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The Efficiency of the Eichhornia Crassipes (Mart)Solms in the Absorption Contamination Water before Discharge in the Tigris River

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Abstract
Carried out this study in the College of Agriculture and forestry / Mosul University during growing season of the water hyacinth *Eichhornia crassipes* (Mart)Solms for 2012 included the experiment two factors , first the quality of the water and second time periods of sampling where the measurement of the proportion of heavy elements from the stream of the valley of the Al-Kraze , which is in the effluent of AL-kosar , and then the Tigris River .in a week if I took samples of the water before entering the receptacle of cultivated plants is the water hyacinth, and then take samples after the presence of water with the plants for two days . Showed results high efficiency water hyacinth in the absorption of mineral elements including heavy with salts with modification number the EC of the water course of the valley of the Al-Kraze, where it is absorbed by the water entering into the zone of plant growth through the summer months quantities of salinity, nitrate, phosphate, copper, zinc, lead and cadmium of up to 6,4 ٪, 55,9 ٪, 38,7 ٪, 65,8 ٪, 51,3 ٪, 51,9 ٪, 65,6 ٪respectively also reduced the number the pH of the water at a rate of 0,21 . Although there is variation in the rates of salinity and the elements present in the water during the time periods of July to September , it has obsorp the plant higher amounts of the element of copper, lead and cadmium in the month of September, while, obsorp the highest level of salinity, nitrate, phosphorus, and zinc, in the month of July .
Keywords: pollution, *Eichhornia crassipes* (Mart)Solms , period of time, quality of water, waste water, heavy metal

Introduction

The water pollution one of the most important problems facing the world due to the progress of civilization, or due to containment of the soil on some of the heavy elements , in Iraq, who is the Tigris river from the north to the south of it, the mouths of the industrial waste or agricultural fields as well as sewage, sanitation, all leading to the pollution of the Tigris River, although the concentration of contaminants may make the water invalid uses of the human (Al-rawy , 1993) . The toxic elements such as heavy still is a source of concern for workers in the field of the environment, because they relate to human health (Feng , others, 2008) conducted several studies to measure salinity, nitrates, phosphorus and some heavy metals in the Tigris-Euphrates River where they found the element of lead, cadmium, zinc, phosphate, nitrate, and increase the salinity by a high on the permissible limits in the river as they found the concentration of lead and nickel in the Tigris River City of Mosul has exceeded the determinants of Iraqi drinking water, common in the coast right(Kasim , 1990 Saleh , 2001, Albroiry , 2004 ,Al safafioy , 2006 and Al-abadi , 2007). Consider the water hyacinth is plants that grow and reproduce in a wide range of environmental conditions are different, the best growth was observed in water, neutral PH=7, which contain loads of nutrients such as nitrates and phosphorus , so the absorption of these two components leads to the increase of biomass and number of produce especially when the ratio of nitrogen : phosphorus of 1 : 7 (Heard and winterton, 2000), as it was able to growth in contaminated water, remnants of the factories, the salinity of up to 15% of seawater salinity (Wright and Purcell, 1995) . In general, because of the absorbed heavy metals to varying degrees, States have begun to use it in water treatment or water purification, especially the water-containing manganese, zinc, lead, copper, nickel, chromium, and cadmium in large quantities, although the capacity of the absorption depend on the size of the biomass and growth rate propagation (Julien and others , 1999 , Zhu and others , 1999 , Hill and Coetzee , 2008) . The objective of the research identified on the ability or efficiency of what is absorbed by the *Eichhornia crassipes* (Mart)Solms, streams, sewage and disbursement of cities before being put into the Tigris river from salinity, nitrate, phosphorus, and some heavy items to reduce the pollution .

