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A comparative Study of Some Biochemical Characteristics of Common carp (*Cyprinus carpio L.*) in Earthen ponds at Different Locations of the Tigris and Euphrates Rivers / Middle of Iraq.

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ABSTRACT

This study was conducted with the aim of showing the effect of different locations and water quality on some blood enzyme properties of common carp (*Cyprinus carpio L.*). This study was carried out in four different locations in central Iraq for the period from June 1, 2022 to November 30, 2022. The Dujail and Suwayra sites on the Tigris River were used, and the Fallujah and Mahaweel sites on the Euphrates River were used. 120 fish were collected from the four sites, 30 fish for each site, and some biochemical traits were measured, including total protein, albumin, kinase phosphatase, glucose and total cholesterol. The results of the current study showed that the values of blood enzymes increased with the rise in temperatures during the hot months and decreased with the decrease in temperatures in the cold months. It was also found that there were highly significant differences between the Tigris and Euphrates rivers in the values of total protein, kinase phosphatase, glucose and total cholesterol, as the Tigris River was significantly superior to the Euphrates River in the values of these four enzymes, and this indicates that the Euphrates River is better than the Tigris River. As for the value of the two albums, there are no significant differences between the Tigris and Euphrates rivers. The current results also showed that there were significant differences in the values of total protein and kinase phosphatase, as these values were significantly higher in the Dujail site than in the

Fallujah site, while no significant differences were observed between the Suwayrah and Al-Mahaweel sites. The current results also showed that there were no significant differences between the four sites in the value of the two albums. The current results showed higher values of blood enzymes in the Dujail site compared to the Fallujah site, and this indicates that the Fallujah site is one of the best sites in the values of enzymes, being close and within the natural limits, and this is due to the availability of an appropriate healthy environment in the Fallujah site compared to other sites.

1. Introduction

It's important to know that in most Fish is one of the most important sources of food since ancient people knew it, and it still enjoys a prominent position in all countries of the world, and as a result of the large increase in the world's population in recent years, countries have turned to exploiting various kinds of wealth to secure the food needs of their people [1] confirms the World Health Organization The world community states that the individual should obtain 20 kg / year of fish meat [2]. The lack of animal protein made researchers turn their attention to fish in order to compensate for it, especially after the global financial crisis, the increase in extreme weather phenomena, and the increase in the world population that is not compatible with limited natural resources, as natural fisheries and aquaculture provided the world with about 214 million tons of fish during the year 2020[3] .

The common carp (*Cyprinus carpio L.*) is one of the most important species of fish farmed in freshwater and warm-water species, and one of the most widespread species of fish in the world because of its adaptation to different environmental conditions [4]. It is widely spread in many regions of the world and is bred in stagnant and running waters, in ponds, lakes and cages, in addition to its ease of reproduction, its ability to withstand difficult conditions, diversity of its nutrition and rapid growth are among the main factors in its success [5]. The fish farming process in Iraq began to face many difficulties due to the large environmental changes, such as the decrease in the water level, the increase in pollutants, the use of illegal methods in fishing, and the lack of interest of government institutions and decision-makers in the problems of fish breeders [6].

The main objective of aquaculture is to increase production and not depend on natural fisheries through the establishment of earthen ponds and the selection of a suitable site that is characterized by the ability to increase productivity per unit area and good management in providing processed food that increases the growth rate of these large numbers by providing good water and the possibility of monitoring the health status by studying the

biochemical characteristics such as total protein, albumin, kine phosphatase, glucose and total cholesterol, and thus knowing the health status of the fish and obtaining a good economic return and preserving the aquatic environment from pollution [7].

2- Materials and methods:

The study was conducted in four different sites for fish farms in central Iraq, represented by the sites of Dujail and Suwayra on the Tigris River, and the two sites of Fallujah and Al-Mahaweel on the Euphrates River, each site divided into three ponds, the area of one pond is 5 dunums. Measurement of some blood enzymes over the months of the study for the period from 1/June/2022 to 30/November/2022. Blood samples were drawn from the caudal vein of the experimental fish using a plastic syringe of 3 ml. The blood was placed in tubes that did not contain anticoagulation (heparin). Then the tubes were placed in a centrifuge at a speed of 3000 rpm for 3 minutes to separate the blood serum. Then the tubes were placed. In freezing at -20 ° C for the purpose of conducting biochemical tests of blood serum.

