

## Effect of Supplementary Safflower Oil (*Carthamus tinctorius*) On Some Blood Parameters of Common Carp (*Cyprinus carpio* L)

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### Abstract:

The experiment carried out in fishes laboratory in the college of agriculture /university of Baghdad for 75 days ,of common carp *Cyprinus carpio* distributed randomly with average weight 33.02gm fish on 15 glass tank with dimensions of (60x40x40cm) and on five treatments experience in three replicates (7 fishes for glass), were fed on manufactured in laboratory with protein content between 23.62 and 26.50 % and energy about 3021.45 and 3073.75 calorie/ kgm. The Results of the statistical analysis of cholesterol showed no significant differences between treatment T3 (139.5) and T1, T2 and T4, which reached 146.2, 144.6 and 131.75 mg / dl respectively .The result cholesterol level checking decrease of triglycerides with increase the level of safflower oil in diet , it was the highest value for the T1 (210.15) mg/dl and the lowest value for T5 it was 100.85 mg/dl. and no significant difference ( $p < 0.01$ ) for high density lipoproteins but the highest value was for T5 (49.10 mg/dl), and the result of low density lipoprotein show increase with increase of safflower oil it was the lowest value for T5 (30.85, 31.10 mg/dl) We inference from this study the possibility of adding safflower oil, helping them control the cholesterol levels and lipoproteins in the blood of common carp.

**Key words:** Common carp, Lipoproteins, Safflower oil, cholesterol

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تأثير اضافة زيت العصفور (*Carthamus tinctorius*) على بعض الصفات الدمية لأسماك الكارب الشائع (*Cyprinus carpio* L.)

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المستخلص:

أجريت التجربة في مختبر الاسماك / كلية الزراعة / جامعة بغداد/ لمدة 75 يوم ،أذ وزعت أسماك الكارب الشائع *Cyprinus carpio* عشوائيا (معدل وزن  $33.02 \pm 0.20$  غم /سمكة) في 15 حوض زجاجي ابعاد (60×40×40سم) على خمسة معاملات تجريبية بواقع ثلاثة مكررات (7سمكه للمكرر). غذيت الاسماك بعلائق

تم تصنيعها مختبرياً ذات محتوى بروتين يتراوح بين 23.62% و 26.50 وطاقة تراوحت بين 3021.45 و 3073.75 كيلوسعرة/كغم. أضيف زيت نبات العصفور بمستويات مختلفة (0 و 1.5 و 2 و 2.5%) إلى العلائق الخمسة. أظهرت نتائج الكوليسترول فحص مستوى الانخفاض من مع زيادة مستوى زيت العصفور في العلائق. أظهرت نتائج التحليل الإحصائي لصفه الكولستيرول عدم وجود فروق معنوية بين المعاملة T3 (139.5) و المعاملات T1 و T2 و T4 إذ بلغت قيمها 146.2 و 144.6 و 131.75 ملغم /ديسيلتر على التوالي بينت نتائج التحليل الإحصائي وعدم وجود فروق معنوية ( $P>0.01$ ) البروتينات الدهنية عالية الكثافة كانت أعلى قيمة للمعاملة T5 (49.10 ملغم. ديسلتر<sup>-1</sup>). وشهدت نتائج لفحوصات البروتينات الدهنية ذات الكثافة الواطئة جدا و ذات الكثافة الواطئة. انخفاض تلك القيم مع زيادة نسب زيت العصفور إذ كانت أقل قيم للمعاملة T5 حيث بلغت 30.85 و 31.10 ملغم. ديسلتر<sup>-1</sup>. ونستنتج من هذه الدراسة إمكانية إضافة زيت العصفور مما يساعد في التحكم بنسب الكولستيرول والبروتينات الدهنية في دم أسماك الكارب الشائع. الكلمات المفتاحية: الكارب الشائع، البروتينات الدهنية، زيت العصفور، الكولستيرول.

