Key words: Iraq, Diwani River, some trace elements, Diwani textile factory, spectroscopic methods

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INTRODUCTION

Water great importance in the continuation of life, covering 70% of the Earth's surface is a important element in the industry where it has particular specifications may vary from one industry to another, if used directly or are manipulated sources [Mukhylonov 2001] and be many uses, including as a primary or a solvent in many material industries or have substance tanker to heat or raw materials and ions such as paper and paint industry or material to wash in a number of industries [Nemerow 1971, Zhou and Smith 2002] are rivers of the most important surface water sources that are used in industry where contain many salts which are different proportions and quality depending on geological and the type of human activities in areas that experienced by also contain a number of outstanding material resulting from erosion or throwing industrial waste in [Ramathan et al. 2003].

The industrial water containing harmful substances which must be addressed before it is put to the rivers where the quantity of water depends on the industry and the amount and type of production methods. The textile industry of the most water-consuming industries as cotton or turn raw wool or nylon fibers derived from petro-chemical industries in which the textile products [Report EPA-600 2002, Gurnham 1985]. Where the water requires included this industry with high purity therefore must be treated before it is used in the industry and the industry remnants is complex and diverse in terms contain a lot of water pollutants such as dyes, fibers, nylon and materials termination and the palace, which added to the cotton fiber [Ramathan et al. 2003]. Craps vary from plant to another depending on the type of fiber used and the parts of the production processes and the quality and quantity of materials [Koziorowski and Kucharski 1987]. Including organic waste consumed to the amount of dissolved oxygen, which gives recipes unwanted water and stuck them materials deposited in the river bed [Cromption 2007. And also solids and liquid floating on the surface of rivers such as grease and oil derivatives that hinder the arrival of the sun's rays into the water and threaten aquatic life [Atkins and Lowe 2010] The inorganic contaminants such as salts, it affects the water hardness and salinity increases and the proportion of heavy elements in the waters of the rivers [Zhou and Smith 2002, Ramathan et al. 2003] The acidic and basic Jetsam of pollutants affecting the life of the fish in the river that the remnants of the plant impact on the sewer system where affect the pH and the amount of toxic substances [Report EPA-600 2002, Atkins and Lowe 2010] is also. As materials pose sends hydrogen sulfide gas and affect the amount of free chlorine and reduces the self-purification of the river [Koziorowski and Kucharski 1987].

The most important pollutants are toxic trace elements which has scaled deposited on the surface of rivers and kills the plant and animal life in the river where affect water transparency by preventing the arrival of the sun's rays and

greatly affect humans. In this research, we care about measuring the extent of the environmental pollution of the waters of the River Diwani, some of these elements raised from Diwani, a textile factory where environmentally pose danger rises when its concentration in the river water [Ramathan et al. 2003, Liu and Han 2002]. Were measured concentrations of elements in the water entering, the water emerging and river water near the factory by using atomic absorption technique (AAS) (Atomic absorption Spectrophotometry) where the advantage of sensitivity and high selectivity for measuring concentrations in the samples at a wavelength appropriate for each studied element [Surard and Chiranjepri 2005] and a comparative analysis of this method with the appropriate standard spectral method for each component in the same models to demonstrate the accuracy, sensitivity and precision of the method which it is using for measurement of trace elements and the study of the extent of the environmental pollution caused by waste water on the river water near from the factory

MATERIALS AND METHODS

Devices used: Sensitive Balance, Sortoris, Germany., pH-meter - Knick Digital pH-meter, Pye Unicom flame Atomic absorption Spectrophotometry, PD-303 UV-VIS Spectrophotometry Digital Conductivity, India, Glass.

Materials used: All the materials used in the research was a high degree of purity and equipped from companies listed their names and specifications, according to the Table 1.