The statistical program SPSS version 26 was used in analyzing the data according to a complete random design (CRD) to find significant differences among the different sites.

3- Results and discussion:

It is clear from tables (1, 2, 3 and 4) that the values of blood enzymes increased with the rise in temperatures during the hot months and their decrease with the decrease in temperatures in the cold months The current results agreed with what came out in the study [8,9]. Blood enzymes values with temperature changes during the study months. The current results showed, as shown in Table (5), that there were no significant differences between the two sites (Dujail and Fallujah) before Baghdad and between the two sites (Suwayra and Al-Mahaweel) after Baghdad in the values of total protein, albumin and kinase phosphatase, while high significant differences were found at the probability level (P≤ 0.01). In the values of glucose, the sites after Baghdad were superior to the sites before Baghdad 118.1 and 109.7, respectively, and this indicates that the sites before Baghdad are better than the sites after Baghdad. While there were significant differences at the level of probability (P ≤ 0.05) in the concentration of total cholesterol, as the sites before Baghdad were superior to the sites after Baghdad, as they recorded 141.3 and 129.0, respectively.

The current results also showed that there were highly significant differences at the level of probability (P ≤ 0.01) between the Tigris and Euphrates rivers in the values of total protein, kinase phosphatase, glucose and total cholesterol, as the Tigris River was significantly superior to the Euphrates River in the values of these four enzymes, and this indicates that the Euphrates River is It is better than the Tigris River. As for the value of the two albums, there are no significant differences between the Tigris and Euphrates rivers. The current results also showed the presence of significant differences at the level of probability (P ≤ 0.05) in the values of total protein and kine phosphatase, as these values were significantly superior in the Dujail site

than in the Tigris River. Fallujah site, while no significant differences were observed between Al-Suwayra and Al-Mahaweel sites. The current results also showed that there were no significant differences between the four sites in the value of the two albums. The current results also showed that there were highly significant differences at the level of probability ($P \leq 0.01$) in the glucose values, as the Dujail site was significantly superior to the Mahaweel and Fallujah sites, while there were no significant differences between the Suwayra, Dujail and Mahaweel sites. As for the value of total cholesterol, the site of Dujail was significantly superior to the sites of Suwayra, Fallujah and Mahaweel, and no significant difference appeared between Fallujah and Mahaweel. The increase in the concentration of pollutants and the increase in stress on the fish leads to the rupture of the cell membranes in the tissues of the liver and the leakage of enzymes into the blood, thus increasing their concentration in the blood [10]. The current results agreed with the study of both [11,12], which indicate an increase in the activity of enzymes in the blood of fish with an increase in pollution and stress, and these vital indicators in the liver can be adopted as indicators of pollution and determine the health status of fish [13,14]. This indicates that the site of Fallujah is one of the best sites in the values of enzymes being close to or within the normal limits.

Table (1): The values of some blood enzymes in common carp fish reared in earthen ponds in Salah al-Din Governorate (Dujail district) at the Tigris River for the period from June to November 2022

Months	Total protein g/dl	Albums g/dl	Alkyne Phosphatase U/L	Glucose mg/dl	Total Cholesterol mg/dl
June 2022	4.4	1.9	89.5	116.5	177.8
July	5.7	1.6	92.4	137.6	183.7
August	6.0	2.7	93.2	140.7	85.91
September	4.4	1.5	82.7	128.2	176.8
October	5.8	1.3	77.6	132.2	163.9
November	4.5	1.5	72.7	130.8	160.1
Term	4.4- 6.0	1.3- 2.7	72.7- 93.2	116.7- 140.7	160.1- 185.9
The average	5.1 ± 0.32	1.8±0.20	84.7 ± 3.43	131.0 ± 3.45	174.7 ± 4.28