### Introduction:

The blood volume in fish is generally lower compared to other vertebrates. The size of blood in bony fish ranges from percent 2-4% of the fish weight, while it was in mammals are from 7 to 5% of the animal weight. This is because the fish have a complete vascular system and one closed circulation. fish blood of fish is similar to vertebrates in terms of chemical composition, which contains the red blood cells and white blood plasma consisting of organic substances, sugars and Lipoproteins. (5). The lipoproteins, according to their density, transfer the cholesterol from the body and return it to the liver and vice versa(8). as well as the effect of fatty acids in fish feeding, which play a role in the formation of fat in fish body tissues and composition of lipoproteins and the level of cholesterol in the fish blood (15) (3). the amounts of cholesterol and low-density lipoproteins (LDL) are increased by increasing the proportion of saturated fatty acids and the low proportion of unsaturated fatty acids in fish. (7) It is therefore necessary to look for additions to fish diets of oils that support these fatty acids Vegetable oils, including soybean oil, olives and sunflowers, are part of these polyunsaturated fatty acids (PUFA), including linoleic acid (C18: 2 n-6) (11) Vegetable oils contain low levels of saturated fatty acid (SFA) compared to those contained in animal. (7) Vegetable oils play an important role in fish farming sectors when added to fish diets, which contribute to increase the growth rates, in blood qualities. The aim of this study was to effect the addition of safflower oil (*Carthamus tinctorius*) in fatty acid constituents and the formation of lipoproteins in common carp fish (*Cyprinus carpio*).

### Materials and method:

Common carp were brought from al-Radwanayah pond fish / west Baghdad area to the fish laboratory / college of Agriculture / University of Baghdad. Fish were placed in the 15 experimental tank with dimensions( 60 x 40 x 40 cm ) Was filled with 70 liters of water with an initial weight of  $33.02 \pm 0.20$  g and a biomass 231.2 g. Fish

were fed on five experimental diets (5 treatments) and three replicates per treatment. Safflower (free from yellow flowers) was purchased from the local markets. It was extracted from cold oil by fermentation for 2-3 days, then the seeds were strained with the manual extract. Then the oil was added by a cloth (Mulle) to be taken for use in experimental diets, while the meal is used as feed for animals. feed constituent were purchased from local commercial markets and imported and mixed feed materials after milling. Safflower oil was added to the experimental rations and was As follows .diet1 (Safflower oil 0%) diet2 (Safflower oil 1 %) diet3 ( Safflower oil 1.5%) diet 4( Safflower oil 2%) diet5(safflower2.5%)(table1) The meat Machine was made of Japanese origin, the diameter of the 2 mm.

**Table 1: Diet components of feed materials.**

Feeding materials	T1	T2	T3	T4	T5
fish meal	6	6	6	6	6
animal protein	15	15	15	15	15
asayboian meal	28	28	28	28	28
sesame meal	13	13	13	13	13
corn white	6	6	6	6	6
Flour	6	6	6	6	6
Millet	6	6	6	6	6
Rice Bran	10	10	10	10	10
Wheat Bran	8	7	7	6	6
vitamin and mineral	1	1	1	1	1
Salt	1	1	0.5	1	0.5
safflower oli		1	1.5	2	2.5
Total	100	100	100	100	100

**Characteristics of the blood**

**Cholesterol measure**

Blood analysis was performed to estimate serum cholesterol by converting cholesterol to Quinoneimine (pink) os in(13).

$$\text{The concentration of cholesterol} = \frac{\text{Sample Absorption}}{\text{Standard solution Absorption}} \times 200$$

**Measure of triglycerides**

triglyceride was determined by enzymatic analysis. Which he referred to (6)

**Measure of high density lipoproteins.**

High density lipoproteins (HDL) were measured using the concentration of cholesterol in floating matter by depositing lipoproteins using MgCl<sub>2</sub> Phosphotungstic acid as in (17). After preparing the solutions, mix well and leave for 10-15 minutes at 37 ° C and absorb the absorbance at 505 nm wavelength and the following equation was used.

$$\frac{\text{Sample Absorption}}{\text{Standard solution Absorption}} \times 5$$

