Al-Muthanna J. For Agric Sci Print ISSN: 2226-4086 Online ISSN:2572-5149
Vol. 10 , Issue. 02. 2023

https://muthjas.mu.edu.iq/ http://doi.org/10.52113/mjas04/10.2/3

Effect of different levels of brewer's yeast *Schizosaccharomyces pombe* and molasses on some cellular Blood parameters traits of common carp *Cyprinus carpio* L.

Haider Kadhum Abd and Mariam Jassim Mohammed

Animal Production Department, Agriculture College, Al-Muthanna University, Iraq.

Received on15 /6/2023 Accepted on 31/7/2023 Published on 15/12/2023

Abstract

Study was done at Agricultural Research Experiment Station in Um Akf in Samawa, from 1 October/2022 to 20 December /2023, at a dugout pond, it is about 570 meters away from the Euphrates/Atshan River, at coordinates E 45.189309N ,31.321394, to determine the effect of different levels of Brewer's yeast *Schizosaccharomyces pombe* and molasses and their mixture on fish blood. Experimental parameters were as follows: T0: control diet (without additives). T1: add 0.5 mg brewer's yeast / kg diet. T2: add 1 mg brewer's yeast / kg diet. T3: add 1.5 mg molasses / kg diet. T4: add 2 mg molasses / kg diet. T5: add 0.5 mg brewer's yeast + 1.5 mg molasses / kg diet. T6: add 0.5 mg brewer's yeast + 2 mg molasses / kg diet. T7: add 1 mg brewer's yeast + 1.5 mg molasses / kg diet. T8: add 1 mg brewer's yeast + 2 mg molasses / kg diet. Results indicated that all special treatments, in addition to brewer's yeast and molasses, significantly improved cell blood parameters RBC, Hb, PCV, MCV, MCHC and Platelets) of carp fish compared to control treatment, T2 treatment (addition of 1.5 mg molasses / kg diet) gave the best results significantly compared to the rest of the experimental treatments.

Keywords:

Introduction:

Feeding fish is an important factor for the success of fish farming process to obtain best productive performance. Nutritional needs of fish are similar to nutritional needs of other animals, it needs protein, energy, carbohydrates, fats, vitamins and minerals for growth and reproduction, as well as its need to perform other vital functions, fish need diets with a high protein content compared to domestic birds and ruminants, because the protein content in dry matter of fish bodies ranges between 60-90 (Craig and Kuhn, 2017). New (1987) indicated that fish require low energy compared to other animals, in addition, fish cannot digest complex sugars unlike simple sugars, turning them into glycogen in both the liver and pancreas.

Brewer' syeast (*Schizosaccharomyces pombe*) is a natural product obtained from fungi, enters many food industries, especially the production of pastries, plays a role by secreting the zymese enzyme, which works to ferment starchy foods, it derives its energy through the fermentation of sugars in starchy materials. Brewer's yeast is usually produced from barley, apple, grape or fungal plants (Podpora *et al*., 2016). Pinto *et al*. (2015) showed that spent brewer's yeast is an agricultural industrial waste and sugar biomass, from brewers around the world it was obtained after completing several fermentation cycles, as the beer fermentation process is at a rate of 1.7-2.3 kg / m^3.

Molasses is used in many fields, as Vucurovic *et al.* (2011) showed that beetroot molasses contains reasonable proportions of pantothene and inositol, because cane molasses contains biotin, it is preferable in the production of bread yeast to mix beetroot molasses with about 20% of this cane molasses, it was preferable to use beetroot molasses in the production of bread yeast over cane molasses.

Khademi *et al.* (2019) indicated that the addition of sugar beet molasses as a source of carbon at a rate of 2% in the feed improved the immune performance of common carp fish through an increase in the levels of globulin and lysozyme in the fish blood plasma.

Study aims to demonstrate the effect of adding different levels of brewer's yeast *Schizosaccharomyces pombe* and molasses and their mixture on some blood parameters of common carp fish *Cyprinus carpio* L.