Table (2): The values of some blood enzymes in common carp fish reared in earthen ponds in Wasit Governorate (Suwayra district) at the Tigris River for the period from June to November 2022

Months	Total protein g/dl	Albums g/dl	Alkyne Phosphatase U/L	Glucose mg/dl	Total Cholesterol mg/dl
June 2022	4.4	1.6	72.9	107.8	137.6
July	4.6	1.7	80.5	126.1	152.9
August	5.3	1.8	89.6	133.7	145.1
September	4.6	1.5	77.8	126.9	128.4
October	4.7	1.5	68.8	123.2	130.1
November	4.3	1.4	58.9	117.6	126.9
Term	4.3- 5.0	1.4- 1.8	58.9- 89.6	107.8- 133.7	126.9- 152.9
The average	4.1 ± 0.14	1.6 ± 0.06	74.8 ± 4.29	122.6 ± 3.64	136.8 ± 4.25

Table (3): The values of some blood enzymes in common carp fish reared in earthen ponds in Anbar province (Fallujah district) at the Euphrates River for the period from June to November 2022

Months	Total protein g/dl	Albums g/dl	Alkyne Phosphatase U/L	Glucose mg/dl	Total Cholesterol mg/dl
June 2022	3.7	1.4	37.2	88.9	110.2
July	9.3	1.6	37.9	90.3	114.1
August	4.2	1.9	41.9	94.8	116.5
September	3.2	1.1	37.2	91.5	104.8
October	2.9	1.1	40.2	85.2	103.2
November	2.9	1.0	35.3	80.2	99.0
Term	2.9- 4.2	1.0-1.9	35.3- 41.9	80.2- 94.8	99.0- 116.5
The average	3.5±0.22	1.4 ± 0.14	38.4±0.95	88.5 ± 2.09	108.0 ± 2.76

Table (4): The values of some blood enzymes in common carp fish reared in earthen ponds in Babel Governorate (Al-Mahaweel District) at the Euphrates River for the period from June to November 2022

Months	Total protein g/dl	Albums g/dl	Alkyne Phosphatase U/L	Glucose mg/dl	Total Cholesterol mg/dl
June 2022	4.1	1.4	80.0	105.0	105.0
July	4.5	1.9	83.5	120.3	120.3
August	5.0	1.9	86.3	124.6	124.6
September	3.9	1.5	26.0	113.1	113.1
October	3.7	1.2	31,9	107.5	107.5
November	3.4	1.0	23.9	111.9	111.9
Term	3.4- 5.0	1.0- 1.9	23.9-86.3	105.0-124.6	105.0-124.6
The average	4.1 ±0.23	1.5±0.14	55.3 ±12.6	113.7 ± 3.04	113.7 ± 3.04

Table (5): The effect of location, water type and their interaction on some blood enzymes of common carp fish in the current study for the period from June to November 2022

Factors		Mean ± standard error				
		Total protein g/dl	Albums g/dl	Alkyne Phosphatase U/L	Glucose mg/dl	Total Cholesterol mg/dl
The site						
Tigris and Euphrates rivers before Baghdad		4.3±0.31	1.6±0.13	61.5±7.18	109.7±6.69^{b}	141.3±10.34^{a}
Tigris and Euphrates rivers after Baghdad		4.4±0.15	1.5±0.07	65.0±6.99	118.1±2.62^{a}	129.1±4.79^{b}
Moral level		N.S	N.S	N.S	**	*
Water type						
River Tigris (Salah Al-Din - Wasit)		4.9±0.18^{a}	1.7 ±0.10	79.7±3.01^{a}	126.8±2.7^{a}	155.8±6.39^{a}
Euphrates River (Anbar-Babylon)		3.9±0.18^{b}	1.4±0.10	46.8±6.53^{b}	101.1±4.19^{b}	114.6±4.37^{b}
Moral level		**	**N.S**	**	**	**
Water type overlap × Location						
Tigris River	Dujail	5.1±032^{a}	1.8±0.20	84.7±3.43^{a}	131.0±3.45^{a}	174.7±4.28^{a}
	Suwayra	4.7±0.14^{ab}	1.6±0.06	74.8±4.29^{ab}	122.6±3.64^{ab}	136.8±4.25^{b}
Euphrates River	Fallujah	3.5±0.22^{c}	1.4 ±0.14	38.4±0.95^{c}	88.5±2.09^{c}	107.9±2.76^{c}
	Mahaweel	4.1±0.23b^{c}	1.5±0.14	55.3±12.56^{bc}	113.7±3.04^{b}	121.3±7.68^{c}
Moral level		*	**N.S**	*	**	**

