

## Adding Some of Organic Acids into Feed Common Carp Fish *Cyprinus Carpio L.* and Affecting of Feeding on Coefficient of Digestion and Rates of Growth

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**Abstract.** The study has been done in the Fish Laboratory of the Dep. of Animal Production / Faculty of Agriculture / Tikrit University to exhibit the effect of using prepared fish residue powder enrichment by lactic and formic 1%,2% on coefficient of digestion and rates of growth *Cyprinus carpio L.* This has been given for eighty fish, while the fish has been put in sixteen glass pools each one has five fish. Also, the initial weight had been a  $270 \pm 1.85$ g/fish. In general, fish had been fed for two times a day. In this feed which has been prepared from chemical elements for feeding common carp The T2 and T3 groups had recorded the highest digested coefficient of protein which reached about  $83.36 \pm 0.58$  and  $80.33 \pm 0.47$  respectively, while the digested coefficient of carbohydrate had recorded around  $78.59 \pm 0.95$  and  $76.86 \pm 0.53$  respectively. The indigested coefficient of ash was written down by about  $89.14 \pm 1.28$  and  $87.76 \pm 0.39$  respectively, so these results of T2, T3 are more significant effect than others. Moreover, all experimental groups in the digested fat coefficient were a significant higher compared of the T1 control treatment  $79.46 \pm 0.99$ . The T3 and T5 had recorded the highest rate of weight by around 109.56g and 105.47g respectively, while the T3 group appeared the highest rates of daily growth of 2.17 g/day, relative growth 42.03, and qualitative growth of 0.29 g/day at  $P \leq 0.05$  level compared of others. The current study shows that the abilities of adding lactic and formic acid by about 1%, 2% respectively into feeding fish has had a critical positive effect on coefficient of digestion and without any side effects by using as a source of animal protein into feed common carp fish.

**Keywords.** Common carp, Fish residue powder, Feed, Lactic acid, Formic acid, Digestion factors, Growth rates.

### I. INTRODUCTION

Quantity of given meal, the nourish system, elements that used to prepare Period. provender's and starvation. In addition, the environmental factors, such as temperature, daily period, and addition of marketing feed, have an impact on improving the fish growth, including these chemical products (hormones and antibiotics) [1]. The starting addition of organic acids such as lactic acid and formic to fish residues and the production of organic acid-preserved silage began taking into account the low pH in 1930 [2]. The use of organic acids as additives in fish food has become an important issue in aquaculture where it can Increase the weight, feed conversion and survival rates [3]. [4] showed that these acids are constitute of organic acids and salts, which have a huge attention because they represent a promising addition to the food of aquatic organisms and other animals to improve their performance. These acids may have different mechanisms: intake food and its effect on the digestive system of animals and finally effect on metabolism. Several studies have been conducted to use organic acids in aquaculture such as formic, acetic, propionic, lactic and citric by adding them to the feed of many different types of fish such as iris trout, Atlantic salmon, tilapia, carp and shrimp. The first studies h shown that organic acids have ability to have a positive effect on animal performance when added to diets published more than 30 years ago [5].

Many organic acids are used as feed additives to enrich feed value, reduce disease incidence and change the intestinal microbial availability of aquatic organisms [6,7].

The current study was designed to prepare powders from fish residues and enriched them with acids 1% and 2% and added them in a feed *Cyprinus carpio* L. to improve the properties of digestion coefficient and rates of growth.

## II. MATERIAL AND METHODS

The powders were prepared by cutting of fish residues and mixing with (1, 2) % of lactic and formic acids then it left in incubator for 24 hours Then it ensure proper decomposition . Then it dried in the electric oven at a temperature of 60° C until Obtaining the powder, Then it the feed was prepared after processing the raw materials (wheat, barley, yellow corn, bran, vitamins and minerals). The study had been done in the fish laboratory of the Dep. of Animal Production in the Faculty of Agriculture University Tikrit for 6 weeks where used 16 basins Glass dimensions (40×60×40) cm<sup>7</sup> with ventilation system and filtration through electric air pumps (Rselectrical), and covered by metal mesh to prevent fish jumping. The experiment fish put 80 common carp.

Eighty experimental fish of common carp *Cyprinus carpio* L. were randomly distributed five fish per pool eight of 270±1.85 g/fish. The fish records, such as genetic, nutrition, have known that the fish took from known hatchery fish in the Aweinat area of Salah Addine. The fish transported in cork containers and sterilized using a 3% saline solution for five minutes to ensure rid of pathogens and left four days for preparing before beginning the experiment. The fish was starved for three days to start experimenting.