Table 1. All the materials used in the research and the equipped companies

	Materials names	Formula	purity	Equipped companies
1	Cobalt nitrate hexhytrate	$Co(NO_3)_2 \cdot 6H_2O$	99.9%	Merck
2	Nitric acid	HNO_3	70%	Merck
3	Di-methyl glyoximato	$C_4N_2O_2H_8$	95.5%	Merck
4	Nickel chloride hexhydrate	$NiCl_2 \cdot 6H_2O$	99.9%	Merck
5	Lead nitrate	$Pb(NO_3)_2$	98%	Merck
6	Naphthol β - nitrose - α	$ONC_{10}H_6OH$	99%	Merck
7	Mercury nitrate monohydrate	$Hg(NO_3)_2 \cdot H_2O$	99%	Fluka
8	Cadmium chloride	$CdCl_2$	98%	Fluka
9	Copper Sulphate pentahytrate	$CuSO_4 \cdot 5H_2O$	98%	Fluka
10	Ferric chloride trihytrate	$Fe\,Cl_2 \cdot 3H_2O$	98%	Fluka
11	Ethanol	C_2H_5OH	75%	Aldrich
12	Chloroform	$CHCl_3$	95%	Aldrich
13	Carbon tira chloride	CCl_4	99%	Britsh Durg Houses
14	Sodium hydroxide	$NaOH$	98%	Britsh Durg Houses

15	Ammonium hydroxide	NH_4OH	98%	Britsh Durg Houses

Working method:

Preparation of samples: The water samples was taken by utilizing 1 liter for each sample,wastewater and entering water that was producing from the laboratory Liquidation Station which it was in the factory and river water near Diwani textile factory, who put him waste for a period of four consecutive weeks, where it is putting the waste by once a week from the factory and the production process you need to a month to complete,and that was enough to study its impact on the river, it was taken 200 ml and filtrated by filtration diameter paper 0.45 even gets rid of waste sticking to measure the concentrations of elements in a manner atomic absorption and spectral method.

Prepare standard solutions for the measured ion. The standard solution is prepared at concentration 10 ppm of each ion in 100 ml of distilled water as a stocks solution, according to the Table 2.

Table (2) chemical compositions and weights of materials used for the preparation of standard solution

| Weight (gm/100 ml)	Material	element
0.0023	Ni $CL_2.6H_2o$	Nickel
0.0028	$Co(NO_3)_2.6H_2o$	Cobalt
0.0034	$Hg(NO_3)_2.H_2o$	Mercury
0.0024	$Cu(NO_3)_2.5H_2o$	Cupper
0.0018	$CdCl_2$	Cadmium
0.0033	$Pb(NO_3)_2$	Lead

Solutions used in spectroscopic measurements

– alpha-nitrous-beta-naphtol solution: It was papered by dissolution 1 g in 100 ml acetic acid.

– dithiazon solution: It was papered by dissolution 0.002 g in 100 ml chloroform.

– dimethyl glyoximato (DMG solution): It was papered by dissolution 1 g in 100 ml ethanol.

– 1,10-phenanthroline solution: It was papered by dissolution 0.25 g in 100 ml distilled water that acidic with 0.1 M of hydrochloric acid.

RESULT AND DISCUSSION

Measured ions: the calibration curve was made for each ion by utilizing two methods (atomic absorption spectroscopic method and spectroscopic methods) appropriate for each ion and through these curves possible to find concentrations of various ions in aqueous samples, It was as follows 1-lead ion (Pb^{+2}): concentrations of lead in samples was measured by atomic absorption spectroscopic

method and spectroscopic method for measuring of lead by calculating the absorbance of the complex lead with Dithiazon with maximum absorbance at 510 nm [Merczenko 2005] calibration curves were as Figure 1 the results was according Table 3.
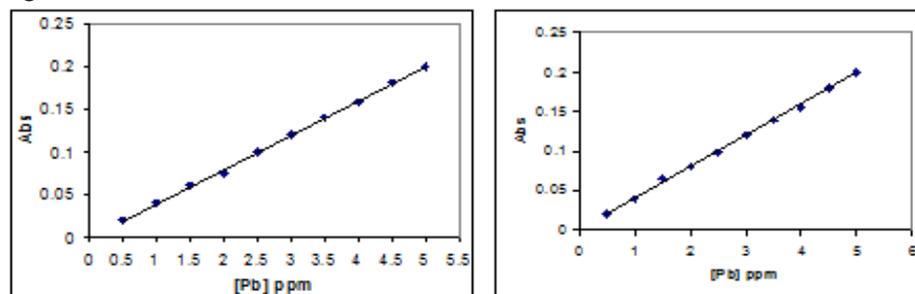
Calibration curve for lead Calibration curve for lead
(atomic absorption method) (spectroscopic method)
Fig. 1. Calibration curves for the ion lead

