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EFFECT OF ADDING PALM KERNEL MEAL IN COMMON CARP DIET *CYPRINUS CARPIO* L.

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Abstract

This study was conducted at Department of Animal Production (Fish Laboratory), College of Agriculture, Anbar University, for the period from 19/11/2018 to 27/1/2019 to demonstrate the effect of the use of Palm Kernel Meal in the diet of common carp *Cyprinus carpio* L. on growth performance and blood recipes. In the experiment, 20 glass basins with dimensions of 70 × 40 × 30 cm and a capacity of 84 liters and filled with 70 liters, in which 140 fish were randomly distributed at a single weight rate of 19.5 ± 2 g over ten different experimental treatments and by two replicates per treatment (7 fish / bis). 4% of the body weight on a 4.5 mm laboratory diets with a protein content of 27.44% to 30.82%. T2, T3 and T4 were used for Palm Kernel Meal, and T5, T6 and T7 dates were processed for oyster mushrooms. T8, T9, and T10 Palm Kernel Meal cores were treated with commercial enzyme mixture, all at 33%, 66% and 100%, respectively, instead of yellow maize (25%). The results of the study showed a significant superiority (Pd"0.01) in favor of treatment T4 (Palm Kernel Meal 100% substitute for maize (25%) compared to the rest of the experiments. In the final body weight rate and the total weight gain rate and the rate of growth and relative and qualitative Feed intake and feed conversion ratio were 53.60 g / fish, 34.60 g / fish, 182.10%, 0.85%.g / day, 58.70gm, 1.69 and 2.03%, respectively.

Key words : Common Carp Fish, Palm Kernel Meal.

Introduction

Fish occupies a cornerstone and effective in covering part of the human food needs in Iraq, and is thus economically an important source of animal protein, and the importance of fish in some countries and regions to the extent that they constitute a high proportion of the daily diet of humans as well as exploited in many industries Such as feeds, fertilizers and some medical preparations (Heuzé and tran, 2014; Fadhil, *et al.,* 2017). Feed production is the main problem currently facing fish breeding projects. Feeds cost about 60-85% of their operating costs on fish farms, and therefore inexpensive, unconventional feeds should be used (Swar, 2016). Therefore, the use of substitutes for imported and expensive materials such as yellow maize will reduce (Rashid, 1984). The cost of rations and also palm kernel powder (Palm Kernel Meal). and Palm Kernel Meal were observed to have a high energy content (Akbarzadeh, *et al.,* 2019), Palm Kernel Meal were composed of 74% carbohydrates, 7.5% crude protein, 56.03% fiber, 7.3% moisture, 9.21% ether extract and 0.84% ash (Sharifi, *et al.,* 2017). It is clear from the foregoing that the nuclei of dates rich in carbohydrates, and to some extent with fat and protein, as well as a good ratio of calcium to phosphorus from the rest of plant products, and therefore interested in nutrition scientists as one of the alternatives in animal feed, and the first obstacle in its use is the hardness of nuclei and how to prepare it Easy. The reason for its hardness is that it contains lignin compounds, a strong substance found in the cell wall as well as cellulose and hemicellulose in cell walls that contribute to the reduction of digestibility in fish in particular, so there are many treatments available to break down the cellulose chain in the powder of Palm Kernel Meal makes it more digestible. The chemical and biological treatments of Palm Kernel Meal powder appear to improve nutritional value

(Ng, *et al.*, 2002). Cellulose is the main component of the cell wall of Palm Kernel Meal. It consists of a series of monosaccharides (glucose), which are interconnected with beta-clicoside bonding (Al-Akidi, *et al.*, 1985). It is an insoluble crystalline substance and cannot be used as a foodstuff unless it is treated and converted into a soluble substance, which is a monosaccharide, which is a good source of energy for a large number of cellulose-decaying microorganisms, especially bacteria and fungi (Frias, *et al.*, 1996).

Fungi do not naturally contain chlorophyll. And they get nourishment from the metabolism of inorganic organic matter (Ropciuc, *et al.*, 2016). Fungi are important food products because of their role in human health, nutrition and disease control (Tesfaw, *et al.*, 2015). *Pleurotus ostreatus* is the third largest commercially produced mushroom in the world and is an edible species that is widely cultivated worldwide.

Oyster mushrooms have a complex enzymatic system, which makes them highly capable of growing on many types of plant residues rich in lignin and cellulose (Kwon and Kim, 2004), such as wheat straw, rice straw, maize citrus, agricultural residues of date palm, as well as many bushes such as halva and cane (Al-Badrany, 2010; Hassan, 2011; Obodai, *et al.*, 2003).