### • Digestibility and Feeding Experiment

The fish was fed by the feed factories of Erbil province and its chemical composition as described in (table 1), according to [8]. Use Cr<sub>2</sub>O<sub>3</sub> green chromium oxide at 1% of the weight of dry feed as a marker to test the digestion coefficient, feed provided to fish by re-grinding the feed with the addition of chromium oxide by 1% of the weight of the mixture, then add water by (35-40)% of the mixture weight and re-form the finger shape by using an electric meat grinder and leaved to dry .

TABLE 1. Percentage of using materials in fish feeding.

substance	% substance
Yellow corn	30
wheat	30
barley	20
Protein concentration	10
bran	9
Vitamins and minerals	1

### • Measuring Digestion of Coefficient

The fish was daily fed by using the feeding that had prepared till the end of the study. The time feed adding was in the early morning and left it for an hour in order to give fish enough time to eat as much as they can. Next step was to remove the rest of uneaten feeding in the pool by using the mothed siphon, and it was repeated two times. After collecting the amount of rest of uneaten feeding was dried very well in order to account the digestion of coefficient by using format that was mentioned in [10].

$$Y = 0.2089 X + 0.0032$$

Y= Absorption along the wave length (450nm).

X= Chromium oxide concentration mg/100 ml

### Protein digestion coefficient %

$$= 100 - \left( \frac{\text{Cr}^2\text{O}^3 \text{ in food \%}}{\text{Cr}^2\text{O}^3 \text{ in waste \%}} * \frac{\text{protein in waste \%}}{\text{protein in food \%}} \right) * 100$$

$$= 100 - \left( \frac{\text{Cr}^2\text{O}^3 \text{ in food \%}}{\text{Cr}^2\text{O}^3 \text{ in waste \%}} * \frac{\text{Fat in waste \%}}{\text{Fat in food \%}} \right) * 100$$

$$= 100 - \left( \frac{\text{Cr}^2\text{O}^3 \text{ in food \%}}{\text{Cr}^2\text{O}^3 \text{ in waste \%}} * \frac{\text{carbohydrate in waste \%}}{\text{carbohydrate in food \%}} \right) * 100$$

$$= 100 - \left( \frac{\text{Cr}^2\text{O}^3 \text{ in food } \%}{\text{Cr}^2\text{O}^3 \text{ in waste } \%} * \frac{\text{ash in waste } \%}{\text{ash in food } \%} \right) * 100 \quad [11].$$

- *Growth Measurements*

- Total weight gain**

Weight gain rates were calculated by the following law:

$$\text{Weight gain (g)} = \text{final weight (g)} - \text{primary weight (g)}.$$

- Daily rate of growth**

According to the daily growth rate according to the following equation:

$$\text{Daily growth rate g/day} = \text{weight gain (g)} / \text{duration of increase (day)} \quad [12]$$

- Qualitative growth rate**

Estimate the qualitative growth rate according to the following equation:

$$\text{Qualitative growth rate (\% G/Day)} = \frac{\text{Logarithm Final Weight} - \text{Logarithm Primary Weight}}{\text{Trial Duration}} \times 100 \quad [13]$$

- Relative growth rate**

According to the rate of dietary conversion according to the following equation:

$$\text{Relative growth rate \%} = \frac{\text{final weight (g)} - \text{primary weight (g)}}{\text{primary weight (g)}} \times 100 \quad [14]$$

- Efficient food conversion**

The efficiency of food conversion was estimated according to the following equation:

$$\text{Food conversion efficiency \%} = \frac{\text{wet weight gain for fish (g)}}{\text{feed weight provided (g)}} \times 100 \quad [14]$$

- *Statistical Analysis*

[15] Used data analysis to study the impact of different transactions on traits studied on a complete random design (CRD), and compared the moral differences between duncan test averages [16] multiple range test at a probability level ( $P \leq 0.05$ ).

