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Using Yeast, Poultry Wastes and Casein to Feed Juveniles of Common Carp (*Cyprinus carpio*)

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Abstract. Juvenile fish of common carp *Cyprinus carpio* were reared in plastic basins of 20 liter capacity. Three types of food were used, a powder of yeast, poultry wastes and powder of casein, for a period of 35 days. Ecological characters of basins water as temperature, oxygen, salinity, and pH were suitable for culture of common carp. The growth rates of fish was calculated. Results indicated that juveniles fed on casein recorded the length, weight, increase by mass, specific growth rate and the relative growth were high than fish fed on yeast powder and poultry wastes.

Introduction

It is well known that global demand for aquatic food resources is increasing rapidly, not only due to population growth, but also preferred healthier food consists of high-quality protein and important nutrients to human health (Abimorad and Carneiro, 2007). There is a great demand for artificial foods which increase the crop of cultured fishes (Catacutan and Pagador, 2004). Fish meal is the main source of protein used in fish food production (Yigit *et al*., 2006 and Glencross *et al.*, 2007). The growing demand, high cost as well as uncertain availability of fish meal led to the alternative sources of food to be used as diets for freshwater and marine fishes (Nyirenda *et al*., 2000). The classification of alternative protein of fish meal derived from plant and animal origin (Glencross *et al*., 2007). The replacement by plant resources such as using powder of rapeseed as substitute for fish meal (Davies *et al*., 1990).

Also fish meal was replaced by soybean in diet of tilapia (Webster *et al.*, 1992). Cotton seed meal also used as an alternative to fish meal (Rinchard *et al*., 2002). while animal protein origin such as powder of turkey used as replacement to fish meal in the diets of Sunshine bass (Muzinic *et al*., 2006)**.**Meat powder and bone were used as a partial substitute in the diets of rainbow trout (Bureau *et al*., 2000). Powder earth worm and worm larvae were used in catfish feeding (Yaqub, 1997).

The aim of this study was to explain the comparison among food items which were used in experiment.

Materials and methods

Juveniles of the common carp were brought from the aquaculture station in the Marine Sciences Center (www.msc-basra.com). The average of total weight was (0.019 g) and the average of total length was (1.3 cm). Plastic basins were used for the experiment of capacity (20 liters) for each one. Three types of food were used, yeast powder, poultry wastes and casein powder. Fish were distributed on basins at the rate of ten fish in each basin in two replicates for each treatment. Experiment terminated in 35 days. Water of each basin was cleaned daily by siphon before and after feeding as 25% from the water per day. Weights and lengths of fish were measured weekly. Water quality as temperature, pH, concentration of dissolved oxygen and salinity, were measured. The equations used here in below for the expression of the growth rates according to (Jobling (1993):

1. Increase in weight (g) = final weight (g) – initial weight (g).
2. Relative growth rate (%) = [final weight (g) / initial weight (g)] X 100.
3. Specific growth rate (% g / day) = [(ln final weight (g) - ln initial weight (g)) / period (day)] X 100.

The statistical program SPSS was used in data analysis, and test LSD (Lest Significant Deference) to test the significant difference between the treatments below the level of confidence 0.05.

Results

Measured water quality as oxygen concentration ranged from 8.40 - 9.12 mg / L, pH ranged between 7.13-8.17, salinity ranged from 1.38 -

1.57 ‰ and temperature of the water ranged from 25-28. Figure (1 and 2) explain that the rates of total length and final weight were obtained from feeding common carp on different food treatments (yeast powder, poultry wastes and casein), it is clear that the fish fed on casein showed highest in growth,than other food treatments.

Table (1) showed the growth rates of juveniles common carp fed on casein significantly different (P <0.05) from the growth rates for the other group fed on yeast powder and poultry wastes.

Table 1. Growth rates of juveniles of common carp fed on different food items.

Food type	Initial weight ~~rate~~ (gm)	Final weight rate (gm) ±s.d	Weight increase (gm) ±s.d	Specific growth rate (% g / day) ±s.d	Relative growth rate (%) ±s.d
yeast	0.019 a	0.483± 0.017 a	0.464± 0.017 a	9.246± 0.104 a	2444.73± 93.04 a
Poultry wastes	0.019 a	0.503± 0.016 a	0.484± 0.016 a	9.359± 0.096 a	2547.36± 89.31 a
casein	0.019 a	0.645± 0.026 b	0.627± 0.024 b	10.076± 0.109 b	3302.62± 130.25 b

The different letters (a,b) means difference is significant at the 0.05 level.