The planting medium of oyster mushrooms is like soil for plants. Fungal yarn grows on it and takes its necessary needs for growth. Different media are often used by oyster mushroom cultivation methods, such as hay, sawdust, cotton residues, grain husks, corn mills, sugarcane residues, banana leaves and plants containing high cellulose fibers. This diversity is due to the multidirectional enzymatic system. multi lateral enzyme system owned by this fungus. The hay medium is one of the most widely used mediums due to its easy accessibility and high lignin and cellulose content (Kwon and Kim, 2004).

Enzymes play an important role in the digestion of feed by the animal, as the addition of the feed under certain conditions lead to increase the nutritional value of the feed material by increasing digestion, and many enzymes, which plays an important role in the digestion of starch (α-amylase) and the other in the digestion of carbohydrates (β The protease is very important for digesting proteins and converting them into small peptides and some free amino acids that are readily absorbed. There are other enzymes such as Lipase, which acts on digesting fatty substances, as these enzymes have an important role in the process of decomposition of feed materials into its primary units. Small and easy to digest Through the intestine (Rashid,1984).

Few studies have been conducted on the evaluation of Palm Kernel Meal as an alternative to maize in *Cyprinus carpio* globally and have not been carried out in Iraq. For these reasons, this study was conducted to evaluate the growth performance of common carp fed on diets containing different levels of Palm Kernel Meal powder and in three forms of finely ground Palm Kernel Meal powder, treated with oyster mushrooms and treated with commercial enzyme mixture as a partial and total substitute for maize.

Materials and Methods

The fingerlings of common carp were brought from the fish farms in Essaouira on 15/10/2017, with different weights ranging from 13 g to 34 g. The experimental fish were collected after being collected in a 0.5% saline bath until the signs of stress on the fish for sterilization, were transferred to ponds. 3 cement with a capacity of 1200 liters of water per basin and the temperature of the water at the time of 23 ± 1.5 ° C, installed using a water pump (water pump) of Chinese origin and thus continued for 30 days to adapt to living conditions. The fish were fed in this period on the commercial diet until they were distributed to the glass ponds of the experiment. The weights started with the experiment ranged from 17 g to 22 g in each repeater at an average weight of 19 g.

The experiment was conducted in the fish laboratory - College of Agriculture - Anbar University for the period from 19/11/2018. To 27/1/2019. (70) days. Designed and equipped with 20 glass basins with dimensions of 70 cm x 40 cm x 30 cm, the basins were washed with water and sterilized with coarse salt of sodium chloride at 5 g / l and left for a week after it was cleaned and filled with 70 liters of water until the fish were placed there. (W) for heating in the case of low temperature, and is equipped with air by two pumps, each of which is half a horse to push the air operating alternately using a timer (Timer) hour for each pump and the air flow is distributed evenly to all basins as well as temperature gauges, filling and discharging ponds With a super pump of Chinese origin, the laboratory is equipped with a water tank 1000 Liters with 3 heaters for heating water for filling ponds and storing liquefied water with 4000 L tanks for a period of not less than 24 hours to get rid of chlorine and maintain an appropriate water temperature before using it for experiment basins.

140 common carps were used at a rate of 19.28 g / fish and a live mass of 134.96 g / basin. They were distributed over 20 basins, filled 70 liters of water and placed in each basin 7 fish with 10 treatments per treatment. Each treatment was represented by a diet

where ten diets were used, the first diet without additives was promised a comparative treatment, and the second, third and fourth nuclei were added raw dates, and the fifth, sixth and seventh dates were added. Dates are treated with commercial enzyme mixture of 33%, 66% and 100%, respectively, replacing maize (25%).

Fish were fed on these diets for the duration of the 70-day trial. The localization period was 15 days, feeding from 1% to 4% at three meals per day. The fish were weighed every 15 days and the feed intake was adjusted according to the weight of the fish after each weighing. The water temperature was measured daily with a Chinese mercury thermometer and the pH concentration of the water was measured. Ponds are cleaned and the pond water is changed by 50-60%. Feed the first three meals starting at eight in the morning and the second meal starts after 5 hours after the first meal and the third meal at six in the evening.

Statistical Analysis System was used to analyze the effect of different coefficients in the studied characteristics on a complete Randomize Design (CRD), and the significant differences between the averages were compared with Duncan (SAS,2012). Polynomial at the level of significance ($P < 0.05$), depending on the mathematical model.

$$Yij = M + Ti + eij$$

Results and Discussion

The results of the statistical analysis table 2 showed the effect of different experimental factors on the average body weight (gm) of common carp fish throughout the experiment (70 days)

It was found that there was a significant superiority ($P \leq 0.01$) for T_2, T_3, T_4, T_8, T_9 and T_{10} treatments compared to the rest of the experiment parameters.

