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Effect of mango leaf meal as supplementary feed on growth of common carp (*Cyprinus carpio*) fingerlings

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Abstract
The present research was conducted for 60 days to assess the Effect of Mango Leaf meal as Supplementary Feed on Growth and Digestibility of *Cyprinus carpio* (Linnaeus, 1758) Fingerlings. Between July and November 2022, this experiment was carried out. Mango leaf meal was added to the basal diet at five different levels to create the experimental diets: T_0 (control), T_1 (5%), T_2, T_3, and T_4, which each replaced an equal amount of the basal diet. The fish were given feed 3% of their body weight once every day. The increased weight gain, percent weight gain, SGR, GCE, and lowest (best) FCR, combined with the enhanced proximate composition and digestibility of different treatments, convincingly indicate the efficacy of mango leaf meal supplemented diet. Growth parameters showed a significant difference ($p<0.05$) in T_3, with weight gain 38.686±0.0352 observed there compared to lowest 31.120±0.2800 in T_0 (control), The highest percent weight (105.491±0.2161), highest SGR (1.200±0.0021), highest GCE (0.398±0.0005), and the best feed use (lowest FCR 2.508±0.0034) were observed in T_3 during the experimental period. Thus, it can be surmised from the above observations that 15% inclusion of mango leaf meal in fish diets can enhance fish development and aquaculture performance.

Keywords: *Cyprinus carpio*, fish, mango leaf meal, *Carica papaya*, Feed ingredients

Introduction
Fisheries is an essential area of food production that ensures the nations nutritional security while also providing a source of income for a substantial portion of the population, particularly the country's fisherman. India provides about 7.7 per cent of global fish production and is the fourth largest exporter of fish products about in the world. India is 3rd largest fish producing and 1st largest Aquaculture nation globally with 14.73 MMT (DOF, India 2020-21) [1].
Contribution of fisheries sector in national GDP was 1.24%. The total fish production during 2019-20 was141.64 lakh tonnes with a contribution of 37.27 lakh tonnes from marine sector and 104.37 lakh tonnes from inland sector (Handbook on Fisheries Statistics, 2020) [2].
Rajasthan has vast and significant water resources (4.23 lakh ha.) for fisheries. But largely underutilized and untapped potential for fish production and livelihood development (Saini, 2017). 4.23 lakh ha water resources are available but fish production was 1.16 lakh tons in 2019-20 (DOF, India 2020-21) [1].
The common carp is native to Europe and Asia, and has been introduced to every part of the world except the poles. They are the third most frequently introduced (fish) species worldwide, and their history as a farmed fish dates back to Roman times. Carp are used as food in many areas, but are also regarded as a pest in several regions due to their ability to out-compete native fish stocks. The original common carp was found in the inland delta of the Danube River about 2000 years ago, and was torpedo-shaped and golden- yellow in colour. It had two pairs of barbels and a mesh-like scale pattern. Although this fish was initially kept as an exploited captive, it was later maintained in large, specially built ponds by the Romans in south- central Europe (verified by the discovery of common carp remains in excavated settlements in the Danube delta area). As aquaculture became a profitable branch of agriculture, efforts were made to farm the animals, and the culture systems soon included spawning and growing ponds. The common carp's native range also extends to the Black Sea, Caspian Sea and Aral Sea.
Mango (*Mangifera indica* L.) ascribed to the family Anacardiaceae has been adjudged as the vital traditionally significant and one of the most economically important tropical fruit crop globally. Mango is an evergreen tree with a lot of traditional medicinal resources apart from its very famous fruits. Mangoes are native to the South and Southeast Asia, and in 2018, the