Table 3. Lead ion concentration in water samples

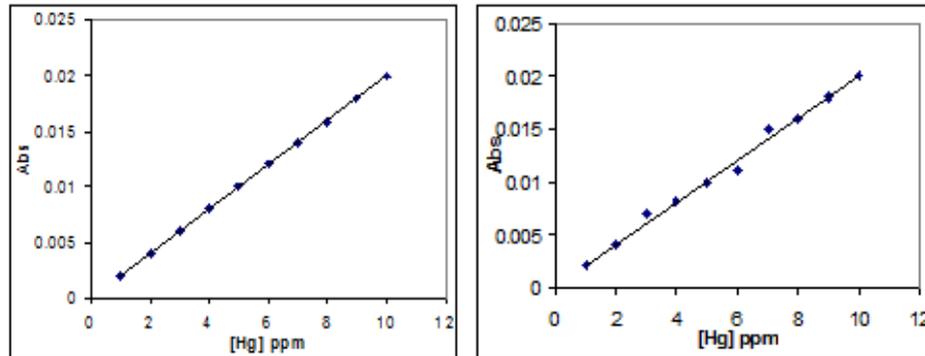| Re%	E_{rel}	RSD%	values (r)	Av. conc. of element (ppm)	Method	Water type
98.50%	-1.50	1.40%	0.9993	3.31	Atomic absorption	Waste water
95.50%	-4.50	4.60%	0.9989	3.38	spectroscopic method	Waste water
97%	-3.00	1.51%	0.9993	3.05	Atomic absorption	Entering water
96.50%	-3.50	4.20%	0.9989	3	spectroscopic method	Entering water
98.30%	-1.70	1.40%	0.9993	3.5	Atomic absorption	River water
93.50%	-6.50	4.60%	0.9989	3.6	spectroscopic method	River water

From the Table 3 note the presence of high concentration of lead in entering water on the factory and it was not making any treatment for removing this ion. highly concentrations in waste water record of the ion in the nearby river waters of which is outside the allowable percentage of lead (outside the boundaries of the threshold), which equals 0.05 ppm (WHO 2007), which is one of the international Standards. Ion and its compounds are highly toxic, where we note that the factory waste containing a high concentration of it is because there galvanized pipes and entry in the synthesis of dyes used in the four-ethyl lead used in fuel (derivatives as a contraceptive bang) [Abdal-Radha et al. 2002].

The ion accumulation of lead cause brain damage, anemia, breach of digestion and kidneys work also leads to the death of plants when exposed to him [Mayne

1994, Gaw and Cowana 2007]. By the results we find r correction factor and RSD% and Erel and Re% for the atomic absorption method is more accurate, adjust and highly sensitivity in the estimation of the ion than spectral method for all the measured samples it was preferred in the measurement of lead ion.

Mercury ion (Hg^{+2}): Mercury ion concentration was measured in the samples in a manner atomic absorption and which needs to be cold atomization, the spectroscopic method by measuring the absorbance of complex output of mercury and dithiazon reagent when the maximum wave length at 485 nm [Merczenko 2005], according to the calibration curves shown in Figure 2. The results was being in the Table 4.

Calibration curve for mercury Calibration curve for mercury
(atomic absorption method) (spectroscopic method)

Fig. 2. Calibration curves for the ion mercury

Table 4. Mercury ion concentration in water samples

Re%	E_{rel}	RSD%	values (r)	Ava.conc.of element(ppm)	Method	Water type
96.50%	-3.50	2.40%	0.9999	1.18	Atomic absorption	Waste water
95%	-5	4%	0.9955	1.4	spectroscopic method	Waste water
0	0	0	0.9999	ND	Atomic absorption	Entering water
0	0	0	0.9955	ND	spectroscopic method	Entering water
98%	-2	1.40%	0.9999	1.14	Atomic absorption	River water
96%	-4	3%	0.9955	1.51	spectroscopic method	River water

By the Table note there are no mercury concentration in entering water samples on the factory where it is processed through the formation of complexes dissolved with the additive of chlorine in the liquidation process of water [Surard

and Chiranjepri 2005]. In the waste-water and river water we note the presence of mercury very high concentration is out of range for the concentration of mercury in surface water (outside the threshold limit) which is equal to 0.005 ppm (WHO 2007). The emergence highly concentration of mercury in the waste water, the ion is and its compounds are highly toxic where it enters in many dyes formation. It was entering in the materials that was utilizing against the brownish, also is used in the synthesis of many organic compounds used in industry [Vekhande 2006].