The reason for the superiority in favor of the substitution treatments for raw Palm Kernel Meal powder substitutes for maize is that Palm Kernel Meal have high antioxidant activity because of their phenolic content which makes them as potent catalysts that can be adopted as a source of natural antioxidants (Al-Farsi and Lee, 2008; Baliga, *et al.,* 2011). There is an increase in the weight gain rate in favor of T_2, T_3, T_4, T_8, T_9 and T_{10} compared to the rest of the experiment. The decrease in the weight gain in T_5, T_6 and T_7 may be due to the increase in the crude fiber percentage in the dates of oyster fungi treated with oyster mushrooms. Which leads to acceleration of the passage Food items in the gut and that makes it out to outside of the body without the full benefit of them (Al-Amoudi, *et al.,* 2001).

The results of the statistical analysis (Table 2) of the relative growth rate of the experiment showed that the coefficients T_2, T_3, T_4, T_8, T_9 and T_{10} had a significant superiority ($P \leq 0.01$) compared to the rest of the experiment. This may be due to the differentiation of the chemical composition of Palm Kernel Meal through low fiber content in feed or feed components, which may stimulate increased feed intake as well as enhance feed quality and digestion (Shiawoya and Adeyemi, 2003; Sule and Sotolu, 2010).

The results of the statistical analysis (Table 2) showed a significant superiority ($P \leq 0.01$) in favor of the treatments of raw Palm Kernel Meal powder and Palm Kernel Meal treated with commercial enzyme mixture (T_2, T_3, T_4, T_8, T_9 and T_{10}) respectively in the growth rate compared With the treatment of Palm Kernel Meal powder treated with oyster mushrooms, we conclude from this experiment and using different levels of raw Palm Kernel Meal powder added to the common carp diet, the best treatment is T_4 (100% raw nuclei powder substitute for maize 25%), followed by treatment T9 (Powdered Palm Kernel Meal treated with a mixture of commercial enzymes mixture 66% alternative to yellow corn 25%), after A transaction comes T6 (the nuclei of dates powder plants mushroom by 66% turbinal substitute for yellow corn 25%) compared to the rest of the experiment transactions.

Intake of feed intake, feed conversion ratio, intake protein intake and protein efficiency ratio

Feed consumption is an economically important characteristic and a key indicator in the calculation of the production cost of the project because feeding constitutes more than two-thirds of the total cost in fish farming projects. The results of statistical analysis table 3 showed the effect of experiment factors on the rate of feed consumption during the fish farming period. A significant difference ($P \leq 0.01$) was observed in favor of treatment T4 compared to the rest of the experiment. No significant differences were recorded with T_2, T_3 and T9 treatments in total feed consumption during the trial period.

This study shows that the Palm Kernel Meal powder treated with oyster mushrooms with T_5 and T_6 treatments are the least fodder compared to the rest of the experiment. This may be due to the presence of Tannins which have a somewhat bitter taste and strict taste affects the palatability and digestion of the feed. Protein quality by reducing feed digestion and palatability and acting as a constrictor which leads to contractility of the tissues in the body, especially the mucous tissues in the interior of

Table 1: Chemical Analysis of Experiment Relationships.

Treatment	Carbohydrate	Fiber	Ash	Fat	Protein	Moisture
T_1	33.28	4.27	15.1	7.05	30.57	9.74
T_2	32.44	2.57	16.44	7.17	30.63	10.8
T_3	32.97	4.64	17.11	7.24	30.82	7.22
T_4	33.89	5.99	16.96	6.83	29.65	6.73
T_5	30.88	9.72	12.99	10.74	28.14	7.53
T_6	33.26	10.98	13.11	7.65	27.44	7.56
T_7	31.79	12.97	14.39	7.53	27.98	5.34
T_8	34.6	4	16.59	8.32	28.79	7.78
T_9	27.72	4.98	17.14	12.17	29.3	8.69
T_{10}	29.44	6	17	9.08	29.93	8.54

Table 2: Effect of Experimental Coefficients on Body Weight Rate, Weight Gain, Relative Growth and Specific Growth of Common Carp Fish ±Standard Error.

Treatment	Average body weight	Weight gain rate	Relative growth rate	Specific growth rate
T_1	47.25±2.25b	28.25±2.25b	148.68±11.84b	0.56±0.11b
T_2	52.50±1.10a	33.50±1.10a	176.32±5.79a	0.81±0.05a
T_3	52.75±0.45a	33.75±0.45a	177.63±2.37a	0.82±0.02a
T_4	53.60±0.90a	34.60±0.90a	182.10±4.73a	0.85±0.03a
T_5	38.40±0.30c	19.40±0.30c	102.10±1.57c	0.03±0.02d
T_6	38.30±0.10c	19.30±0.10c	101.58±0.53c	0.02±0.01d
T_7	41.80±0.90c	22.80±0.90c	120.00±4.74c	0.26±0.06c
T_8	51.35±1.05a	32.35±1.05a	170.26±5.52a	0.76±0.05a
T_9	51.80±1.70a	32.80±1.70a	172.63±8.95a	0.77±0.07a
T_{10}	52.00±0.70a	33.00±0a	173.68±3.68a	0.79±0.03a
Moral level	(P≤0.01)	(P≤0.01)	(P≤0.01)	(P≤0.01)

a,b,c: the different letters within one column indicate significant differences between the coefficients at the significant level (P≤0.01).

