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Effect of Dietary *Aloe vera* Extract on Survival, Growth and Hepato-Somatic Index (HSI) Of Common Carp Cyprinus Carpio (Linnaeus, 1758)

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Abstract

Aquaculture practices in Nepal are mainly semi-intensive carp polyculture with an average production of 4.9 t/ha. More than 5,85,000 people directly involved in their livelihood of life, poverty alleviation, and nutritional security. Thus, a study conducted to evaluate the effects of dietary *Aloe Vera* extract on growth performance, feed conversion ratio (FCR), and hepatic-somatic index (HSI) of common carp.90 days feeding trial conducted with fry (1.72±0.041g) of common carp *Cyprinus carpio* L. in glass aquaria (100 l) in a static indoor fish rearing system. The carp fry fed on a pelleted diet containing 40% crude protein source was in five treatments A (0.0%), B (0.2%), C (0.4%), D (0.8%), and E (1.6%), each with three replicates. Each replica contained 15 fries having a total initial weight of 21.45±0.31g, and the carp fed on 3% of body weight and twice daily (09:30 am and 3:30 pm).In the end, a significant difference ($P<0.05$) higher final weight gain, weight gain rate (WGR%), specific growth rate (SGR), and hepatosomatic index (HSI) observed in carp fed with C (0.4%) as compared to other groups. Food conversion ratio (FCR) was minimum in the treated group compared to control. It has concluded that *Aloe vera* dietary extract has a good effect on growth performance, Feed Conversion Ratio (FCR), and Hepato-Somatic Index (HSI) for Common carp *Cyprinus carpio* (Linnaeus, 1758) and C (0.4%) was the best dose for proper growth.

Keywords: *Aloe Vera*; Carp; Feed Conversion Ratio; Growth; Hepatosomatic Index; Nepal

Introduction

Nepal is a small, land-linked country with enormous pressures on available food-producing land, severe rural poverty, protein deficiencies, and overfished natural waters **[1]**. In Nepal, the history of aquaculture is concise, initiated in mid-1940 with indigenous Indian major carp from India and followed in the 1950s with the introduction of the exotic species (Budhathoki, 2018) common carp (*Cyprinus carpio*). The policymakers of Nepal believe that highlands fish farming is entirely unsuitable, unrealistic, and a complete waste of effort and resources. Due to which, poverty, malnutrition, is rampant in Nepal both from a regional and global perspective. The production potentials of cold water aquaculture in highland areas have always ignored. Over the years, carp polyculture in ponds has developed as the most viable and accessible aquaculture production system in Nepal, and 2003/2004 accounted for over 90 percent of total aquaculture production (Shrestha, 2012). The modern aquaculture, along with fisheries practices, contributes 1.32% of Gross Domestic Production (GDP) and 4.22% in Agriculture Gross Domestic Production (AGDP) (DOFD, 2016) **[2]**. Fish production of fiscal year 2016/17 shows that out of 83, 898 metric tons of fish production 25% comes from capture fisheries, whereas 75% from aquaculture **[3]**.

Aloe vera **(Figure 1)** is lance-shaped leaves with jagged edges and sharp points **[4]**. The inner gel of *Aloe vera* is the colorless gel consisting primarily of water and polysaccharides, including pectin, cellulose, hemicellulose, glucomannan, and mannose derivatives **[5]**. The functional component of *Aloe vera* is Acemannan and is composed of a long chain of acetylated mannose **[5]**. Common carp *Cyprinus carpio* is among the most successful cultured finfish species in the world because of its fast growth rate **[6]**. Common carp are having good tolerance to a wide range of environmental conditions and found in over many countries (Zeitler et al. 1984). Lapsi fruits enhance the growth of common carp **[7]**. Improvement of growth parameters following *A. vera* administration in common carp have been reported previously **[8]**. Thus, the current study demonstrated that the inclusion of *A. vera* extracts in common carp *Cyprinus carpio* (Linnaeus, 1758) diet markedly affects

growth performance, feed conversion ratio, and hepatosomatic index.

Figure 1: The plant *Aloe vera* used during the experiment.

Materials and Methods

Fish Sources and Maintenance

Around 1000 juveniles of common carp *Cyprinus carpio* procured from a local hatchery from Fish Super-Zone of Dhanusha District, Nepal. All fish adapted to laboratory conditions before the experiment, and fish fed the regular basal diet. The consult of the Department of Animal Health fish was quarantine by experts and monitored its health status during acclimatization.

