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USING DIFFERENT CHEMICAL TREATMENTS ON WATER HYACINTH LEAVES *EICHHORNIA CRASSIPES* AND REPLACE THEM WITH SOME COMMON CARP *CYPRINUS CARPIO* L. DIET INGREDIENTS AND KNOWING THEIR EFFECT ON SOME GROWTH PARAMETERS

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Abstract

This is study was conducted in Al-Muthanna University þ/ agriculture college the first station of agricultural experiments and research from 17/11/2017 to 25/1/2018 to knowing the effect of using chemical substances on water hyacinth leaves *Eichhornia crassipes* on common carp fish, *Cyprinus carpio* L. 60 fish with average weight (65.33±0.2gm) were used randomly distributed on for four treatments with three replicates to each treatments. The differences between all treatments was in chemical substances type which using on plant leaves, NaOH, vinegar (Al Badawi made of locally) and citric acid were used with 10% / 1 kg from water hyacinth leaves dry matter, as well as control treatment witch free from any edition of water hyacinth leaves 25% of water hyacinth leaves with diet ingredients. Fish with fed on an experiment diet with 3% from its weight daily. Experiments continue for 10 weeks. The results showed that T2 (NaOH) and T3 were the best, a significantly differences were found in almost studied characters (final weight, weight gain, daily growth rate, specific growth rate, thermal growth rate, food conversion ratio, food conversation efficiency) Followed by T1 (control) and T4 (Citric acid), who no significant differences between them on an almost studied characters. From what we found this is study we suggestion by using NaOH and vinegar with 10% on water hyacinth leaves and common carp diets under recent experiments conditions.

Key words : Water hyacinth, leaves, common carp, chemical treatments.

Introduction

Fish feeding cost in any projects of fish breeding projects reached (50–60%) from production coasting (Craig and Helfrich, 2002). So, there was a massive needing to finding roughage replacements as alternative ingredients instead of basic ingredients of ration that required to finding diets with little coasting and highly production (Muzinic *et al*., 2006). Chemical treatments to plant parts or yields were effective, As they increase their using in fish feeding in the same time decreasing dependence on fish Productions that's using in diet manufacturing (Mbonge, 2007). Hassan and Alattar (2005, 2006) using NaOH and caustic soda on palm fronds to improvements it's digestion coefficient¡as well as Mishimaa *et al*. (2006) using sodium hydroxide and sodium peroxide on water lettuce and Azolla to improve their nutritional value. In the present time, the needing require replacement source n fish stocking process because of what our country exposed from water scarcity so that's the perfect using two water resulting continuous fish stocking process and develop it in the future (Arisha, 2009). Wassif *et al*. (2003) explained succeed tilapia fish breeding by using groundwater. AL-Jubouri (2017), also using well waters in common carp breeding. This is the aiming to knowing the possibility of using some chemical materials at the rate of 10% on and water hyacinth leaves and replacements as a part of common carp diet ingredients.

Materials and Methods

This experiment was conducted in an opening water system with water flow rate (70 L/30 Minute) and temperature (23^0C) by using (60) common carp fish with

average weight (65.33±0.2gm), fish distributed on (15) oval plastic pond with capacity (70) L to each pond with average (5) fish/pond and (3) replicates to each treatment. Fish were fed with 3% daily from their weight by (3) meals with modified quantities that given to their after weighing their weekly. Four experiments diets were making, first diet was for comparison (diet without any additions), the rest diets were (T2 25% water hyacinth leaves treated with NaOH, T3 25% water hyacinth leaves treated with vinegar, T4 25% water hyacinth leaves treated with citric acid) as a replacement addition to corn, barley, wheat bran.

Experiment continue for 10 weeks after fish adaptation for 2 weeks. Diets manufactured after the grinding their materials, which entrance every diet alone, and then Handley mixed according to values mentioned in table 2. Every diet mixtures entered a big size roughage factor with capacity 4 tons/hour to produce pellets with 4 Mm, then all diets faced air to cooling and dried, after that packed in a bag with a capacity of 50 kg until we used them. A sample of diets ingredients was taken to analysis to knowing their chemical composition as shown in table 1.

Data analysis by using analytical program (spss) Statistical package for social sciences version (14) according to complete randomized design and using Duncan test (Duncan, 1955) to testing the differences between treatments in the probability level <0.05.

Experimental diets manufacturing are given in table 2.