Materials and methods search

This study was carried out in the College of Agriculture and forestry / Mosul University during growing season of the plant *Eichhornia crassipes* (Mart)Solms for 2012 included the experiment two factors, first the quality of the water and second time periods of sampling . Used the basins of plastic with an area of (72 x 23) cm and the depth of 60cm where the soil depth 10 – 15 cm. and then filled with water then put the water hyacinth propagates smoothly on 1/5/2011 after the passage of 55 days from planting , Was the measurement of the proportion of heavy elements in the water inside any before watering the plants, water hyacinth . after a couple of days is take a sample of the water remaining in the tub is measured where the ratio of heavy elements and repeat this process 11 once more with a fixed interval of seven days between the sample and the water used in the irrigation, coming from the Al-Kraze which is located inside the University of Mosul , the length of the valley (15km) and the rate of discharge up to 72m³ / min (Mustafa , 2009) , This is the stream part of the AL-kosar river that hurt in the end. River Tigris and up to the valley, the waters of the crap, including residential, agricultural, industrial, in addition to what you're shoveling water, rain, flooding, and estimate the concentration of each of the (zinc , copper , cadmium , phosphate , nitrate , lead) to the spectrometer, atomic absorption, and through the standard curve of each component to find the concentration of the metals through the application of the equation expressed in unit of (mg / l) . Was the analysis of the results by computer using the SAS according to the experimental system, simple design, indiscriminate to the full (CRD) in three Replicate and the use of the test of Duncan multiple-range comparison between the averages, where the identified averages that differ from each significant at the level of 5% in letters different .

Results and discussion

Electrical conductivity Ec

Table (1) on 2/8 the existence of a lower salinity in the water course compared to the rest of the time periods of 5/7 as of 12/9, while the observed highest salinity was in 18/7 as the difference between the highest and the lowest rate 285,7 Ms / cm-1 increased by 33,5% as well observed during the month of July there was significant difference between the beginning of the month 5/7 to 18/7 , it was observed significant increase in the rate of salinity during the four weeks of the month of August he referred, Richard (1954) on the classification of the irrigation water to its content of salts and stated that the rate of electrical conduction (ppm/ cm) From 100 - 250 is so little water salinity , and 250 - 750 average salinity and 750 – 2250 high salinity . It explained Albroariy (2004) assessing sources of water for the purposes of irrigation, the average values of electrical conductivity were erratic according to the months of the year, which ranged from 383 – 3450 ppm/ cm . the effect of the plants is the water hyacinth in the absorption of salinity from the wastewater of the valley of the Al-Krazeit has been found that the rate of retention of salinity within the plant was 48,14 Microms / cm.this is the difference between the water entering the plants, water and emerging from it , we deduce from this that the rate of absorption of these salts was increased by 6,4% by the plant, the water hyacinth, the plant tolerate salinity and grows well in wastewater effluents of the cities and water contaminated by remnants of the factories, or the container on the proportion of toxic substances (So others 2003) . also said the table to the existence of different significant , in the amount of salinity between the water entering a plant is the water hyacinth and the water out of them as weeks, it was observed high amount of salinity in the water within the plants was in the middle of the month of July (week II and III) and the end of August until 12 September (week VIII, IX, X), and that the rate of absorption of plant to salinity was in the second week, third, fourth, and fifth arrived to 67,33 ,73 , 67,66 , 60,33 Microms /cm, respectively, and the least rate was absorbed in week VII, where the absorbed 22,33 Microms / cm.

Table (1) Effect of different period of time, the quality of water inter the water hyacinth in the EC sewage in the city of Mosul .

Number of weeks	date of the sample	water inside the plant (micro/cm)	water outside of the plant (micro/cm)	rate of difference between the water inside and out	percentage absorption %	effect of the readings
1	2011/7/5	653,000h	610,333j	42,67	6,5	631,667g
	2011/7/12	848,000b	780,667d e	67,33	7,9	814,333b
2	2011/7/18	888,333a	815,333c	73,00	8,2	851,833a
3	2011/7/25	790,333d	722,667g	67,66	8,6	756,5e
4	2011/8/2	596,333k	536,000m	60,33	10,1	566,167i
5	2011/8/9	618,333j	580,000l	38,3	6,2	599,167h
6	2011/8/16	655,667h	633,333i	22,33	3,4	644,5f
7	2011/8/22	784,000d e	750,000f	34,00	4,3	767,00d
8	2011/8/29	812,333c	785,000d e	27,33	3,4	798,667c
9	2011/9/6	822,000c	774,667e	47,33	5,8	798,33c
10	2011/9/12	840,333b	791,000d	49,33	5,9	815,667b
effect of the quality		755,33a	707,182b	48,148	6,4	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