Preparation of *Aloe Vera* extract

The fresh plant of *Aloe vera* collected from the local nursery and taxonomic identification done by an expert from the Department of Botany, Nepal. The leaves of *Aloe vera* were collected and washed in sterile distilled water and evacuated from a gel. The leaves were separately shade-dried for 10 days till weight constancy achieved. The *Aloe vera* sample converted into fine powder in an electric blender. The crude extract prepared with the standard method of percolation. For this, chopped dried plant leaves in 80% ethanol percolated for 72 hours. Then, the slurry was filtered with Whatman No. 1 filter paper and centrifuged for 5 min at 3000 g. The filtrate obtained from ethanol using a rotary device, the excess solvent was separated from the extract. These crude extracts stored at 4 °C until use **(Figure 2)**.

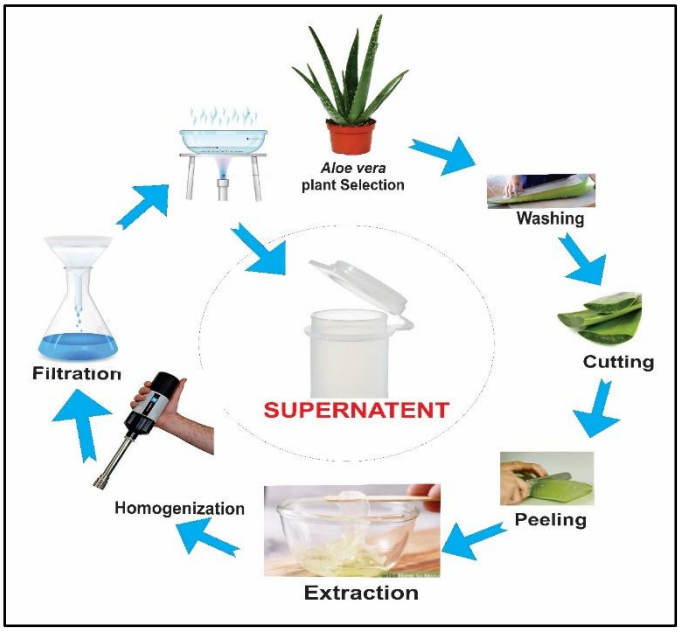

Figure 2: Extraction of *Aloe vera* gel (lab process).

Experimental diets, Rearing, and Sampling

The preparation of the experimental diet was according to the method explained by Labh et al. (2017) **[1]**. Altogether five experimental diets **(Table 1)** were prepared, and basal diet without supplementation of *Aloe vera* was diet A (0.0%) considered as control diet, while other treated diets supplemented with *Aloe vera* was as B (0.2%), C(0.4%), D(0.8%) and E(1.6%). A total of 270juvenile carp(1.43±0.05g) was distributed randomly at the rate of 15 fish per aquarium (30"x24"x 8") into 18glass aquaria equally into triplet form. Fish fed on 3% of body weight twice daily (09:30 am and 3:30 pm) and water quality like temperature (22 to 25 °C), pH (7.9), and dissolved oxygen (5-7 ppm) were monitored daily for 90 days. The present study conducted in Fish Research Lab (27.7172° N, 85.3240° E) of the Department of Zoology at Amrit Campus, Tribhuvan University, Kathmandu, Nepal. Sampling was one very fifteen days, and during specific sampling, the weight (g) of fish recorded using a digital balance. For the hepatosomatic index (HSI), one fish sacrificed from each aquarium and liver of fish collected, weighed on every 15th day after proper dissection.

Ingredients	Experimental diets (% inclusion)				
	A (0%)	B (0.2%)	C (0.4%)	D (0.8)	E (1.6%)
Fish Meal†	29.31	29.31	29.31	29.31	29.31
Soya meal‡	14.52	14.52	14.52	14.52	14.52
Groundnut oil cake†	9.17	9.17	9.17	9.17	9.17
Rice Powder†	13.16	13.16	13.16	13.16	13.16
Wheat Flour†	14.43	14.43	14.43	14.43	14.43
Corn flour†	11.37	11.37	11.37	11.37	11.37
Sunflower oil†	3	3	3	3	3
Cod liver oil†	2	2	2	2	2
Vitamin & Mineral Premix§	1	1	1	1	1
Betain Hydrochloride††	0.02	0.02	0.02	0.02	0.02
BHT(Butylatedhydroxytoluene)††	0.02	0.02	0.02	0.02	0.02
Crude *Aloe vera* Extract	0	0.2	0.4	0.8	1.6
CMC (Carboxymethylcellulose) ††	2	1.8	1.6	1.2	0.4
Total	100	100	100	100	100
Proximate analyses					
Protein, (%DM)	39.87	39.76	39.91	39.64	39.83
Fat, (%DM)	7.68	7.68	7.72	7.83	7.75
Ash, (%DM)	5.63	5.64	5.94	5.32	5.45
NFE, (%DM)♯	47.16	47.16	47.16	47.17	47.18
Energy, (kj/g)♯♯	19.34	19.85	19.35	19.78	19.76

†Ingredients like fish meal, soya meal, groundnut oil cake, rice powder, wheat flour, cornflour, sunflower oil, and Cod Liver Oil procured from the local market of Kathmandu Valley.

