

Study of the physical and chemical characteristics of the Euphrates River in the Al-Fadhliah district in Nasiriya governorate

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Abstract

The current study dealt with the study of physical and chemical characteristics to assess the environmental condition of the Euphrates River for the period from the 5th of September 2021 to the 5th of February 2022. The length of the Euphrates River is 2780 km from its branching point, the height of its source is 4500 m and the amount of water flowing in it is 818 square meters per second. Its source from (Turkey, Syria, Iraq), Gazi(2004). It pours into the Arabian Gulf, passing through several districts and sub-districts belonging to the Dhi Qar Governorate, and the Euphrates River is surrounded by vast agricultural lands planted with field crops and palms. Three stations were selected for the study. The first station is located 167 km north of the Fadhliah district in the water supply site for the region, the second station is located eight kilometers from the first station after crossing the river to the Fadhliah district. The third station is located 13 kilometers from the second station. The abiotic environmental characteristics such as air and water temperature, light transmittance, salinity, dissolved oxygen, carbon dioxide, pH, alkalinity, total hardness, and biological oxygen requirement were measured regularly for a period of six months. The water temperature ranged (from20-12.5) in the first and third stations, respectively. The light transmittance ranged between (23-32) cm. The lowest values of salinity (1.5 parts per thousand) were recorded during November in the first station. The highest was (5.72) parts per thousand in the third station in January. The values of dissolved oxygen showed a decrease in the hot months (September and October), and the lowest values were (7.4) mg/liter during November in the second station. The pH ranged between (7.9-8.5), and the highest concentrations of the hardness of water were recorded in January (450 mg/L).



I. INTRODUCTION

The physical and chemical characteristics have an effect on fish culture in cages, as well as management, good nutrition, lack of dissolved oxygen, increase or decrease of salinity, and high water temperature. The culture of fish for the family of carp, especially common carp, has received wide attention due to its rapid growth, high production rates, clear resistance to sharp changes in environmental conditions, ease of cultivation and availability of its requirements, and typical characteristics of the fish to be cultured (Abdul-Hadi, 2021)). Fish are exposed to stress in natural as well as artificial conditions. Therefore, any environmental disturbance is considered one of the sources of stress, which stimulates several responses in the fish to deal with the physiological changes that occur due to changes in environmental factors. These responses can make changes in the concentration of hormones or the concentration of basic substances in the plasma or a change in the size and numbers of blood cells and functional changes in the organs of osmotic regulation (Davies 2006). , 2014). The environment in which fish live has an important role in their infection with infectious and non-communicable diseases (Taher, 2014).

II. MATERIALS AND WORKING METHODS

3-1 Description of the study area:

The experiment was carried out in Dhi Qar Governorate / Suq Al-Shuyoukh / in one of the farms affiliated with the Al-Fadhliya district on the banks of the Euphrates River. The length of the Euphrates River is 2780 km from its branching point, the height of its source is 4500 m and the amount of water flowing in it is 818 square meters per second. Its source from (Turkey, Syria, Iraq), and Gazi(2004).

Water tests:

1-3 water temperature:

The water temperature was measured using a mercury thermometer, graded from 0-100 manually, during the times of fish weighing. The water temperature was measured with the thermometer immersed in water, the process was done in the morning to ensure the accuracy of the reading.

2-3 Light transmittance:-

The light transmittance was measured using a Secchi disk with a diameter of 25 cm and with an opening connected to a graduated rope to conduct the measurement, the disc is lowered into the water vertically until it disappears from view, to record the depth(d1), then the disc is pulled out until it appears again and the depth is recorded for a second (d2). The average of the two readings is taken to represent the transmittance of light and the result is expressed in centimeters (Stirling).



3-3 dissolved oxygen:

The described method (Welch 1964) was followed , which is the Winkler method to determine the amount of dissolved oxygen in natural water, and the result was expressed in (mg/L) using the Multi parameter device sampler i350 -made by a German company.

4-3 pH:

The device for measuring the Field pH is PH meter Model HI8915 made by Hanna company after calibration with standard solutions, Buffer solutions(PH9,7,4)

5-3 salinity: -

The electrical conductivity was measured using a TOA conductivity meter, model EGPW252, by Jenway company, and expressed the output in micro-Siemens units/cm. After multiplying the output by the constant 0.64 to extract salinity values according to the method of 1978, by Makareth et al.