The measurement of the pH

shows Table (2) The existence of significant differences for the measurement of pH during the ten weeks (5/7 as of 12/9), it was noted, the highest he reached pH 8,09 on 25/7 and then the dropped to 7,23 with the acidity moderate and this shows that the plant has the ability to live in environments of different pH (7,23 to 8,09) this result is consistent with Muramoto and et al. (1991) plant grows in water of high acid or base PH ranging from (4-10), but the best growth was observed at PH =7 . The difference in PH values during the ten weeks is the result of the different PH values of water inflows during that period . But the presence of the plant in the aqueous medium lowers the PH value of a significant this is a result of the rate effect of the quality of the water. In general, when the presence of the plant in the water exchange rate of the cities, the values of PH drop at different rates on the values of PH for the water inside the plant, but it was observed that the best modification of the values of PH was on 12/9 as the difference between the two read (inside and out) is 0.47, while it was observed less difference in the adjustment of PH on 12/7 this depends on the rate of growth of the plant .

Table (2) Effect of different period of time, the quality of water inter the water hyacinth in the PH sewage in the city of Mosul .

Number of weeks	date of the sample	water inside the plant (micro/cm)	water outside of the plant (micro/cm)	rate of difference between the water inside and out	percentage absorption %
1	2011/7/5	7,71 c-e	7,45g h	0,26	7,58c
	2011/7/12	7,51e-h	7,49f-h	0,02	7,50c
2	2011/7/18	7,71c-e	7,53f-h	0,18	7,62c
3	2011/7/25	8,26a	7,92b c	0,34	8,09a
4	2011/8/2	7,59d-g	7,50f-h	0,09	7,54c
5	2011/8/9	7,75b -d	7,51e-h	0,24	7,63c
6	2011/8/16	7,87b c	70,70c -f	0,17	7,78b
7	2011/8/22	7,74b-d	7051e-h	0,23	7,62c
8	2011/8/29	7,87b c	7,82b c	0,05	7,85b
9	2011/9/6	7,34h	7,13i	0,21	7,23d
10	2011/9/12	7,51e - h	7,04i	0,47	7,27d
effect of the quality		7,717a	7,512b	0,21	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

Nitrate No3 :

shows Table (3) that the amount of nitrates different depending on the period of time of ten weeks, where it reached the highest rate of nitrates in the 5/7 , 12/7 , 25/7, while it was observed the lowest rate of nitrates was on 12 September, which differ significant from the rest of the time periods, although the reason for this difference may be due to the difference in the amount of nitrates in the water entering the plant and, in general, those quantities are limited and do not constitute danger in water pollution, because the plant has the ability to absorb nitrogen at a rate of 28 mg / l (Sato and Kondo , 1981). It was also noted effect of the plant in the water inside and out which is the significant , where the plant has the ability to absorb more than 50% of the nitrates in the water within him because of his need of this element in large quantities if compared with the element of phosphorus, at a rate of 7 : 1 (Heard and Winterton , 2000), where the nitrogen to increase biomass and number of produce formed by the plant , but the interaction between the time period of water entering and leaving the plant it was observed that the higher the rate of absorption of nitrates by the plant (the difference between the water and enter) It was in the first week of 0,789 mg / l and week III of 0,706 mg / l and less absorption in the 12/9 0,284 mg / l may be due not to the capacity of the plant, but limited the amount of nitrates in the water within him . We deduce from it the following points : 1) The plant has the ability to absorb nitrates from the water up to 30 - 60% . 2) The plant has no ability to absorb all the nitrates existing in the water, even if of low . 3) The difference in the rates of uptake of nitrate depends on the rate of growth of the plant and the environmental conditions encouraging him to multiply . In general, the plant has great ability to exploit the items within the perimeter of the development, the better. compared to other aquatic plants (Coetzee et al 2005) .

Table (3) Effect of different period of time, the quality of water inter the water hyacinth in the absorb nitrate NO_3 sewage water to the city of Mosul .