‡Ruchi Soya Industries, Raigadh, India.

§Composition of vitamin-mineral mix (EMIX PLUS) (quantity 2.5kg $^{-1}$)

Vitamin A 55,00,000 IU; Vitamin D_3 11,00,000 IU; Vitamin B_2 2,000 mg; Vitamin E 750 mg; Vitamin K 1,000 mg; Vitamin B_6 1,000 mg; Vitamin B_{12} 6 µg; Calcium Pantothenate 2,500 mg; Nicotinamide 10 g; Choline Chloride 150 g; Mn 27,000 mg; I 1,000 mg; Fe 7,500 mg; Zn 5,000 mg; Cu 2,000 mg; Co 450 mg; Ca 500 g; P 300g; L- lysine 10 g; DL-Methionine 10 g; Selenium 50 mgl^{-1}; Selenium 50 mgl^{-1}; Satwari 250 mgl^{-1}; (Lactobacillus 120 million units and Yeast Culture 3000 crore units).

††Himedia Laboratories, Mumbai, India.

♯Nitrogen Free Extract (NFE)=100-(CP+EE+CF+Ash)

Table 1: Feed formulation of five different diets supplemented with *Aloe vera*.

Analysis procedure

Total weight gain, percent weight gain, specific growth rate (SGR), feed conversion ratio (FCR), feed conversion efficiency (FCE), and protein efficiency ratio (PER) and also the hepatosomatic index (HSI) measured following standard formulae and excel worksheet. The calculation was as follows:

Survival Rate (SR %) = (Number of fish survived/Number of fish leased) x 100

Weight gain (WG = Final weight-Initial weight

Weight gain% (%WG) = (final body weight-initial body weight) ×100/initial body weight

Specific growth rate (SGR %) = (LnWt-LnW0) ×100/t; where W0and Wtare the initial and final body weights and t is the culture period in days.

Feed conversion ratio (FCR) = total feed fed (g)/total wet weight gain (g)

Food conversion efficiency (FCE) = Body weight gain (wet wt. (g) x 100/ Feed given (dry wt. (g)

Protein efficiency ratio (PER) = final wet weight gain/protein intake

Hepatosomatic index (HSI) = (liver weight×100)/body weight

Statistical Analysis

Data analysis was using SPSS software version 20 (SPSS, Michigan Avenue, Chicago, IL, USA). The significant difference between treatments was determined using a one-way analysis of variance (ANOVA) followed by Duncan's multiple range test (Duncan, 1955). All data presented in the text, figures, and tables are means ± standard error, and the significance level was $P < 0.05$.

Results

Survival percentage

The mortality parameter of fish in fisheries population dynamics is to account for the loss of fish in a fish stock through death. In this regard, the survival rate of *Cyprinus carpio* monitored every day up to 90 days of feeding trial. The survival rates of fish were all above 90% and showed little difference (P>0.05) among all the treatments. However, cent percent (100%) survival was recorded in C (0.4%) diet-fed group while the survival rate was 97.67±3.18, 94.00±2.31, 94.00±2.32, and 92.67±3.19 in carp fed group A (0.0%), B (0.2%) C (0.4%), D (0.8%) and E (1.6%) respectively **(Figure 3)**.

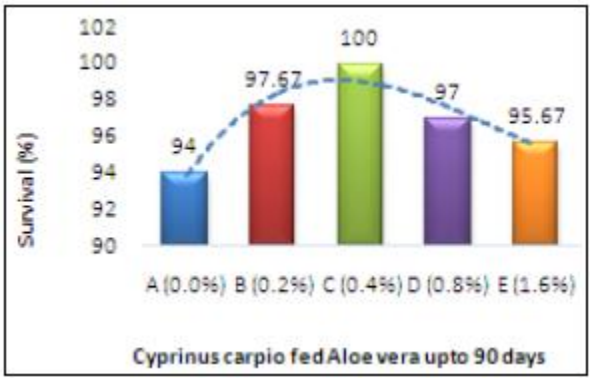

Figure 3: Common carp *C. carpio* fed *Aloe vera* and survival % on 90 days.