Materials and Methods

Fingerlings of common carp used in the experiment were brought from Babylon, Al-Mahaweel district, Al-Imam district, Al-Hajj Muhammad Abboud farm. Non-stressed fish of similar weight were selected. The fish were sterilized in a saline bath of 3% sodium chloride solution for five minutes, which is the necessary period for the appearance of signs of stress on them for the purpose of purifying them from external parasites. The fish were weighed on the basis of live mass to the nearest 0.01 gm using an electronic balance after placing them in a container containing an amount of

water. Fish were distributed among cages, 6 fish per cage, and three cages were allocated for each treatment, the number of fish used in the experiment was 162 fish, kept another number of fish in a storage recipe to compensate for the losses that might occur during the period of acclimatization or before the start of the experiment. The experiment lasted for 82 days. The experimental treatments were as follows:

T1: add 0.5 mg brewer's yeast / kg diet.
T2: add 1 mg brewer's yeast / kg diet.
T3: add 1.5 mg molasses / kg diet.
T4: add 2 mg molasses / kg diet.
T5: add 0.5 mg brewer's yeast + 1.5 mg molasses / kg diet.
T6: add 0.5 mg brewer's yeast + 2 mg molasses / kg diet.
T7: add 1 mg brewer's yeast + 1.5 mg molasses / kg diet.
T8: add 1 mg brewer's yeast + 2 mg molasses / kg diet.
Its components are shown in Table No. (1 and 2).

Table 1. The diets used in the experiment and according to the experimental parameters.

Items	T0	T1	T2	T3	T4	T5	T6	T7	T8
Soybean meal	40	40	40	40	40	40	40	40	40
Protein concentrate	20	20	20	20	20	20	20	20	20
Wheat bran	15	15	15	15	15	15	15	15	15
Barley	5	5	5	5	5	5	5	5	5
Wheat	3	3	3	3	3	3	3	3	3
Premix	1	1	1	1	1	1	1	1	1
Oil	1	1	1	1	1	1	1	1	1
Maize	15	15	15	15	15	15	15	15	15
brewer's yeast	----	0.5	1	----	----	0.5+1.5	0.5+2	1+1.5	1+2
molasses	----	----	----	1.5	2				
Total	100	100	100	100	100	100	100	100	100

Studied traits: Red Blood Cells (RBC), Hemoglobin (HGB), Packed Cell Volume (PCV), MCV (Mean Corpuscular Volume) and Platelets.

Results and discussion

Table (2) shows that the highest value of red blood cells (RBC) was recorded T1 (2.01×10^6 cells/ml), which was significantly ($P\leq0.05$) superior to all experimental treatments, then it was followed by the second treatment (1.99×10^6 cells/ml), while no significant differences were recorded among T0, T3, T4, T5, T6, T7 and T8, were record 1.59, 1.35, 1.24, 1.42, 1.27, 1.70 and 1.36×106 cells/ml, respectively.

Table (2) indicates that there were significant differences ($P\leq0.05$) among the different treatments on HGB and PCV, T2 was significantly ($P\leq0.05$) superior to all treatments, which amounted to 11.40 gm/100 ml. The results showed that there were significant differences ($P\leq0.05$) in T3 (10.50 gm/ 100 ml) compare with the control diet. There were no significant differences among T0, T1, T4, T5, T6

and T7, which were 7.95, 7.60, 6.20, 7.40, 6.75 and 8.40 gm/100 ml, respectively. T8 recorded 5.95 gm/100 ml.

Table 2. Effect of different levels of brewer's yeast *Schizosaccharomyces pombe* and molasses on RBC, HGB and PCV of blood of common carp *Cyprinus carpio* L.

Treatments	RBC (cell×10^6)	HGB (gm/ 100 ml)	PCV (%)
T0	1.59±0.10 ab	7.95±.032 bc	36.05±2.22 a
T1	2.01±0.59 a	7.60±0.12 bc	33.45±1.59 ab
T2	1.99±0.25 a	11.40±2.25 a	36.70±4.27 a
T3	1.35±0.64 ab	10.050±1.65 ab	29.60±0.40 ab
T4	1.24±0.08 b	6.20±0.64 c	27.80±2.51 b
T5	1.42±0.12 ab	7.40±0.64 bc	33.45±2.57 ab
T6	1.27±0.52 b	6.750±0.38 bc	29.55±1.47 ab
T7	1.70±0.10 ab	8.40±1.04 bc	33.20±2.540 ab
T8	1.36±0.20 b	5.95±0.20 c	26.40±1.44 B
Sig.	0.05	0.05	0.05