Studied parameters

1. Weight Gain (W.G) = Final weight-Initial weight.

2. Daily Growth Rate (D.G.R) = Final weight(g/day)-Initial weight(gm/day)/Experiments period.

3. Relative Growth Rate (RGR) % =

$$\frac{\text{Final weight (W2)} - \text{Initial weight (W1)}}{\text{Initial weight (W1)}} \times 100$$

4. Specific growth ratio (SGR) % =

$$\frac{\text{Log Final weight (gm)} - \text{Log Initial weight (gm)}}{\text{Experiment period}} \times 100$$

5. Thermal-Unit Growth Coefficient (TGC) = (Final weight)$^{0.3333}$ - (Initial weight)$^{0.3333}$/(Temperature× Experiments period) × 100

6. Food Conversion Efficiency(FCE%) =

$$\frac{\text{Weight gain (gm)}}{\text{Food intake (gm)}} \times 100$$

7. Food Conversion ratio (FCR)= $\frac{\text{Food intake (gm)}}{\text{Weight gain (gm)}}$

8. Protein Efficiency ratio (PER) =

$$\frac{\text{Weight gain (gm)}}{\text{Protein intake (gm)}}$$

9. Apparent Protein Digestibility Coefficient =

$$100 - \frac{\text{Cr2O3in food \%}}{\text{Cr2O3in feces \%}} \times \frac{\text{Food protein in feces \%}}{\text{Food protein in food \%}} \times 100$$

Results

The temperature in a fish breeding pond during experimental days ranged from 22.8-23.5, it was close to an optimum temperature for common carp breathing, while pH values were from 7.2-7.5 and water salinity was 4.32-4.49 and these results were similar to AL-Jubouri (2017) and Saleh (2013). Statistical analysis showed NaOH and vinegar treatments exceed than Control and citric acid treatments in almost studied growth parameters (Final weight, weight gain, daily growth rate, specific growth rate, thermal growth rate, food conversion ratio) as shown in table 3. As final weight (FW) recorded for T2 and T3 (83.95±0.46) and (82.80±0.82). Sequentially, while T4 final weight value was 79.05±0.31 without any significant differences with control treatment. Significant differences were found in probability (0.05) in weight gain (WG) to T2 and T3 (18.85±1.09) and (17.75±0.59gm/fish) who significant difference from T4 which never significantly differ from control treatment in the same level, which reached (13.54±0.30). As for the relative growth rate (RGR), NaOH and vinegar treatments were significantly exceed on control and citric acid treatments, who reached a rate amount (28.48±1.97%) (27.28±0.28%), respectively, while RGR for citric acid treatment was (20.67±0.53%) without any significant differences with control treatment. For the specific growth rate (SGR) T2 and T3 were significant to exceed on control and T4 treatments if recorded at ate for the (SGR) amount (0.35±0.022) (0.34±0.009%)/ day without any significant differences between them respectively, while T4 SGR (0.26±0.006%)/day without any significant differences with control treatment. Daily growth rate (DGR) were significant differences also for the T2 and T3 treatments on control and T4 treatments were amount (0.26±0.015), (0.25±0.008 gm)/day. Sequentially, while T4 recorded DGR amount (0.19±0.004) gm/day without any significant differences with control treatment. T2 and T3 recorded a significant differences Thermal growth rate (TGR) on control and

Table 1 : Chemical analysis to materials that using in experimental diets manufacturing.

Roughage materials	Chemical compounds						
	DM%	Protein%	Ether extract%	Ash%	Crude fiber%	Carbohydrates%	Total
Soy bean meal	99.19	42.30	8.33	4.80	6.14	37.62	99.19
Corn	98.31	7.14	12.01	3.17	8.49	67.5	98.31
Barley	94.66	10.30	4.01	5.90	9.15	65.3	94.66
Wheat bran	95.17	8.66	1.04	5.90	10.21	69.36	95.17
Fish meal	99.18	65.01	8.15	1.39	—	—	—
Wheat flour	87.9	10.5	1.25	0.65	0.5	75	87.9
*WHL treated with Naoh	94.39	11.03	3.08	5.17	5.12	69.99	94.39
*WHL treated with vinegar	90.20	10.38	2.04	6.05	6.95	64.78	90.20
*WHL treated with citric acid	95.61	11.46	3.20	4.01	6.22	70.72	95.61

Table 2 : Explained using material values in experimental diets%.

Compounds	T1Control	T2 25% water hyacinth treated with NaoH	T3 25% water hyacinth treated with vinegar	T2 25% water hyacinth treated with Citric acid
Soy bean meal	30	30	30	30
Fish meal	10	10	10	10
Corn	20	10	10	10
Wheat flour	4	4	4	4
Wheat bran	20	10	10	10
Barley	15	10	10	10
*WH leaves	-	25	25	25
Minerals and vitamins	1	1	1	1
Total	100	100	100	100

Table 3 : Some studied parameters (Mean ± Standard error) for experiment fish which fed on experiment diets.