Growth Performance

Feeding trial with a dietary supplement of *Aloe vera* on 15th **(Table 2)** day found a change between the weights of the treated group to that of the control diet-fed group **(Table 2)**.

At the beginning of the experiment, no significant (p>0.05) differences were among the treatments of all five groups concerning their weight (1.72±0.041g). But on the 15th day, the percent weight gain was higher 56.23±0.02 in C (0.4%) diet-fed group while it was 13.06±0.03 in control A (0.0%) diet-fed group. Similarly, significant (p<0.05) differences observed in SGR, FCE, and PER, and it was higher0.49±0.47, 0.22±0.05, 0.51±0.35 in fish fed with group C (0.4%) as compared to control. The reverse trend in FCR always indicates better for fish growth, and FCR was a minimum of 4.78±0.15 in C (0.4%) diet-fed group (**(Table 2)**. On 30th **(Table 3)**, 45th **(Table 4)**, 60th **(Table 5)**, 75th **(Table 6)**, and 90th **(Table 7)** days of feeding drastic trial differences in growth of carp observed. However, as the dose of *Aloe ver* increased in the diets growth rate like weight gain, % weight gain, SGR, FCE, and PER always show higher in C (0.4%) diet-fed group as compared to other treated groups **(Table 2 to Table 7)**.

Title	A (0.0%)	B (0.2)%	C (0.4%)	D (0.8%)	E (1.6%)
IW	1.79±0.07	1.73±0.12	1.69±0.67	1.69±0.33	1.71±26
FW	2.027±0.02	2.15±0.03	2.63±0.56	2.62±0.23	2.63±06
WG	0.23±0.13	0.42±0.21	0.94±0.18	0.93±0.18	0.92±02
%WT	13.06±0.03	24.46±0.05	56.23±0.02	55.53±0.13	54.07±21
SGR	0.13±0.32	0.24±0.12	0.49±0.47	0.48±0.29	0.46±0.21
FCR	20.20±0.15	12.71±0.13	4.78±0.15	4.77±0.02	6.35±0.22
FCE	0.05±0.23	0.09±0.03	0.51±0.05	0.21±0.15	0.21±0.62
PER	0.11±0.05	0.22±0.11	0.51±0.35	0.50±0.12	0.49±0.54

Table 2: Common carp C. *carpio* fed Aloe vera and growth parameters studied on 15th days.

Title	A (0.0%)	B (0.2)%	C (0.4%)	D (0.8%)	E (1.6%)
IW	1.79±0.07	1.73±0.12	1.69±0.67	1.69±0.33	1.71±26
FW	2.59±0.18	2.60±0.19	3.09±0.59	2.97±0.42	2.84±0.24
WG	0.80±0.13	0.87±0.31	1.40±0.23	1.27±0.08	1.13±0.58
%WT	44.76±0.25	50.85±0.55	83.34±0.11	75.60±0.97	66.23±0.17
SGR	0.41±0.86	0.45±0.33	0.67±0.74	0.62±0.68	0.56±0.15
FCR	5.76±0.49	5.31±0.17	3.06±0.48	3.37±0.35	3.84±0.07
FCE	0.17±0.82	0.20±0.02	0.32±0.28	0.29±0.31	0.26±0.46
PER	0.41±0.53	0.46±0.06	0.76±0.49	0.69±0.36	0.60±0.26

Table 3: Common carp *C. carpio* fed *Aloe vera* and growth parameters studied on 30th days.

Title	A (0.0%)	B (0.2)%	C (0.4%)	D (0.8%)	E (1.6%)
IW	1.79±0.07	1.73±0.12	1.69±0.67	1.69±0.33	1.71±26
FW	2.90±0.33	3.05±0.69	3.55±0.37	3.32±0.21	3.30±0.26
WG	1.11±0.75	1.27±0.36	1.86±0.11	1.63±0.16	1.588±0.17
%WT	61.77±0.89	73.66±0.14	110.50±0.07	96.45±0.23	92.92±0.12
SGR	0.53±0.91	0.60±0.55	0.82±0.09	0.75±0.38	0.72±0.26
FCR	4.13±0.34	3.59±0.62	2.36±0.78	2.63±0.64	2.74±0.17
FCE	0.24±0.65	0.29±0.39	0.43±0.29	0.38±0.49	0.36±0.18
PER	0.56±0.48	0.67±0.37	1.01±0.39	0.88±0.25	0.85±0.24

Table 4: Common carp *C. carpio* fed *Aloe vera* and growth parameters studied on 45th days.