Number of weeks	date taking a sample	water inside to plant (mg/ liter)	water outside of the plant (mg/ liter)	quantity absorbed by the plant (mg / l)	percentage absorption %	impact readings (effect taking the sample)
1	5/7/2011	1,286 a	0,4966 i j	0,789	61.4	0,891 a
	21/7/2011	1,163 b	0,603 h	0,560	48.2	0,883a
2	18/7/2011	1,083 b c	0,417 j k	0,666	61.5	0,750 b
3	25/7/2011	1,286 a	0,580 h i	0,706	54.9	0,933a
4	2/8/2011	1,0366 cd	0,406 j k	0.630	60.8	0,721 b
5	9/8/2011	0,866 e f	0,377 k	0,489	56.5	0,621 d
6	16/8/2011	0,950de	0,4166 j k	0,534	56.2	0,683 c
7	22/8/2011	0,770 g	0,330 kl	0,440	57.1	0,550 e
8	29/8/2011	0,760 g	0,390 k	0,370	48,7	0,575 d e
9	6/9/2011	0,833f g	0,383 k	0,450	54,0	0,608 d e
10	12/9/2011	0,560 h i	0,276 l	0,284	50.7	0,418 f
impact of the water quality		0,963 a	0,425 b	0,538	55.9	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

Phosphate PO4 :

It turns out from Table (4) vibrate quantities of phosphorus depending on the period of time for sampling of the wastewater where the observed rate of phosphate was high in the first week when the first reading 5/7 on 16 August if the 5,22 , 5,29 mg / l, respectively, while a decrease in the amount of phosphate in the 12/9 this depends to the difference in the amount of phosphate in the watercourse , Mustafa (2008) .That raises the in the Tigris River in the city of Mosul from the pollutants of up to 240 thousand tons /year of which 80 tons of nitrate and phosphate, also found the Sengupta (2006), approximately 85% of the sources of pollution in the river caused by the pollution of civilization and the increase of sources of domestic wastewater untreated . Either the role of the plant in the uptake of the element phosphorus has obsorp 2,128 mg / l, equivalent to 38,7% of the phosphorus present in the water the best The amount of phosphorus suitable to grow perfectly is 7 mg / l (Sato and Kondo , 1981).find Xie and Yu (2003) the root of a plant is the water hyacinth are long, flexible and dense at low phosphorus and receives the opposite . Either the compatibility between the dates of sampling during the period of ten weeks, with the quality of the water involved in the plant growth and it is evident that the higher the

amount of phosphorus in the water was in the 16/8 amounting to 6,44 mg / l has been absorption out of the plant boundary, 2,293 mg / l, but there is the absorption of phosphorus is more in the 25/7 to rate 2,56 mg / l , which indicates that the rate of sorption depends not on the amount of phosphorus present in the watercourse, but is dependent on the rate of growth activity and need phosphorous . If said Heard and Winterton (2000) and Ripley et .al (2006) the concentration of the element nitrogen, phosphorus, and its positive correlation with the growth of the water hyacinth, especially when the ratio of nitrogen to phosphorus of 1 : 7 .

Table (4) Effect of different period of time, the quality of water inter the water hyacinth in the absorb phosphate PO_4 sewage water to the city of Mosul .

Number of weeks	date taking a sample	water inside to plant (mg/ liter)	water outside of the plant (mg/ liter)	quantity absorbed by the plant (mg / l)	percentage absorption %	impact readings (effect taking the sample)
1	5/7/2011	6,406 a	4,033 g	2,373	37	5.22 a
	21/7/2011	6,030 b	3.690 h	34.2	38.8	4,860 b
2	18/7/2011	6.100 b	3.790	2.31	37.9	4.945 b
3	25/7/2011	5,060 e	2,500 l	2.56	50.6	3,780 f
4	2/8/2011	5,453 d	4,016 g	1,437	26.4	4,735 c
5	9/8/2011	5,696 c	3,360 i	2,336	41	4,528 d
6	16/8/2011	6,443 a	4,150 g	2,293	35.6	5,296 a
7	22/8/2011	5,386 d	3,066 J	2,320	43.1	4,226 e
8	29/8/2011	5,006 e	2,770 k	2,236	44.7	3,88 f
9	6/9/2011	4.756 f	2,886 k	1,870	39.3	3,821 f
10	12/9/2011	4,1933 g	2,866 k	1,327	31.6	3.530 g
impact of the water quality		5,503 a	3,375 b	2,128	38.7	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

Copper Cu

Table (5) The existence of significant differences in the amount of copper, according to the dates of sampling during ten weeks in summer if the 0,0943 mg / l on 18/7, while the least amount of copper was observed on 29/8 0,0415 mg / l, The cause of this difference is not only back to the amount of copper present in the stream water during different periods of time, but may be due to the difference in the absorption rate, so the lower the amount of copper at different period of time, the higher the rate of absorption , As to the length of the stream, before arriving at the river Tigris effect in the increase or decrease in the quantity of copper in the water arriving to the area of plant growth .