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Chemical analysis

Moisture, crude protein, crude fiber, crude fat, and ash were estimated for both the provender and fish meat based on the standard methods described by (2000) A.O.A,C and as follows:

Table No(1)- The chemical analysis of the provender

The material	The Percentage
Protein	۳۰,۳۸
Fat	۶.34
Moisture	4.26
Ash	147.
Carbohydrates	51.88
100 gm \ Kilo calories energy	453.802

The energy: protein 5.56*% + carbohydrates *4.45%+ fat 9.2*%

III. RESULTS AND DISCUSSION

water tests

temperature

Table (2) shows the temperatures over the months of the experiment. The lowest value was +(14.4) in September and the highest value was in February. These values recorded in the current study are considered appropriate for the growth of common carp fish. The temperatures suitable for the growth of common carp fish ranged between (23-28). Water temperature is closely related to most of the vital activities of fish such as nutrition and growth. When temperatures drop at certain levels, the ability of fish to perform various vital activities stops or decreases, and this negatively affects growth .when temperatures rise within certain limits increases the ability of fish to carry out vital activities and Increases growth rates.

Table(2)- Some average values of water quality characteristics during the months of the experiment.

month	Dissolved oxygen	Water Temperature	hardness	PH	Light transmittance
September	7.6	14.5	15	8.0	27
October	7.4	12.50	9	8.4	23
November	10.9	10.5	19	8.3	25
December	8.9	9.7	21	7.9	31
January	8.21	13	32	8.5	30
February	10.4	10.9	15	8.1	32



Table (3) Protein efficiency ratio of carp fish cultured with different densities in cages over the months of the experiment

Experiment months						
Treatment	September	October	November	December	January	February
T1	0.535 A	0.716 A	1.200 A	0.900 A	1.292 A	1.068 A
T2	0.431 A	0.597 B	1.110 B	1.020 A	1.348 A	1.095 A
T3	0.299 B	0.581 B	1.065 B	0.993 A	1.317 A	1.318 A
significant	*	*	*	N.S	N.S	N.S

4-4 Chemical analysis of fish body:

The results of chemical analysis of the fish bodies reared in cages for three culture densities (Table 12) showed that there were no significant differences in the fish contents, but the highest moisture rate was recorded in the first treatment (72.31)% and the lowest in the third treatment was (72.00), and the highest percentage of crude protein was recorded in the second treatment was (15.90)%, and the lowest percentage in the third treatment was (15.00)%. The highest percentage of crude fat in the treatment was (6.60)%, and the lowest in the second treatment was (6.12)%. For carbohydrates, the highest percentage was recorded in the third treatment (2.68%), and the lowest percentage was in the first treatment (2.37%), as for ash, the highest percentage was recorded in the third treatment (4.46%) and less than it in the second treatment (4.16)%

We note through the chemical analysis of fish muscles in the experiment that there are no significant differences and this confirms that there is no effect of culture density on the internal content of the body components of protein, fat, moisture, carbohydrates, and ash. These results are similar to Abd al-Hadi (2021) in his experiment, as well as to al-Bahadli (2011) when culturing four densities (20, 40, 60, 80 fish/m³) and no significant differences were recorded between the four treatments.

Table (5) Chemical analysis of muscles of common carp fish cultured in cages for three culture densities for 200 days based on wet weight (average +_ standard deviation)

Compound	The chemical analysis of fish bodies before the experiment	The chemical analysis of fish bodies after the experiment			Significant
		T1	T2	T3	
		T1	T2	T3	N.S



Moisture	71.47	+ 72.31 A 0.46	72.30 0.20-+A	0.56 72-+A 00	N.S
Crude protein	14.29	0-+15.16 A03	0.30 15.90-+A	A 0.75 15.00-+	N.S
Crude fat	7.72	6.5-+0.16 A0	0.02 6.12-+A	-+6.33 A0.04	N.S
Carbohydrates	1.03	0.07 A2.37-+	2-+0.06 A38	-+4.46 A0.02	N.S
ash	5.49	0.07 4.16-+A	4-+0.04 A16	4.46-+ A0.02	N.S

IV. SOURCES

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