



EFFICIENCY OF ALGINIC ACID TO REMOVE SOME HEAVY METALS FROM WATER

Nibras mohammed abdulrasool alsaffar

Market research center and consumer protection/University of Baghdad/Iraq

Corresponding Author email: nibras22877@gmail.com

ABSTRACT

In the present study, some of the heavy elements (Pb, Cr, Co, Fe) were removed from the polluted water by applying a chemical method by adding the biological polymer (alginic acid). Various concentrations were present respectively (0.5,1,1.5,2 ppm) for each element. The pH 5 and the duration of the test were examined within 72 hours, and then the remaining concentrations of the mentioned elements were detected using the atomic absorption spectrometry technique to measure the absorbance. The results showed acidity in the extraction of the studied elements. The highest lead value at 2ppm followed by Chromium at 1.5ppm and then iron at 0.5ppm and cobalt at 0.5ppm.

KEYWORDS: Bio-Polymer, Heavy Elements, Concentration, Polluting Water

INTRODUCTION

There are many methods of treatment of contaminated water containing heavy elements, including the method of ion exchange using resins in the process of treatment. The method of adsorption using activated coal or natural rock or some synthetic materials as well as the method of the equation where the mixing of acid and base liquid generated from the same polluted source and the process of deposition of elements in the form of salts or oxidation as in the oxidation of cyanide or reduction in the center acidic solutions for chromium or use Reverse osmosis Technology But most of these methods are economically costly and require specialized expertise in application (1). In recent years, a trend has been developed among researchers and those interested in emphasizing the importance of the use of biological polymers in the withdrawal of heavy elements from polluted water as one of the advanced and successful methods of treatment (2,3,4). In the last few years, some studies have begun using pollution control in various fields, including water pollution, as in the studies of researchers (5,6). In this study, alginic acid was selected from among these polymers for the purpose of testing its efficiency in the withdrawal of some ions of heavy elements, because of its ability to link positive ions first and easy to get rid of it after the link to the positive ion, and this polymer was described by several names in different references, including global acid or zinc acid or acid

MATERIALS AND METHODS

Sodium alginate, HCL, mixing of 30% ethanol +70% water to make alginic acid, (Pb, Cr, Co, Fe) Different Concentrations The AA-7000 Atomic Absorption Spectrometer was tested at the Atomic Absorption Laboratory of the Market Research and Consumer Protection Center of the University of Baghdad.

Preparation of acid

The acid is brought from the sodium gene. Add 10 g to a 400 ml baker containing 100 ml of 30% ethanol + 70% water with 5 mL of concentrated HCL (35%) and continue mixing for 2 hours at room temperature At the end of the reaction the filtration of the resulting material is acid, washed by the previous mixture and then dried in an oven at 60 ° C for three hours (7) after which the acid is taken and weighed and the required tests are carried out.

Preparation of different concentrations of solutions containing heavy elements

100 ml clean and dry bottles were prepared for the purpose of preparing aqueous solutions of the four selected elements. Four concentrations were prepared for each element (0.5,1,1.5,2ppm) using standard solutions and complete size with ions-free water. The first evaluation was done at this stage and the absorption of the studied elements was measured and then the solutions were divided so that we took 50 ml and treated it by adding 0.050 g of alginic acid after drying it thoroughly and then put it in a water bath with 30 degree and leave it for three days Then calculate the absorption values for all the plants Treat chemically.

RESULTS AND DISCUSSION

When reviewing the results obtained for concentrations of the studied elements, we note that all these concentrations have decreased for all elements from the level they were before the addition of treatment and as shown in the table of absorption values (1,2,3,4 as we see from the results in Table 1) The higher the concentration the greater the absorption The highest concentration was 75%, followed by the concentration of 1ppm with concentration of 60%, then the first concentration of 85% and finally the concentration of 1.5ppm at 25% and the highest effect of acid when the concentration reached 2ppm.

Efficiency of alginic acid to remove some heavy metals from water

Table(1) absorption of(Pb) before and after chemical treatment

Concentration of metal /ppm	Absorption before treatment	Concentration after treatment /ppm
0.5	0.0002	0.3400
1	0.0020	0.3800
1.5	0.0003	0.3000
2	0.0023	0.5000

As for the chromium element, we note that the lowest absorption at the highest concentration where the percentage of removal at the concentration of 2ppm is

about 5% and at the concentration of 1.5ppm was 30% and at the concentration of 1ppm was 25% and the last at a concentration of 0.5ppm The rate was 25%.

Table(2) absorption of(Cr) before and after chemical treatment

Concentration of metal /ppm	Absorption before treatment	Concentration after treatment /ppm
0.5	0.0042	0.2309
1	0.0044	0.2553
1.5	0.0057	0.4137
2	0.0010	0.1589

In Table (3) we note that the lowest removal rate was at the concentration of 0.5ppm where it reached 15% and increase the greater the concentration of more than 85% at

the concentration of 1ppm and at the concentration of 1.5 ppm at 75% and at the concentration of 2ppm was 90%

Table(3) absorption of(Fe) before and after chemical treatment

Concentration of metal /ppm	Absorption before treatment	Concentration after treatment /ppm
0.5	0.0016	0.3490
1	0.0032	0.1314
1.5	0.0008	0.2620
2	0.0039	0.2076

In Table 4, the highest removal rate was at 1ppm, followed by 1.5ppm, followed by 2ppm, followed by 0.5ppm

Table(4) absorption of(Co) before and after chemical treatment

Concentration of metal /ppm	Absorption before treatment	Concentration after treatment /ppm
0.5	0.0001	0.0336
1	0.0043	0.0040
1.5	0.0022	0.0148
2	0.0074	0.0318

From the above, we conclude that the higher the concentration, the greater the percentage of removal, but different according to the element with the stability of the concentration of acid and other conditions of the examination.

REFERENCES

- 1 al-salman, I.M.A, "laboratory study on the use of green algae saenedesmusobliquus in dilution of toxicity of water polluted with some heav metals", AL-Mustansiriya journal of science 9(2),51-57,1998.
- 2 Cozzi, D., Desideri, P.G and Lepri, L."the mechanism of ion exchange with Alginicacid," J Chromatogr,40,130-137,1969.
- 3 Gutinek. D. L and Bach, H. "Engineering bacterial biopolymers for the Biosorption of heavy metals,new product and novel formulations," *Applmicrobiol Biotech.*54,451-460,2000.
- 4 Althuwayniu, MuntahaaNieamah and Abbas, hamidkazim and mohammed, aqilabwatalibwafunajan ,, eabd'al'amirmatlik "The Use of Biological Polymers to Remove Certain Heavy Elements from Water", Journal of the College of Basic Education, Mustansiriya University, 19 (78), 2013.
- 5 Khalil. Z. i. and Asker. M. S. "Effect of PH on growth and biochemical responses of Dunaliellabardawil and chlorella ellipsoidea," *Microbiol Biotechnol.*26,1225-1231,2010.