### Measurement of low density lipoproteins.

Low Density lipoproteins were measured based on the total cholesterol concentration and the three calcirids as in the equation.

$$\text{LDL Cholestrol} = \text{Total Cholestrol} - (\text{Triglyceride}/5 - \text{HDL})$$

### statistical analysis

The Statistical Analysis System (16) was used in complete analysis of the effect of the treatment on the studied traits as in the following mathematical model

$$Y_{ij} = \mu + T_i + e_{ij}$$

I used the Duncan Multidisciplinary Test (4) was used to test the significant differences

### Results and discussion:

#### Triglyceride and cholesterol

The Results of the statistical analysis of cholesterol showed no significant differences between T3 (139.5) and T1, T2 and T4, there were 146.2, 144.6 and 131.7 mg / dl respectively (Table 2). The results of the statistical analysis of triglycerides showed significant differences between all treatments. the results traiglycerdes T1 was the highest value at 210.15 and the lowest value was for T4 and T5, namely 167.60 and 154.10 mg / dl respectively. The level of cholesterol and triglycerides in fish blood is affected by their level of feed intake and intestinal absorption, depending on the quality of fatty acids and the increase in the proportion of *n*-3 and *n*-6 fatty acids. Reduction of cholesterol and triglycerides in fish blood of *Heterobranchus longifilis* when adding palm oil in fish diets.( 2)

#### Low and high density lipoprotein and very low density lipoprotein.

The Results of the statistical analysis showed no significant differences between the high density lipoproteins. (HDL) levels of T2 and T4, and the other treatments were 42.15 and 43.45 mg / dL. The highest value was T5 treatment at 49.10 mg / ml for T3 (33.65) Mg / dL (Table 2), the results of the statistical analysis of low density lipoproteins (LDL) showed no significant differences between T2, T3 and T4, 39.90, 46.70, 39.65 mg / dL. and less than 30.85 mg / ml for T5. The above results indicate the role of safflower oil added to fish diets. the reduction of VLDL and LDL levels, as well as the rise in HDL values in the blood of common carp plays an important in lowering the level of cholesterol in the blood because it collects cholesterol from the tissues of the body and returns it. Therefore,( 8) as well as the role of Oleic acid in safflower oil in fat burning and thus accelerate the rate of oxidation of fat in muscle cells and use more energy (10) and raises the HDL and reduces the cholesterol in the blood (14). The results of this study showed that the addition of 1.5% and 2% of the sun flower oil and maize oil, respectively, led to an increase in HDL level with increased levels of sunflower oil and maize oil as well as low LDL levels associated with liver cholesterol throughout the body, so HDL and LDL play an important role in the transport of cholesterol in the fish from the liver to the body and vice versa (5)

**Table 2: Effect of safflower oil on the blood characteristics of the common carp fish (mean ± standard error).**

V.L.D.L	L.D.L	H.D.L	triglycerides	cholesterol	Treatment
2.40±52.60 A	1.55±73.75 a	3.50±36.5 B	1.05±210.15 A	2.25±146.25 a	T1
0.85±38.35 B	1.80±39.90 b	4.85±42.15 ab	3.00±189.00 b	1.40±144.61 a	T2
2.80±35.80 Bc	2.90±46.70 b	1.55±33.65 b	1.90±179.1 c	1.50±139.50 ab	T3
0.95±36.05 Bc	0.45±39.65 b	0.85±43.45 ab	1.40±167.6 d	1.35±131.75 b	T4
0.400±31.10 C	2.25±30.85 c	1.100±49.1 a	0.90±154.1 e	4.25±100.85 c	T5
**	**	n.s	**	**	Significant level

no Significant (N.S)·(p<0.05) \*(p<0.01) \*\*

- 1- Safflower oil can be added b 2% to common carp fish (*Cyprinus carpio*), feed to improves some of the blood characteristics of the fish.
- 2- The effect of the safflower oil is positive, lowering the cholesterol and triglyceride levels in the blood and elevating the high density lipoproteins (good cholesterol).

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