global production of mangoes (the report includes guavas and mangosteens) was 55.4 million tonnes. The largest mango producing countries are India, China, Thailand, Indonesia, Pakistan, Mexico, Brazil, Bangladesh, Nigeria, and the Philippines. Apart from its economically important portion (fruit), large amounts of crop residues such as leaves, flowers, stem, and bark are generated during pruning, which causes complications of disposal to the farmers. Mango leaves (MLs) are the potential source of minerals, *viz*. nitrogen, potassium, phosphorus, iron, sodium, calcium, magnesium, and vitamins, *viz*. A, B, E, and C. A major bio-macromolecule present in mango leaves is protein. Mango has 93.2 to 171.4 g/kg CP of dry matter. MLs can be utilized as an alternative source of livestock feeding in developing countries for alleviating the food shortage for livestock. Nutritional value of Amrapali has been known by protein content that based on the share of leaves in dry matter yield that correlated with protein content directly.

Material and Methods

This study was conducted for 60 days, from August 2022 to September 2022, at the wet lab of the Department of Aquaculture, College of Fisheries, Udaipur (Rajasthan). For the experiment, 20 FRP tanks with 225-liter capacities were used. A total number of 200 (*Cyprinus carpio*) fingerlings were stocked.

Preparation of basal diet

The basal/control diet was prepared by mixing fish meal, groundnut oil cake, rice bran, wheat flour, vitamins and mineral mixture and vegetable oil in the ratio (60:15:16:5:2:2).

Preparation of experimental diet

The mango leaf meal was added in the basic diet at four different levels i.e. control –T_0 (without mango leaf meal) and treatments: T_1 (5%), T_2 (10%), T_3 (15%), T_4 (20%) replacing equal amount of basal diet.

Table 1: Experimental diet

S. No.	Treatment	Basal diet (%)	Mango leaf meal (%)	Total (%)
1	Control (T_0)	100	0	100
2	T_1	95	5	100
3	T_2	90	10	100
4	T_3	85	15	100
5	T_4	80	20	100

During the experiment, selected water quality parameter (*i.e.* air & water temperature, pH, dissolved oxygen, EC, alkalinity and hardness) were monitored on the initial day and subsequently at an interval of 15 days following APHA (2005) [3]. Each experimental tank's fish weight was measured using an electronic weight balance at the end of each fifteen-day interval. The results were derived using the growth performance metric based on weight and feed, and their values were calculated in accordance with standard procedures:

Weight gain (WG)

Weight gain (WG) = Wight final – Wight initial

Percent weight gain (%WG)

$$\% \text{ WG} = \frac{\text{Wight final} - \text{Wight initial}}{\text{Wight initial}} \times 100$$

Specific Growth Rate (SGR)

$$\text{SGR } \% = \frac{(In\text{Wight final} - In\text{Wight initial})}{D} \times 100$$

Food Conversion Ratio (FCR) formula

$$\text{FCR} = \frac{Weight\ of\ food\ given(g)}{Weight\ gain\ of\ fish(g)}$$

Gross conversion efficiency (GCE)

$$\text{GCE} = \frac{Weight\ gain\ of\ fish(g)}{Weight\ of\ food\ given(g)}$$

The collected data were statistically analysed with the help of statistical package SPSS 16. These data were subjected to the "Duncan's multiple range test" to check the significant differences if any between the means and comparison were made at (p<0.05) level of significance.

Result and Discussion

Papaya leaf meal addition had no impact on the water quality parameters in the tilapia diet. Thus, chosen water quality parameters such as air & water temperature, pH, dissolved oxygen, EC, alkalinity and hardness levels remained nearly the same across all treatments (Table 2).