Table 3: Effect of Experimental treatment on Feed Intake, Feed Transfer Rate, Protein Intake, and Protein Efficiency Ratio for Common Carp Fish ± Standard Error.

Treatment	Amount of feed intake/g	Food conversion rate	Intake of protein intake/g	Protein efficiency ratio
T_1	56.25±0.33dc	2.00±0.17c	17.19±0.10bc	1.64±0.07b
T_2	57.97±0.22ab	1.73±0.06d	17.75±0.07a	1.89±0.03a
T_3	58.08±0.73ab	1.72±0.00d	17.91±0.24a	1.96±0.01a
T_4	58.70±0.33a	1.69±0.05d	17.40±0.10b	1.99±0.03a
T_5	53.45±0.36e	2.75±0.02a	15.03±0.10f	1.29±0.01d
T_6	50.48±0.30f	2.61±0.00ab	13.84±0.08g	1.39±0.00dc
T_7	55.23±0.03d	2.42±0.10b	15.45±0.01e	1.47±0.03bc
T_8	55.48±0.14d	1.71±0.05d	15.97±0.04d	2.03±0.04a
T_9	57.92±0.17ab	1.76±0.08dc	16.97±0.05c	1.93±0.05a
T_{10}	57.08±0.36bc	1.72±0.02d	17.08±0.11bc	1.93±0.02a
Moral level	(P≤0.01)	(P≤0.01)	(P≤0.01)	(P≤0.01)

a,b,c: the different letters within one column indicate significant differences between the coefficients at the significant level (P≤0.01).

the mouth, which leads to dryness of the tissues and reduce secretions (Nwokolo and Bragg, 1977; Akwaowo, *et al.*, 2000).

One of the most important economic indicators for the ability and efficiency of fish in converting the feed consumed to weight is table 2 that there is an advantage in the ratio of food conversion in favor of treatment T_4 compared to other treatments. Experience. The decrease in growth criteria for common carp fish may be caused by the treatment of Palm Kernel Meal powder treated with oyster mushrooms as indicated (Majesty, *et al.*, 2019). The content of *P. ostreatus* fungi on the antibiotic nutrients found in oyster mushrooms *P. ostreatus* having a compound Saponin 1.64 mg / 100 g, alkaloids 1.52 mg / 100 g, oxalate 0.41 mg / 100 g, tannins 0.11 mg / 100 g, phytate 0.90 mg / 100 g and flavonoid 0.31 mg / 100 g, Saponin was the highest against the lowest level flavonoid. Saponin compounds have been involved in reducing the absorption of certain nutrients including glucose and cholesterol in the intestine through chemical reaction within the intestinal cavity (Majesty, 1996), perhaps because the coefficients of raw Palm Kernel Meal powder and Palm Kernel Meal treated with commercial enzyme mixture outweigh the coefficients Dates of oyster fungi treated with oyster mushrooms are high in fiber table 1 for T_5, T_6 and T_7 by 9.72, 10.96 and 12.97, respectively, which reduce the utilization of feed material within the gastrointestinal tract, as well as the lack of acceptance of fish. Of the diet sufficiently reducing the intake of Diet, which is reflected in the recipe ratio of food conversion.

The results of statistical analysis of the amount of protein intake in table 3 showed a significant difference (P≤0.01) between treatments. T_3 recorded the highest amount of 17.91 g. This did not differ significantly with treatment T_2 (17.75 g), and this may be due to the improvement of the physiological condition of the fish intestine as Palm Kernel Meal is a good source and stimulator of the immune system in the body, in addition to that it is antioxidant and this means improved health of the fish (Mohammadi, 2018). The results showed that the protein efficiency ratio showed significant differences (P≤0.01) between

treatments, where the treatment T_8, which reached 2.03%, exceeded the rest of the treatments and did not differ significantly with the treatments T_2, T_3, T_4, T_9 and T_{10}. Feed leads to better digestion thus making the best use of feed by converting it into small molecules leading to increased absorption of nutrients (Verdegem, 2013). Because external enzymes have been widely used to remove antioxidant agents from feed (Sanchez, *et al*., 2019).

Conclusions

We conclude from this experiment that it is possible to add raw Palm Kernel Meal powder with 100% substitute for maize (25%) and use of Palm Kernel Meal powder treated with oyster mushrooms by 66% substitute for maize, while Palm Kernel Meal powder can be used with commercial enzyme mixture by 66%. Alternative to maize in common carp diets as it contributes to higher growth standards.

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