AL-Jubory (2009) the presence of some heavy metals in the Tigris River such as copper Cu, chromium Cr, nickel Ni, lead Pb cobalt, source of,natural (rocks and soils) in addition to the water of the industrial areas. the table to the plant absorbs large amounts of copper are estimated 65,8%, the difference resulting from the quality of the water entering and leaving the zone of plant growth this is the percentage of good, so, in some countries the use of this plant in purification of the wastewater of the cities due to absorbed a number of heavy elements such as Cu in large quantities depend on the density of the plant in the water bodies and climatic conditions and that are appropriate (Zhu et .al 1999 , Hill and Coetzee , 2008) . It's either compatibility between the different time periods and the susceptibility of the plant to absorb this element has reached the highest rate of absorption by the plant in the month of July starting 12/7, while a decrease the absorption rate in the month of August has been the reason for the difference in the rate of absorbed component Cu to activity growth in July compared to the month of August , as they may limit the temperature of the ability of plants to absorb some of the heavy elements . Explain Wolverton and McDonald (1978)that the speed of a doubling of this plant in water, salt water, heavy faster compared to aquatic plants other, if produced 26 -72 g / m / day when the presence in wastewater of cities (Wolverton and McDonald, 1979) .

Table (5) Effect of different period of time, the quality of water inter the water hyacinth in the absorb copper Cu sewage water to the city of Mosul .

Number of weeks	date taking a sample	water inside to plant (mg/ liter)	water outside of the plant (mg/ liter)	quantity absorbed by the plant (mg / l)	percentage absorption %	impact readings (effect taking the sample)
1	5/7/2011	0,1027 be	0,0633 f i	0,0394	38.3	0,083 a c
	12/07/2011	0,1396 a	0,0463 f i	0,0933	66.8	0,0930 a b
2	18/7/2011	0,140 a	0,0487 f i	0,0913	65.2	0,0943 a
3	25/7/2011	0,130 a b	0,0367 h j	0,0933	71.8	0,0833 a c
4	2/8/2011	0,090 c f	0,0310 i j	0,059	65.6	0,0605 c f
5	9/8/2011	0.110 ad	0,0410 h j	0,069	62.7	0,0755 a d
6	16/8/2011	0,117 a b	0,051 g. j	0,066	56.4	0,0837 a - c
7	22/8/2011	0,080 d g	0,023 j	0,057	71.3	0,0515 d f
8	29/8/2011	0,066 f i	0,017 j	0,049	74.2	0,0415 f
9	6/9/2011	0,0736 e h	0,0187 j	0,0549	74.6	0,0415 e f
10	12/9/2011	0,114 ad	0,0216 j	0,0924	81.1	0,0680 b e
impact of the water quality		0,1057 a	0,03618 b	0,0695	65.8	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

Zinc Zn

Points Table (6) The existence of differences significant in the amount of zinc at different date of sampling from a watercourse, the quantity of zinc absorbed in 9/8, while in 5/7 and 12/9 was the least amount of this may be due to the variability in the amount of zinc entering into the zone of plant growth zinc located in areas with high population density and in areas with high traffic in the AL Mosul. also the table to the difference in the amount of zinc in the water entering and leaving the zone of growth of a plant is the water hyacinth if absorb by 1,03 mg / l that is equivalent to the 51,3% of the pointed Hill and Coetzee (2008) to the possibility of its use in the treatment or purification of the wastewater of cities . There is a difference significant , in the amount of zinc between the date of the taking of the sample and the quality of the water entering and leaving the zone of growth of the plant has obsorp the plant 1,56 mg / l date of 2/8 which is a 61% decreased rate of absorption in the 5/7 amounted to 45,5% and decreased in 9/8 amounted to 39%. The average difference in absorption of the component may be due either to the capacity of the plant and the efficiency of uptake during the season of growth and that depends on the biomass of the plant (increased mass means increased absorption) or may be due to the picture the presence of the zinc during the periods of time may not absorbable by the plant , we deduce from this that the plant has the ability to absorb all the amount found in the water, but its capacity may be commensurate with the size of the cluster, its rate of growth and the amount of the benefit of this component in its growth .