The poisoning with mercury cause flicker vertigo and destroy the lungs, blindness, infertility and its accumulation causes brain damage [Lee 2007] also has a significant effect on aquatic life, where is deposited by bacteria, the alkali mercury double threat in the bottoms of rivers and high concentration for 1.5 ppm will lead to the death of fish river [Al-Sadai 2009]. From the results (the correction coefficient r calculated through a calibration curve, RSD%, Erel and Re% note that the atomic absorption method is more accurate, adjust and highly sensitivity in the estimation of the ion than spectral method for all the measured samples it was preferred in the measurement of mercury ion.

Cadmium Ion (Cd^{+2}): Cadmium ion concentration was measured in the samples in the method of atomic absorption spectroscopic and spectroscopic method for measuring of cadmium by calculating the absorbance of the complex lead with Dithiazon at the maximum absorbance at 520 nm [Merczenko 2005] According to the calibration curves shown in Figure 3. The results were being as Table 5.
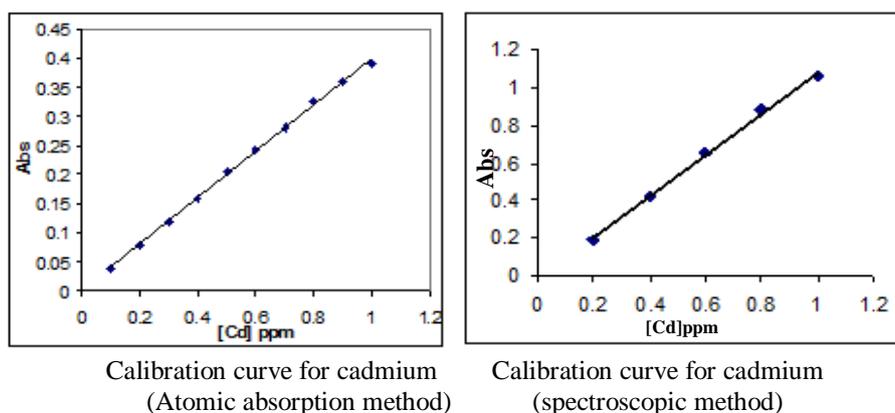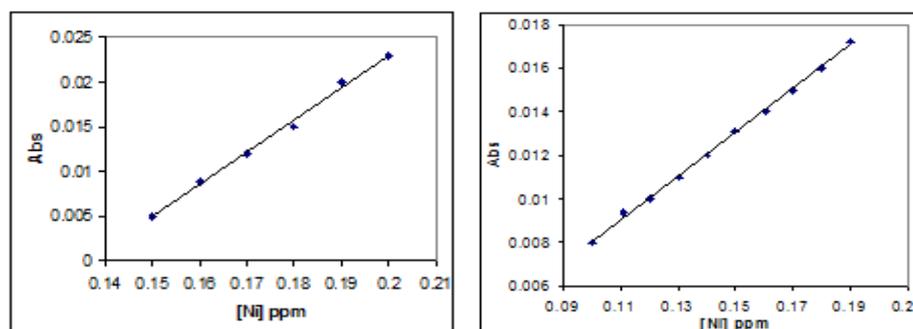

Calibration curve for cadmium   Calibration curve for cadmium
(Atomic absorption method)   (spectroscopic method)

Fig. 3. Calibration curves for the ion cadmium

Table 5. Cadmium ion concentration in water samples

Re%	E_{rel}	RSD%	values (r)	Ava.conc.of element(ppm)	Method	Water type
98.70%	-1.30	1.23%	0.9994	0.375	Atomic absorption	Waste water
98%	-2.00	3.00%	0.9988	0.210	spectroscopic method	Waste water
0	0.00	0.00	0.9994	ND	Atomic absorption	Entering water
0	0.00	0.00	0.9988	ND	spectroscopic method	Entering water
98%	-2.00	1.52%	0.9994	0.390	Atomic absorption	River water
95%	-5.00	3.10%	0.9988	0.400	spectroscopic method	River water