Studied parameters	Treatments			
	T1	T2	T3	T4
F W (gm)	79.04±0.14B	0.46±83.95a	0.82±82.80a	0.31±79.05b
W G (gm)	0.43±14.00B	1.09±18.58a	0.59±17.75a	0.30±13.54b
DGR (gm/day)	0.006±0.20B	0.015±0.26a	0.008±0.25a	0.004±0.19b
RGR (%)	0.86±21.55B	1.97±28.48a	0.28±27.28a	0.53±20.67b
SGR (%/day)	0.01±0.27B	0.022±0.35a	0.009±0.34a	0.006±0.26b
TGC (%/day)	0.0005±0.016B	0.002±0.021a	0.0006±0.020a	0.0003±0.016b
FCR (gm)	0.23±5.28B	0.28±4.00a	0.13±4.18a	0.15±5.44b
FCE (%)	0.81±18.98B	1.65±25.17a	0.76±23.92a	0.52±18.40b
PER	0.03±0.78B	0.06±1.00a	0.03±0.96a	0.02±0.73b
APDC	0.20±86.88C	0.09±92.35a	0.05±90.43b	0.22±87.32c

* Different litters refer to there was a significant differences in probability at level ($p<0.05$).

T4 treatments amount (0.021±0.002), (0.020±0.0006)%/ day Respectively, while T4 recorded a rate for TGR amount (0.016±0.0003%)/day without any significant differences with control treatment.

T2 and T3 recorded a significant differences in control and T4 treatments for the Food conversion ratio (FCR) and Food conversion efficiency (FCE) and for the protein efficiency ratio (PER) there was significant differences to the T2 and T3 in contact with T4, which had no significant differences with control treatment. T2 recorded a significant differences for the Apparent protein digestion coefficient (APDC) on rest treatments followed by T3 who exceed significantly also on control and T4 treatments and the later had no significant differences between them.

Discussion

From the above results, we saw T2 and T3 significant exceed on control and T4 treatments in all studied characters and the result of T2 exceed maybe due to role of NaOH in making change in chemical composition to almost materials that found in water hyacinth leaves

including cellulose, hemicellulose, lignin it breaks down the complex that made from mentioned materials from its effect on lignocellulose bond and therefore release them which causes nutritional value improvement and increase its content from total nitrogen and therefore increasing dry and organic matters apparent digestion and metabolizable energy and apparent digestion coefficient (Hassan, 2004, 2005) and these result agreed with Labib *et al*. (2012) when they used aquatic plants (Azolla and water lettuce) treated with NaOH in Nile tilapia diets. While the T3 may be due to the reason for it exceeds for the addition that vinegar gave it to water hyacinth leaves as a nutritional compound as a carbohydrates, Amino acids, peptides, vitamins, minerals and other compounds as pigments, carotene and phenolic compounds which all make clear effect for ADC (Guerrero et *al*., 2007) and these result agreed with Jasim *et al*. (2016) result when he used natural vinegar in fish silage preparation with replacement value 20% from fish meal.

There were no significant differences noted between T4 and control treatment if there was no was not effective for citric acid using without any negative effects and may be due to citric acid ratio that used very higher as they were not effective against phytic acid in water hyacinth leaves (Saha and Ray, 2011), who making a complexes with minerals and protein (Gifford and Clydesdale, 1990) and making them not accessible for the enzymes action Furthermore it's inhibiting digestion enzymes activity as the pepsin and Trypsin (Cladwell, 1992) and these result agreed with Fauconneau (1988) that added citric acid with ratio 11.6% negative effects resulting on some growth parameters of trout, or maybe the less ratios that using in some studies from citric acid more effectiveness from the ratio which used in current study on bond that found between phytic acid and protein and minerals that had active role to make them more accessible to internal enzymes action (Atapttau and Nelligaswatta, 2005) and these result agreed with Hussain *et al*. (2018) result when he studied about effect of using citric acid and phytase to improving minerals in diets Contin 30% from corn gluten that using in white carp.

Conclusion

Physical and chemical methods using were effective in removing inhibitor that found in water hyacinth leaves as long as improved nutritional value to the water hyacinth plant and this what confirmed by mentioned previous research and the using of water hyacinth leaves reduced diets cost as result for replacement some of the diet compounds with plant parts cheaply and available from one hand and the other hand solve aggravating environmental problems in Iraq rivers because of water hyacinth spread lately.

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