The low concentration of active substances in the proportions of beer yeast and molasses additives, at 0.05% gm/ kg, 2% ml/ kg, respectively, whereas brewer's yeast and molasses were 1% gm/ kg and 1.5% ml/ kg, respectively, in fish diets of the second and third treatments, led to a significant superiority at the expense of the control treatment, and the rest of the experimental treatments, it was attributed to the decrease in the synthesis of blood protein, and this decrease is due to the decrease on the quantities of feed consumed and the digested protein taken up by the fish, which negatively affected the formation of red blood cells and reduced numbers, this interpretation was consistent with what was found by Roberts *et al.* (2000) who indicated that the decrease in hemoglobin concentration, it may occur as a result of some diets containing feed substitutes with low nutritional value proteins. The results of our current study agreed with the findings of Eyiwunmi *et al*. (2018), which showed that the addition of leaf powder to the diet of African running fish by 1.5%, led to an increase and improvement of most of the blood parameters studied compared to the other percentages of addition (0.5, 1%), it also agreed with the results indicated by Elabd *et al*. (2019), which showed a significant superiority in blood parameters (RBC, Hb, PCV), of Nile tilapia fed on Moringa leaf powder, which was included in the diet at a rate of 1.5%, led to an improvement in the state of health. While our findings in this study came close to those of the two studies conducted by Al-Hussaini, and Salman

(2022) and Hulw and Salman (2022) indicated that the blood parameters in fish may vary from one study to another depending on many factors, such as the level of food addition, the type of fish, its size and age, and the health and environmental condition.

Table (3) shows that T5 was significantly (P≤0.05) superior in MCV (Mean Corpuscular Volume) with a mean of 235.60 compared to all treatments, then T6 (232.40), T0 (227.55), T4 (222.95), T3 (220.30), T8 (201.40), T7 (194.75), T2 (185.25) and finally T1 (122.60), respectively. The same table shows that the T3 treatment was significantly superior (P≤0.05) on MCHC (Mean Corpuscular Hemoglobin Concentration) compared to all experimental treatments at a rate of (73.25), then came T2 (55.70), T1 (53.20), T6 (53.05), T0 (50.40), T4 (49.65), T7 (48.49), and finally T8 (45.35) respectively. As for the blood platelets, all experimental treatments showed a significant improvement compared to the control treatment, there were no significant differences between the treatments, where the rates were 24.45, 30.50, 36.50, 30.50, 25.50, 32.33, 20.50 and 31.50, for the treatments T1, T2, T3, T4, T5, T6, T7 and T8, respectively. As for the control treatment, the rate was 68.50. The results of the statistical analysis in the current research indicated that the addition of brewer's yeast and molasses improved the MCV, MCHC and platelets.

Table 3. Effect of different levels of brewer's yeast *Schizosaccharomyces pombe* and molasses on MCV, MCHC and Platelets of blood of common carp *Cyprinus carpio* L.

Treatments	MCV (μm^3)	MCHC ($gm\ dL^{-1}$)	Platelets ($cells/\ mm^3$)
T0	1.59±0.10 ab	7.95±.032 bc	36.05±2.22 a
T1	2.01±0.59 a	7.60±0.12 bc	33.45±1.59 ab
T2	1.99±0.25 a	11.40±2.25 a	36.70±4.27 a
T3	1.35±0.64 ab	10.050±1.65 ab	29.60±0.40 ab
T4	1.24±0.08 b	6.20±0.64 c	27.80±2.51 b
T5	1.42±0.12 ab	7.40±0.64 bc	33.45±2.57 ab
T6	1.27±0.52 b	86.750±0.3 bc	29.55±1.47 ab
T7	1.70±0.10 ab	8.40±1.04 bc	33.20±2.540 ab
T8	1.36±0.20 b	5.95±0.20 c	26.40±1.44 b
Sig.	0.05	0.05	0.05

Brewer's yeast has a high nutritional value, it includes all the essential

amino acids, many nutrients, as well as vitamins, the most important of which was the B complex vitamin (Bellut and Arendt, 2019; Al-Gharawi *et al*., 2023). Martin *et al*. (2020) indicated that brewer's yeast contains a good amount of carbohydrates, proteins, free amino acids, ash, vitamins and fats.