Different letters within one column indicate significant difference

Table (6) indicates that there are no significant differences between the waters of the Tigris and Euphrates rivers at the two sites (Dujail and Fallujah) before Baghdad and between the two sites (Suwayra and Mahaweel) after Baghdad. Likewise, there are no significant differences in temperature between the Tigris and Euphrates rivers, as the water temperature recorded 27.4 and 27.0, respectively.No significant differences appeared between the four sites of Dujail, Suwayra, Fallujah, and Al-Mahaweel, which recorded 27.6, 27.0, 25.9, and 28.3, respectively. The current results agreed with the study of [6] in different locations at the Tigris and Euphrates rivers about the effects of Climate, locations and water nature on water temperatures The current results showed that there are no significant differences between the waters of the Tigris and Euphrates rivers at the two sites (Dujail and Fallujah) before Baghdad and between the two sites (Suwayra and Mahaweel) after Baghdad.The current results also showed that there are significant differences at the level of probability ($P \leq 0.05$) between the Tigris and Euphrates rivers, as the average dissolved oxygen values were recorded as 5.5 mg/L and 7.2 mg/L, respectively.The current results showed that there were highly significant differences at the level of probability ($P \leq 0.01$) between the four sites, as the highest values were recorded at 7.6 mg / liter in the Fallujah site, followed by the Mahaweel site, which recorded 6.8 mg / liter, then came the Dujail and Suwayra sites, which amounted to 5.2 mg / liter and 5.8 mg / liter, respectively, and there were no significant differences between them.

The high and superiority of the Fallujah site in the concentration of dissolved oxygen, and then the site of Al-Mahaweel, which is located on the Euphrates River, came as a result of good ventilation and good and continuous mixing, in addition to the availability of wide and open spaces in the study site, in which the gas exchange process is facilitated, compared to the sites of Dujail and Suwayra, which are located on the Tigris River, which is In which the dissolved oxygen values are low as a result of the large number of expenses in clubs, recreational places, cafes and markets, as well as the proximity of residential areas, slums and factories to the Tigris River and the sites of the earthen basins in which the current study was conducted, as this leads to an increase in the dumping of waste loaded with organic materials into the riverbed and thus an increase in the demand for oxygen before analysed microorganisms. The results of the current study agreed with the study of [11] which refers to the different environmental factors in different locations at the Tigris and Euphrates rivers.

The current results also showed that there were no significant differences in the values of total dissolved solids between the Tigris and Euphrates rivers, which were 0.8 g/L and 0.7 g/L, respectively. While the current results showed that there were highly significant differences at the level of probability ($P \leq 0.01$) between the sites of Dujail, Suwayra, and Al-Mahawel, which recorded the highest values of 1.0,

0.8, and 0.9 gm/L, respectively, and between the Fallujah site, which recorded the lowest values of 0.5 gm/L, this indicates that The Fallujah site is considered one of the best sites due to the low total dissolved solids.

The water, during its flow, is exposed to more sources that cause an increase in the concentrations of total dissolved solids from the areas surrounding the river. And the earthen ponds, as well as the continuous leaching of soil salts as a result of agricultural activity, as well as the remnants of nearby factories and factories, and this was reported by some previous local studies of the Tigris and Euphrates rivers [15] which agreed with the findings of this study.