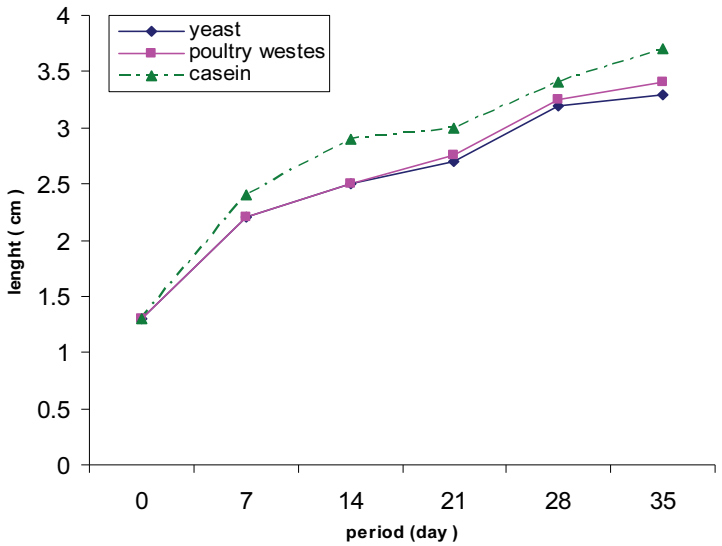

Fig. 1. Rates of total length of juveniles of common carp used in the experiment.

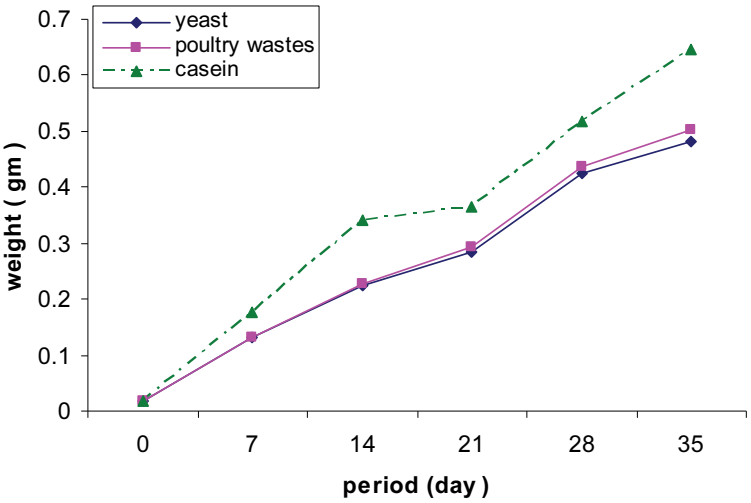

Fig. 2. Weight increase of juveniles of common carp used in the experiment.

Discussion

When fish cultivate in high densities, it requires high quality diets, well-balanced and complete for rapid growth with permanent health. The completed diets applied for all requirements from proteins, fats,carbohydrate, vitamins and minerals for growth and health in fish. Due to the higher expensive of protein than other requirements, therefore it is important to limit the requirements of the protein and amino acid for each species and size from cultured fish (Craig and Helfrich,2002). The results of the present study, the fish feed on yeast powder, poultry waste powder and casein gives final weights, increasing of weights, and specific growth and relative growth, this is due to the availability of essential amino acids which is necessary to build the tissues and increasing the growth of juvenile fish. From these results we noted that the group fed on casein gave high growth with a significant difference ($P < 0.05$) than other diets. Poston (1991) referred to that rainbow trout fry gives high growth, when fed on the casein. Hassan and Das (1993) showed that the waste of meat, innards and bones of poultry are suitable food source for juveniles of indian carp *Labea rohita* (Hamilton). The improvement of growth observed in fish which fed on yeast, was due to the high nutritional value which is rich protein source and vitamin B - complex as well as complex carbohydrates and nucleotides (Oliva - Teles

and Goncalves, 2001 and Li and Gatlin, 2006). In study of juveniles fish Sea bass (*Dicentrarchus labrax*) and the used yeast (*Saccharomyces cerevisae*) at different levels 10, 20, 30, 50% substitute fish meal was found that the rate of 30% did not show any effect on the rate of growth or efficiency of nutrition with marked improvement in food conversion efficiency (Oliva - Teles and Goncalves,2001).

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استعمال الخميرةِ ومخلفات الدواجنِ وبروتينِ الجبن (الكازين) لتغذية يافعات سمك الكارب الشائع (*Cyprinus carpio*)

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المستخلص. تم تحضين يافعات أسماك الكارب الشائع *Cyprinus carpio* في أحواض بلاستيكية سعة ٢٠ لترًا، غذيت على ثلاث أنواع من الأغذية، وهي مسحوق الخميرة، مسحوق مخلفات الدواجن، ومسحوق من الكازين، لمدة ٣٥ يوما. كانت العوامل البيئية لمياه الأحواض كدرجة الحرارة، الأكسجين المذاب، والملوحة، ودرجة الأس الهيدروجيني (pH) ضمن الحدود المثلى لاستزراع الكارب الشائع. تم احتساب معدلات نمو الأسماك إذ أشارت النتائج إلى أن اليافعات التي تغذت على الكازين سجلت أعلى المعدلات في الطول النهائي، والوزن النهائي، والزيادة الوزنية خاصة معدل النمو، والنمو النسبي من الأسماك التي تغذت على مسحوق الخميرة ومخلفات الدواجن.