From the Table 5 appear the absence of the concentration of cadmium in the entering water in the factory because of the treatment for cadmium ion through the formation of insoluble complex with chlorine was that adding when the liquidation process [Surard and Chiranjepri 2005]. As in water waste and water of the river show the presence of high concentration of cadmium caused by waste from the factory. It is been outside the boundaries of the threshold allowed in surface waters where equal 0.04 ppm (WHO 2007) that was producing a high concentration as a result of entering in the composition of pigments and coating materials and enters in the composition of many plastics substances used in the industry, it have strong bonds with carbon and is retracTable soluble in organic solvents and inorganic, it was affecting in human through interaction with DNA or RNA,that was leading to affect in the genes [Khlool 2005], the accumulation cadmium lead to the dissolution of the bones, affects the metabolism of fatty, life cycles, growth in aquatic organisms and affects plants in the aquatic environment [Surard and Chiranjepri 2005]. By the results of the correction coefficient r, RSD%, Erel and Re% note that the atomic absorption method is more accurate, adjust highly sensitivity in the estimation of the ion than spectral method for all the measured samples it was preferred in the measurement of cadmium ion.

Nickel ion l (Ni^{+2}): Nickel ion concentration was computed in the samples by the method of atomic absorption spectroscopic and spectroscopic method for measuring of nickel by calculating the absorbance of the complex between nickel and di methyl glyoximato (DMG) at a greatest wavelength 445 nm [Merczenko 2005] and by calibration curves shown in Figure 4. The results were on Table 6.

Calibration curve for nickel Calibration curve for nickel
(Atomic absorption method) (spectroscopic method)
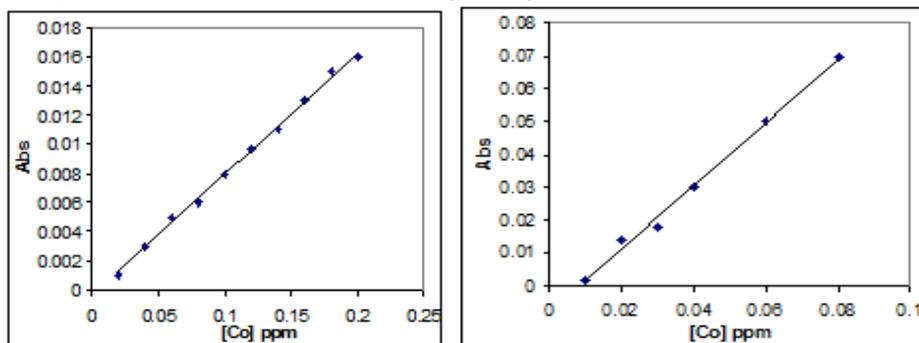
Figure (2) calibration curves for the ion nickel

Table 6. Nickel ion concentration in water samples

Re%	E_{rel}	RSD%	values (r)	Ava.conc.of element(ppm)	Method	Water type
98%	-2.00	1.60%	0.9997	0.135	Atomic absorption	Waste water
96%	-4.00	2.50%	0.9991	0.14	spectroscopic method	Waste water
97%	-3.00	1.70%	0.9997	0.115	Atomic absorption	Entering water
95.90%	-4.10	2.40%	0.9991	0.12	spectroscopic method	Entering water
98.50%	-1.50	2.84%	0.9997	0.16	Atomic absorption	River water
97%	-3.00	3.50%	0.9991	0.19	spectroscopic method	River water

Through from the results, the presence of highly nickel concentration of in the entering water samples on to factory,that was results from the lack for treatment of water in the filtering unit of this ion, that it is noting the height of the focus of ion in the wastewater and nearly water river,it is been outside the threshold limit, which is equal to 0.02 ppm for the surface water (WHO 2007) when nickel concentration rises to 1ppm be deadly of aquatic environment [Alloway 2000]. The concentration of the ion in water waste due to its use in the synthesis of dyes and in the installation of many alloys [Kassam 2005] that the nickel component leads to a lack of growth completeness, it is effects on the blood (high number of red blood cells), affects the overall increase in protein and Alaoriaman during the deposition at the kindly [Gupta et al. 2002]. and plant life through its influence on the solubility by ion exchange in plants [Alloway 2000] By the results of the correction coefficient r and RSD% and Erel and Re% note that the atomic absorption method is more accurate, adjust and highly sensitivity in the estimation

of the ion than spectral method for all the measured samples it was preferred in the measurement of nickel ion.