. The results of the statistical analysis of the current study, as shown in table (6), showed that there were no significant differences between the waters of the Tigris and Euphrates rivers at the two sites (Dujail and Fallujah) before Baghdad and between the two sites (Suwayra and Mahaweel) after Baghdad, while the current results showed the presence of highly significant differences at the level of probability ($P \leq 0.01$) between the Tigris and Euphrates rivers, where the Euphrates River surpassed the Tigris River, as the pH value of the Euphrates River was 7.2, while it was 5.9 in the Tigris River.

The results of the statistical analysis of the current study showed the presence of highly significant differences at the level of probability ($P \leq 0.01$) between the four sites, as the Fallujah site was significantly superior to the rest of the sites in the pH value, as it recorded the highest values of 7.6, then came the Al-Mahaweel site, which is significantly different from the Dujail site. There are no significant differences between the sites of Al-Mahaweel and Al-Suwayra, as well as there are no significant differences between the two sites of Al-Suwayra and Al-Dujail.

The pH of the river water depends on the geological level of the river bed and the environmental and human influences. The changes in the acidity of the water are due to the balance of the water and the changes that occur between night and day, as the rise in carbon dioxide at night is due to the cessation of the photosynthesis process and the respiration of aquatic organisms and their consumption of oxygen and excretion of dioxide Carbon and its high lead to the formation of carbonic acid and thus the acidity increases (the pH decreases) either during the day and during the process of photosynthesis of plants and phytoplankton and the process of respiration of aquatic organisms as well as the levels of water and the speed of its different flow during the day [16]. The results of the statistical analysis of the current study showed that there were highly significant differences at the level of probability ($P \leq 0.01$) between the Tigris River and the Euphrates River, where the Tigris River was significantly superior to the Euphrates River in the value of turbidity, which recorded 37.9 units of naphthalene and 15.8 units of naphthalene, respectively, and this indicates Until the Euphrates River is better in terms of turbidity than the Tigris River. The current results also showed that there were highly significant differences at the level of probability ($P \leq 0.01$) between the four

sites, as the Dujail site was significantly superior to the rest of the sites, as it recorded the highest value of 45.6 units of naphthalene, followed by the Suwayra site, which scored 3.

Table (6): The effect of location, water type and their interaction on some water characteristics of the current study for the period from June to November 2022

Factors		Mean ± standard error				
		Temperature (mº)	Dissolved oxygen (mg/L)	Salinity (g/l)	pH	Turbidity (NTU)
The site						
Tigris and Euphrates rivers before Baghdad		26.7±1.20	6.4±0.38	0.7± 0.08	6.6± 0.35	29.7± 483^{a}
Tigris and Euphrates rivers after Baghdad		27.7± 1.16	6.3± 0.23	0.9± 0.07	6.5± 0.12	23.9± 2.03^{b}
Moral level		N.S	N.S	N.S	**N.S**	**
Water type						
River Tigris (Salah Al-Din - Wasit)		27.4± 1.29	5.5± 0.18^{b}	0.8± 0.06	5.9± 0.18^{b}	37.9± 2.52^{a}
Euphrates River (Anbar-Babylon)		27.0± 1.07	7.2± 0.20^{a}	0.7± 0.09	7.2± 0.18^{a}	15.8± 0.70^{b}
Moral level		**N.S**	*	**N.S**	**	**
Water type overlap × Location						
Tigris River	Dujail	27.6± 2.04	5.2± 0.25^{c}	1.0± 0.06^{a}	5.6± 0.32^{c}	45.6 ± 1.39^{a}
	Suwayra	27.0± 1.77	5.8± 0.22^{c}	0.8± 0.11^{a}	6.2± 0.11^{bc}	30.1± 1.52^{b}
Euphrates River	Fallujah	25.9± 1.35	7.6± 0.18^{a}	0.5± 0.05^{b}	7.6± 0.23^{a}	13.9± 0.35^{d}
	Mahaweel	28.3± 1.64	6.8± 0.30^{b}	0.9± 0.10^{a}	6.8± 0.15^{b}	17.8± 0.74^{c}
Moral level		**N.S**	**	**	**	**

Different letters within one column indicate significant difference

Conclusion:

It was shown through the current study that the Euphrates River is better than the Tigris River, because the values of fish blood enzymes in the Euphrates River are lower than the Tigris River as a result of pollution and stress in the Tigris River, as the blood enzymes increase with the increase of toxins, pollutants and stress, in addition to that the values of blood enzymes increase with the increase in degrees the temperature decreases with lower temperatures. Through the current results, it was found that the best site is the Fallujah site, which is located on the Euphrates River.

