

بسم الله الرحمن الرحيم

(أَوَلَمْ يَرَ الَّذِينَ كَفَرُوا أَنَّ السَّمَاوَاتِ وَالْأَرْضَ

كَانَتَا رَتْقًا فَفَتَقْنَاهُمَا ۚ

وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ أَفَلَا يُؤْمِنُونَ)

صدق الله العظيم

***Dedication***

*To the soul of my uncle Kaml Osman*

*Elzuber*

*My Parents*

*My brothers*

*My colleagues and friends*

# ***Acknowledgments***

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# Abstract

The objective of this study was to detect the pollutant anions in Kamleen drinking water from underground sources. Concentration levels of chloride, sulphate, nitrate, nitrite, and particularly fluoride were determined. In addition, color, turbidity, hydrogen ion concentration, electrical conductivity, total hardness, total alkalinity, and total dissolved solids were measured. Samples of groundwater were randomly collected from twenty eight different areas around central Kamleen locality during the summer season from May to August 2011.

Ion-selective electrodes methods were used to determine fluoride, chloride and nitrate. Colorimetric methods were used to determine sulphate, turbidity and also fluoride and nitrate. In comparison, sulphate content was also determined gravimetrically. Nitrite was also determined colorimetrically but using standard addition method. Chloride was also determined by titrimetric method and also total hardness and total alkalinity.

The results obtained showed that the of fluoride contents ranged from 0.01 to 1.89 ppm, chloride, 3.82 to 770.42 ppm, nitrate 8.52 to 44.00 ppm, nitrite 0.008 to 0.828ppm and sulphate ranged from 5.99 to 881.00 ppm. It was also found that hydrogen

ion concentration and turbidity were in agreement with those of the international standard except those of total dissolved solids (2070 ppm), and electrical conductivity (3105 $\mu$ s) in Eliedaid groundwater.

Chemical composition studies showed that the total hardness, total alkalinity nitrate and nitrite in all sites of Kamleen groundwater complied with those of the international standards of drinking water. Only one sample of Eliedaid, however, showed higher values for chloride (777.24 ppm) and sulphate (881.00 ppm) than the maximum permissible limits (250 ppm) for both ions. Up to five samples of Kamleen groundwater of Fadoul (1.69ppm), Eltakala Abashar (1.63ppm), Eltorabi Elgadida (1.89ppm), Elkasabmar (1.51ppm), Eltakala Rofaa (1.55 ppm), did not conform with the maximum permissible limit of 1.50 ppm for fluoride content in drinking water. The groundwater of these areas could be considered as unsuitable for drinking.

The groundwater of the central and far eastern areas of Kamleen locality were affected by fluoride, while those of northern and western, as indicated by the results obtained, were affected by salinity.

## الخلاصة

هدفت هذه الدراسة للكشف عن الانيونات الملوثة لمياه الشرب الجوفية بمحلية الكاملين. وقد تم تعيين تركيز محتوى الكلوريد والكبريتات والنترات والنترت وحاسة الفلوريد. بالاضافة الى قياس اللون والعكارة وتركيز ايون الهيدروجين والمواد الصلبة الذائبة و العسر الكلي والقلوية الكلية والموصلية الكهربائية.

وقد تم جمع العينات من المصادر الجوفية بطريقة عشوائية من ثماني وعشرين منطقة مختلفه من انحاء ووسط المحلية خلال فصل الصيف في الفترة من مايو الى اغسطس للعام 2011 م.

وقد تم استخدام طرق الاقطاب انتقائية الأيون لتعيين محتوى الفلوريد والكلوريد بالإضافة الى النترات. وقد تم استخدام طرق المطيافية اللونية لتعيين

محتوى الكبريتات والعكارة والنترات أيضاً، وللمقارنة تم تعيين محتوى الكبريتات بالطريقة الوزنية، وقد تم أيضاً استخدام المطيافية اللونية لتعيين محتوى النترات لكن باستخدام طريقة الإضافة القياسية. وتم أيضاً تعيين الكلوريد بالاضافة الي العسر الكلي والقلوية الكلية بالتحليل الحجمي .

وقد اظهرت النتائج ان محتوى الفلوريد يقع في المدى من (0.01 الى 1.89 جزء من المليون) والكلوريد في المدى من (3.82 الى 777.24 جزء المليون) والنترات من (8.52 الى 44.00 جزء من المليون). ولقد وجد أيضاً ان تركيز ايون الهيدروجين والعكارة وكمية الاملاح الذائبة والعسر والقلوية والموصلية الكهربائية مطابقة للمواصفات العالمية ما عد كمية الاملاح الذائبة لقرية العديد 2070 جزء من المليون الموصلية الكهربائية لنفس القرية 3105 مايكرو سمنس. وقد اوضحت الدراسة أيضاً ان محتوى النترات والنترات مطابق للمواصفات العالمية لمياه الشرب. وقد اظهرت عينة واحدة فقط من قرية العديد قيم عالية بالنسبة للكلوريد ( 777.24 جزء من المليون) والكبريتات (881.00 جزء من المليون) والتي تجاوزت الحد المسموح به عالمياً (250 جزء من المليون)

وقد وجد أيضاً ان هنالك خمس عينات في المحلية وهي فضل (1.66 جزء من المليون)، التكلة أبشر (1.63 جزء من المليون)، الترابي القديمة (1.89 جزء من المليون)، الكسمبر (1.51 جزء من المليون) بالإضافة الى التكلة رفاعة (1.55 جزء من المليون) قد تجاوزت الحد المسموح به عالمياً (1.50 جزء من المليون). ويمكن اعتبار ان المياه الجوفية لهذه المناطق غير صالحة للشرب.

وقد اوضحت النتائج ان المياه الجوفية لمنتصف و اقصى شرق المحلية هي الاكثر تائراً بالفلوريد في حين ان تلك التي في شمال شرق المحلية هي الاكثر تائراً بالملوحة.

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