

## Study of some heavy elements in some local water filling stations Wasit / Kut

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دراسة بعض العناصر الثقيلة في بعض محطات تعبئة المياه المحلية واسط / الكوت

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### المستخلص:

أجريت هذه الدراسة لتقدير تراكيز عدد من العناصر الثقيلة لنماذج مياه بعض المحطات الاهلية لتصفية مياه الشرب ( RO ) في بعض المناطق من مدينة الكوت ، حيث سحبت العينات من عشرة محطات اهليه في مناطق مختلفه من المدينه وهي ( حي الامام علي ، منطقة العزه ، انوار الصدر ، حي الخاجيه ، حي الشهداء ، حي الزهراء ، حي العباسيه ، حي تموز ، حي الحكيم ، حي الحوراء ) وتقدير عدد من العناصر مثل ( الرصاص ( Pb ) ، الكاديوم ( Cd ) ، الزنك ( Zn ) ، النيكل ( Ni ) ) ، ومقارنة النتائج مع الحدود المسموح وفق مسودة الدليل 779 مواصفات مياه الشرب منظمة الصحة العالمية وسجلت نسب عالية لعنصري الرصاص والكاديوم وحافظ عنصر الخارصين على القيم المسموح بها اما عنصر النيكل سجل خلو تام للعنصر من العينات المسحوبة ونسب عالية في عينات مناطق حي الزهراء ، حي الامام علي ، حي العباسية ، حي الشهداء ، منطقة انوار الصدر.

### Abstract

The study was conducted to estimate the concentration of a number of heavy elements of water samples of some( RO) plants in different areas of Al Kut city, where samples were withdrawn from ten stations in some regions (Al-Zahra, Imam Ali, Al-Abbasiyah district, Tammuz, Al-Hakim, Al-Hawra district, Al-Azza, Al Khajia, Anwar al-Sadr area, Shuhada regions) and estimate the number of some elements such as lead (Pb), cadmium (Cd),zinc (Zn), nickel (Ni), and compare the results with the permissible limits according to draft 779 Drinking water specifications WHO The high levels of lead and cadmium were recorded and the zinc element was maintained at the allowable values. The nickel element recorded a complete absence of the extracted samples and high percentages in the samples of Al-Zahraa, Imam Ali neighborhood, Abbasiya, Anwar al-Sadr area and Shuhada regions.

## 1- Introduction

Drinking Water is defined as water that is not harmful to humans or water that is not polluted to an unhealthy extent. [1] A source of halves. As water is important and necessary, it enters all industries and processes, and no living organism can live without it. It is necessary for all interactions within bodies Neighborhoods [2]

The bottled water industry is one of the most food and beverage industries [3]. Drinking water is more consumed and regularly increased, due to consumer preference and water pollution as a result of problems with chlorination [4,5]. In general, water pollution has a significant risk of causing an imbalance in the ecosystem and the sources of water pollution is all that affects its properties or changes its nature [6].

The presence of heavy elements is one of the major health problems in drinking water if they at concentrations greater than the permissible limits according to international specifications and Iraqi water. In Iraq, there have been many civil water sterilization stations, most of which are not

Therefore, this study aims to determine of some heavy elements in locally bottled drinking water in Wasit Governorate and the extent of their approval for internationally

subject to the Iraqi drinking water standards. Heavy elements are defined as those that are more than five times the density of water ( $5 \text{ mg / cm}^3$ ) and have negative effects on the environment when used too much and also affect the health of humans, animals and plants. The heavy elements in the water of the most dangerous contaminants, causing many types of cancer [7]

The heavy elements, lead, nickel, cadmium and zinc, are dangerous elements to human health when they exceeds above the normal rates, the lead causes the death or damaging brain and kidney at high concentration level, and cadmium component with low concentrations cause cough, headache and vomiting and high concentrations level cause the accumulation of the element in the liver and kidney and failure Renal insufficiency and absorption of iron in the blood. The zinc element is toxic to humans with high concentrations level and the nickel element has with high concentrations, leads to hair loss [8].

approved measurements according to the WHO manual.

## 2. Materials and methods

During the month of March 2017, samples were withdrawn for ten areas in Wasit governorate. The city of Kut is (Al-Zahra, Imam Ali, Al-Abbasiyah district, Tammuz, Al-Hakim, Al-Hawra district, Al-Azza, Al Khajia, Anwar al-Sadr, Shuhada regions) . 3 samples for each station were used for the purpose of collecting water models bottles of plastic sealants were homogenized with distilled

water black color because of the effects of heavy elements in the sun. The samples were taken very carefully and carefully to obtain accurate laboratory results. Using the 2002 Australian Atomic Absorption Spectrophotometer. The results of the tests were compared with the drafts of the Guide to Drinking Water Standards.

## 3. Results and discussion

The research began at March by measuring heavy elements in 10 stations to clean water from different areas of the city of Kut Wasit city center: (Al-Zahra, Imam Ali, Al-Abbasiyah, Tammuz, Al-Hakim, Al-Hawra

district, Al-Azza, Al Khajia, Anwar al-Sadr area, Shuhada regios). The heavy elements studied in these stations are: lead ( Pb ) , cadmium ( Cd ) , zinc ( Zn ) , nickel ( Ni ).



Figure (1) Location of Wasit Governorate for the governorates of Iraq

Table (1) shows the concentrations of a number of heavy elements measured by the atomic absorption device. Note that the zinc component recorded measurements within the allowed limits according to the draft manual 779 drinking water specifications WHO.

Both lead and cadmium measurements are higher than the permissible limits except for most of the water purification plants do not have Chemical treatment phase for the removal of heavy metals. And the

the area (Al-Shuhada region). The measurements were within the permissible limits.

The nickel element was not recorded in the areas (Tammuz, Al-Azza, Hakim, Al-Khajia, Al-Hawra regions) The presence of the lack of experience for people working at these stations [2,9].

**Table (1) Ratio of elements (zinc, lead, nickel, cadmium)**

S	Region	zinc Zn	lead Pb	nickel Ni	Cadmium Cd
	<b>Limitations of the Standard</b>	<b>3</b>	<b>0.01</b>	<b>0.02</b>	<b>0.003</b>
1	Al-Zahra	0.008	0.108	0.005	0.014
2	ImamAli	0.042	0.187	0.128	0.008
3	Abbasiya	0.003	0.083	0.061	0.015
4	Tammuz	0.008	0.243	ND	0.028
5	Anwar al-Sadr	0.005	0.119	0.011	0.004
6	Al-Azza	0.012	0.271	ND	0.011
7	Hakim	0.001	0.080	ND	0.014
8	Al-Khajia	0.006	0.145	ND	0.020
9	Al-Hawra	0.005	0.159	ND	0.012
10	Al-Shuhada	0.009	0.013	0.172	0.003

## Conclusions

1-Lead and cadmium concentration was at higher levels as comparing with other metals.

2-Zinc concentration found below permissible level.

3- Nickel concentration was not recorded in some areas but found below permissible level in other area.

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