### III. RESULTS AND DISCUSSION

Table 2 represents the digestion coefficient of the control group and the experimental group containing fish waste powder with lactic acid and formic 1% , 2%. The results of T1 and T2 groups show significant increased at level ( $P \leq 0.05$ ) in the value of protein digestion, fat, carbohydrates and ash compared to the control group, where protein digestion did not exceed  $60.76 \pm 0.80\%$  and fat digestion coefficient  $79.46 \pm 0.80\%$ , this may be due to the fact that added organic acids have increased the activity of the pepsin enzyme as well as an increase in nitrogen deposition in the body and an increase in the digestibility of nutrients and the absorption of minerals and thus increased utilization of them [17].

Which lead to increases level of protein digestion and all supplements of digestion of the provender, these results are agreed with the findings [18], which indicated that the addition of some vital supplements in feed of the carp fish has improved growth standards by improving digestion coefficients, [19] found increased ability in digestion of dry matter, fat, copper, zinc, calcium and phosphorus in hamours that fed a diet containing 1% lactic acid compared with control group. the results of current study are agreed with the findings [20], when used fish and chicken powders and

enriched with lactic and hydrochloric acid in common carp fish where digestion rates in experimental feed increased when compared with control group.

**TABLE 2.** Digestion coefficient for experimental provender.

Coefficients	Coefficient of Digestion protein	Coefficient of Digestion lipids	Coefficient of Digestion carbohydrate	Coefficient of Digestion ash
Marketing Provender T1	60.76±0.86 c	79.49±0.99 b	38.99±0.87 c	61.92±0.74 c
feed with fish powder and 1% lactic acid T2	83.36±0.58 a	89.56±1.23 a	78.59±0.95 a	89.14±1.28 a
feed with fish powder and 2% lactic acid T3	80.33±0.47 a	88.80±0.70 a	76.86±0.53 a	87.76±0.39 a
feed with fish powder and 1% formic acid T4	71.9±0.54 b	90.41±1.20 a	9.06±0.83 b	74.71±0.60 b
feed with fish powder and 2% formic acid T5	73.89±0.82 b	93.51±0.75 a	49.17±0.62 b	74.50±0.48 b

Table 3 shows the performance indicators of the growth of common carp fish fed on provender enriched by lactic and formic acid, which shows a significant at level ( $P \leq 0.05$ ) were observed among all groups, T3 revealed high significant than other groups in body weight, rate of daily growth, relative, qualitative growth, and nutritional conversion efficiency of (389.78±1.033 G - 109.56±1.01 g - 2.17±0.16 g/day - 42.03±0.37% - 0.29±0.03 g/day - 59.63±0.79%) Respectively. The results under study agreed with [21] in effect of certain organic acids and organic salt mixtures in indigo tilapia food such as organic acids (malic acid and oxalic acid) combination with two organic acid salts (calcium lactate and sodium filaments) to increased body weight, length, weight gain and growth rate of Nile tilapia compared with control group, and agreed with [22]. Study When used a combination of formic acid, propionic acid and calcium propionate for 60 days, where growth and weight gain rates increased, the total number of red blood cells, hemoglobin content, platelet count and total leukocytes increased significantly compared with control group.[23] also revealed the production of indigo tilapia, striped mullet and African catfish when breeding in earthen ponds for 28 weeks increased food consumption, growth and profit of these basins increased at the end experiment period when it used a multi-acid combination such as formic acid, lactic acid and citric acid when compared to control group that received an acid-free diet.

**TABLE 3.** Some of the growth characteristics of common carp fed on experimental provender.

Groups	Initial weight	Final weight	Increased weight	Daily growth rate	Relative growth rate	Qualitative growth rate	Efficiency Food conversion
Marketing Provender T1	61.82±2.18b	70.04±0.78c	70.52±1.19c	0.9±0.0 c	19.93±07c	0.11±0.03b	20.17±1.03c
feed with fish powder and 1% lactic acid T2	97.61±1.19b	55.16±0.93b	82.75±0.17b	1.60±0.11c	28.29±0.45b	0.17±0.01b	35.52±0.99b
feed with fish powder and 2% lactic acid T3	86.52±1.80b	89.78±1.03a	109.56±1.01a	2.17±0.16a	42.03±0.37 a	0.29±0.03a	59.63±0.79a
feed with fish powder and 1% formic acid T4	76.45±1.41c	30.74±1.08b	81.21±2.06b	1.03±0.08c	27.76±1.05b	0.14±0.06b	31.75±1.10b
feed with fish powder and 2% formic acid T5	75.32±1.09c	31.93±1.12b	81.45±2.17b	1.56±0.10b	27.62±1.11 b	0.12±0.03 b	33.14±1.05b

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