Table (6) Effect of different period of time, the quality of water inter the water hyacinth in the absorb Zinc Zn sewage water to the city of Mosul .

Number of weeks	date taking a sample	water inside to plant (mg/ liter)	water outside of the plant (mg/ liter)	quantity absorbed by the plant (mg / l)	percentage absorption %	impact readings (effect taking the sample)
1	5/7/2011	1,516 fh	0,826 j k	0,69	45.5	1,171 e
	7/12/2011	1,820 de	1,033 i k	0.79	43.4	1,426 cd
2	18/7/2011	1,966 cd	1,100 i j	0.87	44.3	1,533 c
3	25/7/2011	2,226 b c	0,916 i k	31.1	58.8	1,571 c
4	2/8/2011	2,560 a	0,996 i k	1.56	61	1,778 a b
5	9/8/2011	2,266 b	1,373 g h	0.89	39	1,820 a
6	16/8/2011	2,233 b c	0,7533 k	1.48	66	1,493 c
7	22/8/2011	2,196 b c	0,853 J I	1.34	61	1,525 C
8	29/8/2011	1,956 cd	1,250 h i	0,71	36	1,603 b c
9	6/9/2011	1,733de	0,843 j k	0.89	51	1,288 e d
10	12/9/2011	1,560 e g	0,783 k	0.78	50	1,171 e
impact of the water quality		2,003 a	0,975 b	1.03	51.3	

Values followed with the is not different from what some significant at the level of probability of 5% For each status

Lead Pb

To differences in the amount of lead of the course alive, al-hadba pass (Al-Mosul) different time periods and variable if found the highest amount of the element lead in the 25/7 and 16/8, whereas it decreased in 9/8, 6/9, although the cause of this fluctuation might come from the difference in the quality of the wastewater or the exhaust cars, and traffic, which is leaching into the rivers from the amount of lead varies with the locations in addition to seasonal variations (Tomazelli et.al 2003). however, the existing rates doesn't make much of any case of contamination due to the lack of its presence in the stream, because of the scale of the natural presence of lead limits (1 – 10 mg / l) (Ebadi and Hassan 1990) . Effect of the plant is the water hyacinth in the absorption of the component were absorb to the limits of 52% of the amount of lead present in water inflows to the area of the growth of that plant, on average, for the season of summer is this ratio good in the treatment of such water, this result is consistent with Hill and Coetzee (2008) who mention that the plant has the capacity to absorb heavy metals, including lead, in large quantities leg roots are more efficient in the absorption process compared to the leafs . The interaction between the time periods and the effect of the plant in the absorption of the component has indicated the results to the existence of differences significant , where the highest amount was plant absorb 5/7, 29/8, but because of the different amount of lead, the waters of the stream, the two dates of note that the absorption rate is reached 56,4% and, 61,7%, while in other dates, the rate of absorption best reached 67,1% in 6/9 ratio of absorption to 26,8% and on 25/7, this gives a significant increase in the rate of the effect the readings because of the low absorption of this element by the plant . In general, the rate of absorption was from 40 - 64% . Al-awadat (1998) found the element of lead by normal amount from 20 to 400 micrograms / liter . While Al-abadi (2007), when considering the tow station water most of the city of Mosul ,The lead exceeded the permissible limits by 14 - 57% (the left coast of the city of Mosul), and the ratio of 43 to 57% of the station's AL-Hammdania (south of Mosul) . said AL-tayi (2012) lead concentration limits of 3 – 62 micrograms / liter, especially at the mouth of source and Mosul generally conduct surveys for heavy items is matter of the ecosystem of the region, which did not define only the concentrations of those elements, but required the identification of chemical geography chemical which affect the concentration of elements while (Feng et.al 2008) .

Table (7) Effect of different period of time, the quality of water inter the water hyacinth in the absorb **Pb** sewage water to the city of Mosul **.**