Cobalt ion (Co^{+2}): Cobalt ion concentration was calculated in the samples by the method of atomic absorption spectroscopic and spectroscopic method for measuring of cobalt by calculating the absorbance of the complex between ion and alpha- nitrous-beta- naphtol at a maximum wavelength 415 nm [Merczenko 2005] The calibration curves according to Figure 5. Results show the Table 7.

Calibration curve for cobalt Calibration curve for cobalt
(Atomic absorption method) (spectroscopic method)

Figure 5. calibration curves for the ion cobalt

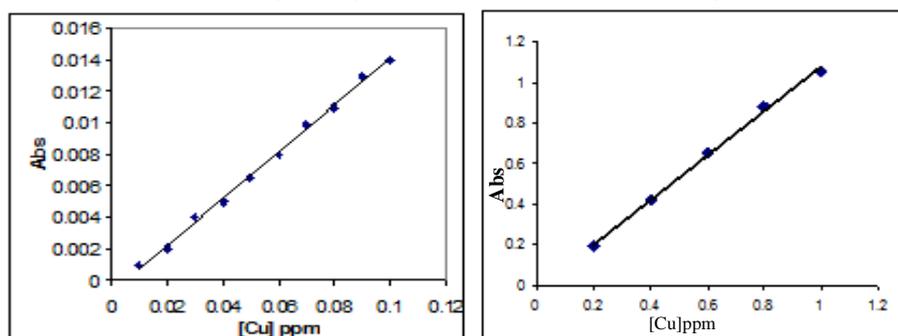*Table 7. Cobalt ion concentration in water samples*

Re%	E_{rel}	RSD%	values (r)	Ava.conc.of element(ppm)	Method	Water type
97.80%	-2.20	3.20%	0.9992	0.043	Atomic absorption	Waste water
96.70%	-3.10	5.50%	0.9980	0.730	spectroscopic method	Waste water
97.50%	-2.50	3.22%	0.9992	0.025	Atomic absorption	Entering water
96.60%	-3.40	4.90%	0.9980	0.021	spectroscopic method	Entering water
97.90%	-2.10	3.30%	0.9992	0.060	Atomic absorption	River water
96%	-4.00	4.80%	0.9980	0.060	spectroscopic method	River water

Through the results, the presence of cobalt concentration of in the entering water samples on to factory, which it was resulting from not treatment for the ion in the water samples, there are get a rise in the concentration of wastewater and river water, where the ion ratio within the allowable limit threshold range which is equal to 0.05 ppm (WHO2007).the ion Enters in the steel pipe industry and in the installation of dyes used in the textile industry [Mahdi et al. 2004]. There are a few percentages in sea water, drinking water, it have complexes are insoluble

settle to the bottom of the aquatic environment, affect the plants, animals and on the growth of human [Sheekh et al. 2003] through the results of the correction r coefficient, RSD%, Erel and Re% note that the atomic absorption method is more accurate, adjust and highly sensitivity in the estimation of the ion than spectral method for all the measured samples it was preferred in the measurement of cobalt ion.

Copper ion (Cu^{+2}): copper ion concentration was calculated in the samples by the method of atomic absorption spectroscopic and spectroscopic method for measuring of cobalt by calculating the absorbance of the complex between copper and Dithiazon at a highly wavelength at 550 nm [Merczenko 2005] was the calibration curves according to Figure 6 and the results according to the Table 8.

Calibration curve for copper Calibration curve for copper
(Atomic absorption method) (spectroscopic method)

Figure 6. calibration curves for the ion copper

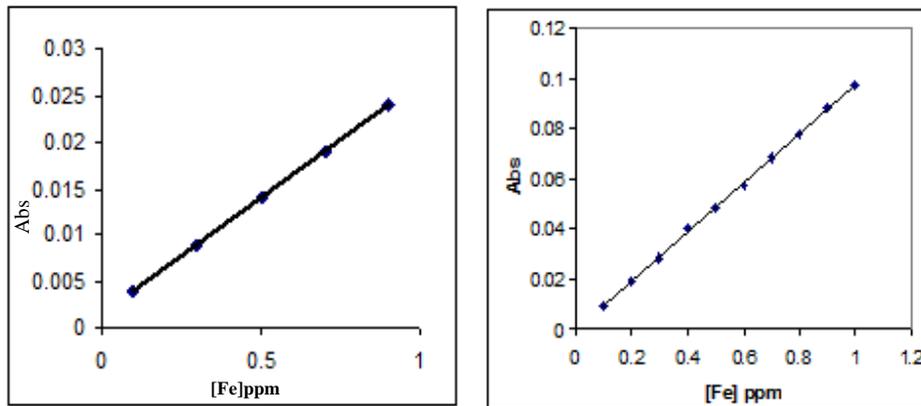*Table 8. Copper ion concentration in water samples*