References

1. Nasr-Allah A.; Gasparatos A.; Karanja A.; Brako ED.; Murphy S.; El-Kenawy D.; Rossignoli C.; Phillips M. and Charo-Karisa H. (2019): Employment generation in the Egyptian aquaculture value chain. Penang, Malaysia: WorldFish. Program Report: 2019-04.
2. Abdel-Latif, H. M. R. and Khafaga, A. F. (2020). Natural co-infection of cultured Nile tilapia Oreochromis niloticus with Aeromonashydrophila and Gyrodactylus cichlidarum experiencing high mortality during summer.Aquaculture Research, (51):1880-1892.
3. FAO, (2022). The State of World Fisheries and Aquaculture. Sustainability in action. Rome.
4. [Mohammadi, M. ; Soltani, M. ; Siahpoosh, A. ; Hosseini Shekarabi, S.P. ; Shamsaie Mehrgan, M. and Lymbery, A.(2018). Effect of date palm Phoenix dactylifera seed extract as a dietary supplementation on growth performance immunological haematological biochemical parameters of common carp. Aquaculture research, 49(8), 2903-2912.
5. Al-Ashab,M.H.,Ahmed, M. A.and Attee, R. S.(2017). The effect of adding anise and cinnamon on growth parameters and some physiological traits of young carp fish diets vulgaris.Cyprinus carpio L.. Diyala Journal of Agricultural Sciences, Volume (9) 2:16-28.
6. Haitham B. A. Hassan et al. (2019). An analytical Economic Study of Fish Production in Egypt.
7. Afridi, A.J.; Zuberi, A.; Yousafzai, A.M.; Maria, M.K . and Ullah, S.(2019). Hemp (Marijuana) reverted copper-induced toxic effects on the essential fatty acid profile of *Labeo rohita* and *Cirrhinus mrigala*. Mol. Biol. Rep., 46 (1): 391–401.
8. Kovacik, A.; Tvrda, E.; Miskeje, M.; Arvay, J.; Tomka, M.; Zbynovska, K.; Andreji, J.; Hleba, L.; Kovacikova, E.; Fik, M.; Cupka, P.; Nahacky, J.and Massanyi, P. (2019). Trace Metals in the Freshwater Fish *Cyprinus carpio*: Effect to Serum Biochemistry and Oxidative Status Markers. Biol. Trace Elem. Res., 188(2):494–507.
9. [9] Khalifa, Z.K.;Attee,R.S. and AL-Shammari,S.M. (2020).SOME PROPERTIES OF MORPHOLOGICAL AND RELATIONSHIP WEIGHT – LENGTH WITH CONDITION FACTOR OF THE Coptodon zillii (Gervais, 1848) IN THE TIGRIS RIVER , BAGHDAD, IRAQ. Diyala Journal of Agricultural Sciences, Volume (12) special issue.
10. Al-Asgah, N.A.; Abdel-Warith AW.; Younis El-S.M and Allam, H.Y.(2015). Haematological and biochemical parameters and tissue accumulations of cadmium in *Oreochromis niloticus* exposed to various concentrations of cadmium chloride. Saudi J. Biol. Sci., 22(5):543-50. doi: 10.1016/j.sjbs.2015.01.002. Epub 2015 Jan 19.
11. Al-Shkarchy,S.S; Raesen,A.K and Najim,S.M. (2021). Effect of heavy

metals on physiological and histological status in liver of common carp *Cyprinus carpio*, reared in cages and wild in the Euphrates River, Babil / Iraq. IOP Conf. Ser.: Earth Environ. Sci.