Number of weeks	date taking a sample	water inside to plant (mg/ liter)	water outside of the plant (mg/ liter)	quantity absorbed by the plant (mg / l)	percentage absorption %	impact readings (effect taking the sample)
1	5/7/2011	0,094 a	0,0411 k l	0,053	56.4	0,0676 b
	12/07/2011	0,091 a	0.045ik	0,046	50.5	0,068 b
2	18/7/2011	0,080 e	0,031n o	0,049	61.3	0.055d
3	25/7/2011	0,082 c e	0.06 h	0.022	26.8	0,071a
4	2/8/2011	0,073f	0,035 m n	0,038	52.1	0,054 d
5	9/8/2011	0,067 g	0,028 x	0.039	58.2	0,0478 e
6	16/8/2011	0,094 a	0,049 i j	0.045	47.9	0,072 a
7	22/8/2011	0,085 c d	0.039 l m	0,046	54.1	0,0621 c
8	29/8/2011	0,081 d e	0,031 n o	0,050	61.7	0,0563 d
9	6/9/2011	0,070 f g	0,023 p	0,047	67.1	0,0468 e
10	12/9/2011	0,087 b c	0,051 j	0,036	41.3	0,0676 ab
impact of the water quality		0,0824 a	0,0396 b	0,043	51.9 a	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

Cadmium Cd

Vary the rate of effect reading during the ten weeks of the season, the summer of the waterway component, the cadmium if reached the highest level of this element in the 12/7 .because the absorption of the plant has the ability 50,6% compare with low rates month of September, due to the rate of absorption of the plant is the water hyacinth , to varying degrees, go to 75,1% and 89% this is in spite of the difference in the quantities of the component present in the water inter zone the growth of the plant . This result is agree with the Tomazelli et.al (2003) when he stated that the element cadmium, according to position and seasons (time periods) in general, drinking water contains 1 micrograms / liter the up in some countries, industrial to 5 micrograms / l in the soil received to 0,53 ppm (Bowen et.al 1969) . Also degradation of water quality of the Tigris River during the passage of the city of Mosul because of the disposal the city different . The effect of the plant is the water hyacinth on the quality of the water emerging from the zone of growth led to reduce the amount of cadmium, which means the plant has absorb 0,14 equivalent to 65,6% of cadmium before entry of water to the plants, the percentage of significant plant uptake of heavy metals we infer from that result that the plant is fit for the presence in the targets of the water treatment before discharge to the River. this result is consistent with the results of Hill and Coetzee (2008) the efficiency of the plant is the water hyacinth in the absorption of the element of cadmium from water . To the different periods of sampling time showed that there are differences in the amount of cadmium to water inflows to the plant growth and these differences led to the difference in the rates of absorption of the component where the ratio of absorption 89% on 12/9, while the least proportion of absorption by the plant of 50,6% in the 12/7 that the proportion of cadmium in the water of the stream was too high, and the significant 0,0296 mg / l, while it was absorbed to the limits of 0,015, while half the amount of that element present in the waters of the stream on 12/9 0,0146 mg / l, but the rate of absorption amounted to 0,013 mg / l . We deduce from these results that the less the amount of cadmium in the watercourse, the greater the rate absorbed by the plant .

Table (8) Effect of different period of time, the quality of water inter the water hyacinth in the absorb cadmium Cd sewage water to the city of Mosul .

Number of weeks	date taking a sample	water inside to plant (mg/ liter)	water outside of the plant (mg/ liter)	quantity absorbed by the plant (mg / l)	percentage absorption %	impact readings (effect taking the sample)
1	5/7/2011	0,0266 a c	0,006 jl	0,021	78.9	0,0163 bc
	12/07/2011	0,0296 a	0,0143 fh	0.015	50.6	0,0220 a
2	18/7/2011	0,0216 ce	0.007 hl	0.015	69.4	0,0143 cd
3	25/7/2011	0,0236 b. d	0,0093 h j	0.014	59.3	0,0165 b c
4	2/8/2011	0,0233 bc	0,0093 hj	0.014	60	0,0163 b c
5	9/8/2011	0,0190 df	0,0076 i k	0.011	57.9	0,0133 cd
6	16/8/2011	0,0276 ab	0,0120 g i	0.016	57.9	0,01983 a b
7	22/8/2011	0,0203 d e	0,0073 i l	0,013	64	0,0138 c d
8	29/8/2011	0,0170e. g	0.004 J. K	0,013	76.5	0,01050 d e
9	6/9/2011	0,0133 g h	0,0030 k l	0,010	75.1	0,0081 e
10	12/9/2011	0,0146f h	0,0016 l	0,013	89,0	0,0081 e
impact of the water quality		0,0215 a	0,0074 b	0.14	65.6	

Values followed with the same letter are not different from what some significant at the level of probability of 5% For each characteristic

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