Re%	E_{rel}	RSD%	values (r)	Ava.conc.of element(ppm)	Method	Water type
96.50%	-3.50	3%	0.9991	0.5	Atomic absorption	Waste water
96.40%	-3.60	3.10%	0.9987	0.41	spectroscopic method	Waste water
96.80%	-3.20	2.90%	0.9991	0.05	Atomic absorption	Entering water
96.50%	-3.50	3.20%	0.9987	0.04	spectroscopic method	Entering water
96.90%	-3.10	3.23%	0.9991	0.52	Atomic absorption	River water
96.70%	-3.30	3.40%	0.9987	0.51	spectroscopic method	River water

From the Table note there is a concentration of copper in water liquefaction that entering in the factory,the height of the focus in water waste and the river so

that for the lack for treatment of ion before entering and be within the range allowed for the concentration of copper in surface waters (within the threshold limit) and is equal to 1 ppm (WHO 2007),the copper was produced in the water waste due to the use of copper pans, plates, copper drilling,copper cylinders that was used in textile printing and in the paint [Purachatetal et al. 2001] that the toxicity of copper produced from taking a large amount of the element and on an ongoing basis, its accumulation in the organisms especially in the liver, it is causes incidence of hemolytic and jaundice where it enters the human body either by food or of the waste of industry [Dirilgen 2001, Zhao et al. 1994]. the results of the correction coefficient r, RSD%, Erel and Re% note that the atomic absorption method is more accurate, adjust and highly sensitivity in the estimation of the ion than spectral method for all the measured samples it was preferred in the measurement of copper ion.

Iron ion (Fe^{+2}): Iron ion concentration was calculated in the samples by the method of atomic absorption spectroscopic and spectroscopic method for measuring of iron by calculating the absorbance of the complex output of iron with 1.10 phenanthrene at highly waveform at 512 nm [Merczenko 2005]. According to the Figure 7 the results were on the Table 9.

Calibration curve for Iron Calibration curve for Iron
(Atomic absorption method) (spectroscopic method)

Figure 7. calibration curves for the ion nickel

Table 9. Iron ion concentration in water samples

Re%	E_{rel}	RSD%	values (r)	Ava.conc.of element(ppm)	Method	Water type
97%	-3.00	3.29%	0.9994	0.06	Atomic absorption	Waste water
97.50%	-2.50	3.19%	0.9996	0.055	spectroscopic method	Waste water
96.50%	-3.50	3.20%	0.9994	0.02	Atomic absorption	Entering water

96.80%	-3.20	3.10%	0.9996	0.03	spectroscopic method	Entering water
97%	-3.00	2.95%	0.9994	0.4	Atomic absorption	River water
96.70%	-3.30	3.10%	0.9996	0.2	spectroscopic method	River water

From the Table note there is a concentration of iron in the entering water samples in the factory, and highly concentration iron in water waste and in the water of the river near from the factory, where it is within the range allowed for ion iron in surface waters (within the threshold limit) which is equal to 0.3 ppm (WHO 2007) this concentration produces in water waste as a result of pipeline iron water transfer process and the rust that you get [Jsail et al. 2003]. That the iron ion have big impact in the textile industry, where are iron salts was making many hazardous and noxious when they exist with the water inside the industry, which gives the yellow color in the washing operations and the palace is also a catalyst for the analysis of minors materials.the presence of in the water entering leads to union with dyes and then occurrence of the darkness of the fabric [Russell et al. 1987]. Also has a significant impact on the lives of plants and animals in the river when you get accumulation get [Jsail et al. 2003]. The results of the correction coefficient r, RSD%, Erel and Re% note that the spectral method is more accurate, adjust and highly sensitivity in the estimation of the ion than atomic absorption method for all the measured samples it was preferred in the measurement of iron ion. and this is due to the oxidation of iron (Fe^{+2}) to (Fe^{+3}) by air on the atomic absorption oven and that leading for overlap in the absorption it was giving the lack in accuracy of this method [Gupta et al. 2002] and in all samples various water.