References:

Al-Gharawi, J.K., A. Al-Yasiry, G.K. Qader, B. Kiczorowska, W. Samolinska, N.T. Sh. Al Salman, H.F.A. Al-Ziyadi and R.K.A. AlRamahi. 2023. Effect of using different methods of adding Melissa officinalis L. on some physiological and immunological traits of broiler. Al-Muthanna J. For Agric Sci., 10(1): 1-7.

Al-Hussaini, A.S.F. and A.H. Salman. 2022. Effect of adding different levels of ginger oil Zingibar officinale to the diets of common carp Cyprinus Carpio L. on some blood traits. Al-Muthanna J. For Agric Sci., 9(2): 1-12.

Bellut, K.; Arendt, E.K. 2019. Chance and Challenge: Non-Saccharomyces Yeasts in Nonalcoholic and Low Alcohol Beer Brewing—A Review. J. Am. Soc. Brew. Chem., 77: 77-91.

Craig, S. and D. Kuhn. 2017. Understanding Fish Nutrition, Feeds, and Feeding. Virginia Cooperative Extension, Virginia Tech. 7 pp.

Elabd, H., E. Soror, A. El-Asely, E.A. El-Gawad and A. Abbass. 2019. Dietary supplementation of Moringa leaf meal for Nile tilapia Oreochromis niloticus: Effect on growth and stress indices. The Egyptian Journal of Aquatic Research, 45(3): 265-271.

Eyiwunmi, FA; Augustine, O; Ovie, WK (2018). The Hematological parameters of Catfish (Clarias gariepinus) fed Fish Feeds with replaced Premix using Moringa Leaf Meal (MLM). Madridge J. Aquac. Res. Dev. 2(1): 35-39.

Hulw, A.H.M. and A.H. Salman. 2022. Effect of different levels of nutmeg on some blood parameters of common carp Cyprinus carpio L. Al-Muthanna J. For Agric Sci., 9(2): 1-9.

Khademi, H.M., Adineh, H., Harsij, M., Gholipour Kanani, H. 2019. Effects of adding molasses in water and diet of common carp on growth, blood biochemical indices, digestive enzymes and water quality in a biofloc system. Aquatic Animals Nutrition, 5(1): 25-34.

Martin DS, Orive M, Inarra B, Castelo J, Estevez A, Nazzaro J, Iloro I, Elortza F, Zufia J. 2020. Brewers' Spent Yeast and Grain Protein Hydrolysates as Second-Generation Feedstuf for Aquaculture Feed. Waste and Biomass Valorization, 11: 5307-5320.

New, M.B. 1987. Feed and Feeding of Fish and Shrimp: A Manual on the Preparation and Presentation of Compound Feeds for Shrimp and Fish in Aquaculture. Rome: Food and Agriculture Organization of the United Nations Environment Program, 78 pp.

Pinto M, Coelho E, Nunes A, Brandão T, Coimbra MA. 2015. Valuation of brewers spent yeast polysaccharides: a structural characterization approach. Carbohydrate Polym., 116:215-222.

Podpora, B.; Swiderski, F.; Sadowska, A.; Rakowska, R.; Wasiak-Zys, G. 2016. Spent brewer's yeast extracts as a ´ new component of functional food. Czech J. Food Sci., 34: 554-563.

Roberts W.L., Fontenot J.D. & Lehman C.M. 2000. Overestimation of hemoglobin in a patient with an IgA-kappa monoclonal gammopathy. Archives of Pathology and Laboratory Medicine**,** 124, 616– 618.

Vucurovic, V., V. Puskas and U. Miljic. 2011. Bioethanol production from sugar beet molasses and thick juice by free and immobilised Saccharomyces cerevisiae. Journal- Institute of Brewing, 125: 1015-1022.