Table 2: Ranges of water quality parameters during experimental period in different treatments

Parameters	T_0	T_1	T_2	T_3	T_4
Air Temperature (°C)	**26.9-30.1 (28.46)**				
Water Temperature (°C)	25-26.6 (25.77)	25.1-26.5 (25.78)	25.3-26.5 (25.80)	25.3-26.4 (25.83)	25.1-26.5 (25.74)
Electric conductivity (mS/cm)	1.69-1.89 (1.76)	1.71-1.96 (1.83)	1.74-1.91 (1.81)	1.72-1.99 (1.83)	1.71-1.91 (1.83)
pH	7.95-8.43 (8.21)	7.99-8.47 (8.23)	8.07-8.43 (8.23)	8.03-8.50 (8.21)	8-8.43 (8.24)
Dissolved oxygen (mg/l)	5.7-7.6 (6.95)	5-7.5 (6.57)	6.1-7.7 (7.08)	6.4-7.6 (7.02)	5.4-8.1 (6.83)
Total Alkalinity (mg/l)	102-136 (118.54)	108-139 (115.33)	108-132 (118.95)	118-141 (123.33)	112-145 (122.16)
Total Hardness (mg/l)	424-509 (453.39)	423-485 (454.65)	440-480 (464.52)	432-490 (463.49)	427-511 (461.20)

Note: Figure in bracket shows average values

Fish species, the quality of the feed, and environmental factors are only a few of the variables that have a significant impact on fish growth. As part of a current study, various concentrations of mango leaf meal were administered to fish to assess growth and digestibility. The results showed a significant difference between treatments at a 5% level of significance. When mango leaf meal was 15% during the current experiment, T_3 demonstrated the highest growth. The highest net weight gain, percent weight gain, specific growth rate, and gross conversion efficiency were discovered in T3 as

38.686±0.0352, 105.491±0.2161, 1.200±0.0021, and 0.398±0.0005, respectively, and the minimum (excellent) food conversion ratio was discovered in T_3 (2.508±0.0034). Nzeh-Obroh *et al*. (2010) [4] reported that inclusion of 5% *Mangifera indica* leaves extracts showed better growth response of *Oreochromis niloticus* which is similar to current findings.

Table 3: Growth parameters of *Cyprinus carpio* fed with different level of mango leaf meal as supplementary feed in different treatments

Treatments	Net weight gain (g)	Percent weight gain	FCR	SGR	GCE
T_0 (Control)	31.120^{a}±0.2800	85.223^{a}±0.9307	2.822^{d}±0.0246	1.027^{a}±0.0102	0.354^{a}±0.0031
T_1	33.153^{b}±0.3644	91.145^{b}±1.3163	2.727^{c}±0.0321	1.079^{b}±0.0140	0.366^{b}±0.043
T_2	34.820^{c}±0.1126	93.888^{c}±0.6658	2.667^{bc}±0.0097	1.103^{bc}±0.0070	0.366^{b}±0.043
T_3	38.686^{e}±0.0352	105.491^{e}±0.2161	2.508^{a}±0.0034	1.200^{d}±0.0021	0.398^{d}±0.0005
T_4	35.810^{d}±0.6857	96.833^{d}±0.7706	2.650^{b}±0.0168	1.128^{c}±0.0079	0.377^{c}±0.0023

Data expressed as Mean ± SE (n=4)

Mean values in the same column sharing different superscripts are significantly different (p<0.05).

Conclusion

The results and analysis make it clear that adding mango leaf meal to fish diets at a level of 15% boosts fish growth in terms of weight gain, percent weight gain, specific growth rate, feed conversion ratio and gross conversion efficiency ratio in the diet of *Cyprinus carpio* fingerlings. To improve growth performance of common carp fingerlings, mango leaf meal at a rate of 15% is advised for use in aquaculture. For a better conclusion, more research on various species and levels is suggested.

References

1. Dof. Ministry of Fisheries, Animal Husbandry & Dairying, India, 2021. https://www.dof.gov.in/inland-fisheries.
2. Handbook of Fisheries Statistics. Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying. Government of India, New Delhi, 2020, 1-190.
3. APHA, American Public Health Association. Standard Methods for the Examination of Water and Waste water, 18th Ed. Washington DC, 2017, 1268.
4. Nzeh GCA, Obrah IO. Effect of *mangifera indica* leaves extract on growth response of *oreochromis niloticus*. African J Online. 2010;6(2).