12. Udotong, J. (2015). 'Assessment of diagnostic enzymes as Indices of heavy metal pollution in Tilapia Fish'. World academy of science, engineering and technology, Open Science Index 102, International Journal of Biotechnology and Bioengineering., 9(6): 670 – 674.

13. Ardeshir R A, Movahedinia A and Rastga S (2017) Fish liver biomarkers for heavy metal pollution: A Review Article. American Journal of Toxicology, 1(1): 1-8.

14. Al-Naymi , N.A.Sh; Nashaat,M.R. and Mohammed,A.J.(2019). Induced Ash toxicity effects on the hematological and biochemical changes of *Cyprinus carpio* L. 1785. Biochem. Cell. Arch. 19) 2(: 2983-2989.

15. Abbas, L. M.; Abu- Elheni, A.J. and Radhy, A. G. (2015). Fish community of Tigris River before Al-Kut Barrier, Southern Baghdad, Iraq. Fish and AnimalJ. Chem. Bio. Phy. Sci. Sec. B, 5(2) : 1639-1645.

16. Bora,M. and Goswami ,D.C.(2015) .Astudy on seasonal and temporal variation in physic-chemical and hydrological characteristic of river Kolong at Nagaon Town Assam .India .Arch .Apple. Sci .,Res., 7(5):110-117.

دراسة مقارنة لبعض الخصائص الكيميائية الحيوية لاسماك الكارب (Cyprinus carpio L.) في الأحواض الترابية في مواقع مختلفة من نهري دجلة و الفرات / منتصف العراق.

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الملخص

تم اجراء هذه الدراسة لغرض دراسة تأثير المواقع المختلفة وجودة المياه على بعض خصائص إنزيم الدم في اسماك الكارب (Cyprinus carpio L.). تم اجراء هذه الدراسة خلال الفترة من 1 حزيران 2022 إلى 30 تشرين الثاني 2022 وذلك في أربعة مواقع مختلفة في وسط العراق وذلك في منطقتي الدجيل والصويرة بالنسبة لنهر دجلة فيما تم اختيار الفلوجة والمحاويل بالنسبة لنهر الفرات. تم جمع 120 سمكة من أربعة مواقع ، 30 سمكة لكل موقع ، وتم قياس بعض الصفات البيو كيميائية ، بما في ذلك البروتين الكلي ، الألبومين ، كيناز فوسفاتيز ، الجلوكوز والكوليسترول الكلي. أظهرت نتائج الدراسة الحالية أن قيم إنزيمات الدم زادت مع ارتفاع درجات الحرارة خلال الأشهر الحارة وانخفضت مع انخفاض درجات الحرارة في الأشهر الباردة. وقد وجد أيضًا أن هناك اختلافات كبيرة بين نهري دجلة والفرات في قيم البروتين الكلي ، والفوسفاتيز كيناز ، والجلوكوز والكوليسترول الكلي ، حيث كان نهر دجلة متفوقًا بشكل كبير على نهر الفرات في قيم هذه الإنزيمات الأربعة ، وهذا يشير إلى أن نهر الفرات أفضل من نهر دجلة. أما بالنسبة لقيمة الألبومين فلا توجد فروق ذات دلالة إحصائية بين نهري دجلة والفرات. كما أظهرت النتائج الحالية وجود فروق ذات دلالة إحصائية في قيم البروتين الكلي وفوسفاتيز كيناز ، حيث كانت هذه القيم أعلى معنوياً في موقع الدجيل عنها في موقع الفلوجة ، بينما لم يلاحظ وجود فروق معنوية بين موقعي الصويرة والمحاويل. أظهرت النتائج الحالية ارتفاع قيم إنزيمات الدم في موقع الدجيل مقارنة بموقع الفلوجة ، وهذا يشير إلى أن موقع الفلوجة من أفضل المواقع في قيم الإنزيمات ، كونه قريب وضمن الحدود الطبيعية ، وهذا يرجع إلى توافر بيئة صحية مناسبة في موقع الفلوجة مقارنة بالمواقع الأخرى.