Acidic function influence (pH): the acidic function pH was measuring at in the various water samples (liquefaction, waste water, river water) to the AL-Diwani textile factory for a period of four consecutive weeks pH ranges was according to the Table 10.

Table 10. pH range for the water and wastewater samples

pH range	Sample
6.50-7.20	Wastewater
7.39-7.75	Entering water
7.55-8.00	River water

Found that the waste water to be more acidic than water liquefaction, where it returns to the palace materials and termination, which added to the textile products which reduce relatively alkaline water piped make wastewater with highly acidic get [Jsail et al. 2003] The waters of the river was the extent of pH within the limit of surface water which is equal to 8.0-6.5 (WHO 2007), because of the waste from factory combined with substances found in the river to be neutral salts may settle to the bottom of the river [Al-Sadai 2009].

9-Measurement of electrical conductivity: conductivity was measured by connectivity measuring device after cleaning pole and calibrated with a solution of KCl and water deionized [Russell et al. 1987] were the ranges of conductivity of samples for a period of four weeks, according to the Table 11.

Table 10. Electrical conductivity (ranges) for samples

Electrical Conductivity (mS·cm⁻¹)	Sample
1210-1913	Waste water
1162-1193	Entering water
1082-1054	River water

Through the results show a significant increase in connectivity wastewater then the liquefaction water and then back to the factory waste containing a high concentration of ions metallic and complex which produces various additions and factory events diverse the river water have small conductivity due to the impact of the aquatic environment where precipitate ions in the river bottom, which reduces the conductivity of water [Al-Sadai 2009]. The conductivity higher than the allowable limit by threshold limit which is equal to 1000 mS·cm⁻¹ (WHO 2007). In surface water as a result of waste laboratory.

CONCLUSIONS

From the search results can be obtained of the following:
Find out the extent of the environmental pollution of the waters of the River of Diwani by some trace elements of Diwani, a textile factory that was measuring its concentration in the water entering and leaving him and their impact on the nearby waters of the river where it is measured by atomic absorption method and spectroscopic method appropriate for each ion.
Finding the measured concentrations of elements in the waste water, where it is the lead element is the most focused and up to (3.31 ppm) and the element cobalt is less concentrated and up to (0.043 ppm) The elements cadmium, mercury, nickel, copper, iron is concentration between the two elements.
The inefficiency of the filter unit is located in the factory where it is addressed a small section of the contaminants and leaving the majority to enter the factory.
The elements concentrations was measured by the atomic absorption method and spectroscopic method appropriate for each ion and was made a comparison between the two methods, where he was the first method is the most accurate, adjust and the sensitivity to measure the concentrations of the elements for the second method except iron ion in the various samples. this application was represented out of laboratory for these chemical methods and comparing the efficiency with other methods.

Measuring the extent of acidic function and electrical conductivity of the samples, where is was is the most acidic pH on wastewater a 5.6 to 2.7 and is the highest connectivity where 1210-1913 mS·cm^{-1}.

Inefficient unit for wastewater treatment which makes it necessary to establish a new unit based on modern methods of treatment, such as oxidation, ion exchange, deposition strong bases and thus lead to remove the waste from the factory and minimizing the extent of river water contamination that was caused by the waste.

RECOMMENDATIONS

The possibility of using these methods to measure the concentrations of trace elements for the knowledge of the extent of the environmental pollution caused by waste water other factory's, such as tires, cement and other that lead to the possibility of re study on them.

Improve the water entering specifications to the factory, to increase its purity by developing in the lab filtering station.

Study and evaluation of the waste water emerging from the factory to find out the extent of environmental pollution that was caused.

Create a new treatment unit or improve unit efficiency in the factory to get rid of contaminants.

The use of modern treatment methods such as ion exchange by using polymers, methods of photo oxidation by catalysts existence or use bases to precipitate the contaminants thus lead to remove it.

The possibility of re industrial effluent from the plant through the use of recycled by using the best treatment method and least expensive.

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