Title	A (0.0%)	B (0.2)%	C (0.4%)	D (0.8%)	E (1.6%)
IW	1.79±0.07	1.73±0.12	1.69±0.67	1.69±0.33	1.71±26
FW	3.39±0.39	3.45±0.16	4.03±0.29	4.035±0.69	4.05±0.34
WG	7.37±0.64	7.262±0.14	6.24±0.68	6.20±0.24	6.16±0.27
%WT	312.09±0.17	319.52±0.28	269.47±0.14	266.27±0.06	260.07±0.31
SGR	1.57±0.77	1.59±0.25	1.44±0.12	1.44±0.22	1.42±0.43
FCR	2.85±0.32	2.60±0.14	1.89±0.29	1.84±0.24	1.85±0.24
FCE	0.35±0.21	0.39±0.15	0.54±0.09	0.54±0.15	0.56±0.23
PER	0.81±0.69	0.91±0.22	1.27±0.33	1.27±0.11	1.25±0.36

Table 5: Common carp *C. carpio* fed *Aloe vera* and growth parameters studied on 60th days.

Title	A (0.0%)	B (0.2)%	C (0.4%)	D (0.8%)	E (1.6%)
IW	1.79±0.07	1.73±0.12	1.69±0.67	1.69±0.33	1.71±26
FW	4.39±0.19	4.45±0.16	4.37±0.17	4.36±0.28	4.39±0.16
WG	2.60±0.38	2.72±0.73	2.68±0.13	2.67±0.17	2.67±0.65
%WT	145.12±0.02	157.79±0.12	158.90±0.13	157.77±0.11	157.34
SGR	0.95±0.59	1.049±0.47	1.05±0.21	1.049±0.16	1.042±0.42
FCR	1.75±0.12	1.62±0.13	1.61±0.04	1.62±0.14	1.67±0.14
FCE	0.57±0.18	0.62±0.17	0.62±0.11	0.62±0.14	0.61±0.23
PER	1.32±0.31	1.44±0.05	1.45±0.12	1.44±0.12	1.44±0.26

Table 6: Common carp *C. carpio* fed *Aloe vera* and growth parameters studied on 75th days.

Title	A (0.0%)	B (0.2)%	C (0.4%)	D (0.8%)	E (1.6%)
IW	1.79±0.07	1.73±0.12	1.69±0.67	1.69±0.33	1.71±26
FW	4.39±0.19	4.45±0.16	4.37±0.17	4.36±0.28	4.39±0.16
WG	2.60±0.38	2.72±0.73	2.68±0.13	2.67±0.17	2.67±0.65
%WT	145.12±0.02	157.79±0.12	158.90±0.13	157.77±0.11	157.34
SGR	0.95±0.59	1.049±0.47	1.05±0.21	1.049±0.16	1.042±0.42
FCR	1.75±0.12	1.62±0.13	1.61±0.04	1.62±0.14	1.67±0.14
FCE	0.57±0.18	0.62±0.17	0.62±0.11	0.62±0.14	0.61±0.23
PER	1.32±0.31	1.44±0.05	1.45±0.12	1.44±0.12	1.44±0.26

Table 7: Common carp *C. carpio* fed *Aloe vera* and growth parameters studied on 90th days.

The highest weight gain percent was recorded 283.53±0.13 in C (0.4%) diet-fed group on 90th **(Table 7)** days of feeding trial. Similarly, SGR, FCE, and PER were significantly ($p<0.05$) higher1.49±0.13, 1.11±0.31, and 2.59±0.15 in C

(0.4%) diet-fed group on 90th **(Table 7)** days of feeding trial. Better FCR was recorded 0.899±0.03 in C (0.4%) diet group on 90th **(Table 7)** days of feeding trial. It was surprising that the effect of *Aloe vera* supplemented diet was always better as compared to the control diet-fed group. The protein efficiency ratio (PER) was better on the 60thand 90thdays in C (0.4%) diet-fed group of Common carp Table 2 to Table 7.

Hepatosomatic Index (HSI)

The weight of the liver from each treated and control group collected through proper dissection on every 15th day (15th, 30th, 45th, 60th, 75th, and 90th day) up to 90 days **(Figure 2)**. The HSI level was significantly ($P < 0.05$) high (0.981±0.43) on the 60thday of feeding trial in fish fed with C (0.4%) diet followed by 75th (0.957±0.27) and 90th (0.885±0.57). However, at the beginning of feeding trial on first 15th day HSI level was minimum (0.173±0.14) due to least growth in the liver, a similar result was on 30th day (0.271±0.17), but 45th-day hepatosomatic index level was increasing (0.467±0.14) as the dose of *Aloe vera* increased in the diet **(Figure 4)**. Finally, C (0.4%) diet-fed group exhibit better HSI levels during the entire feeding trial.

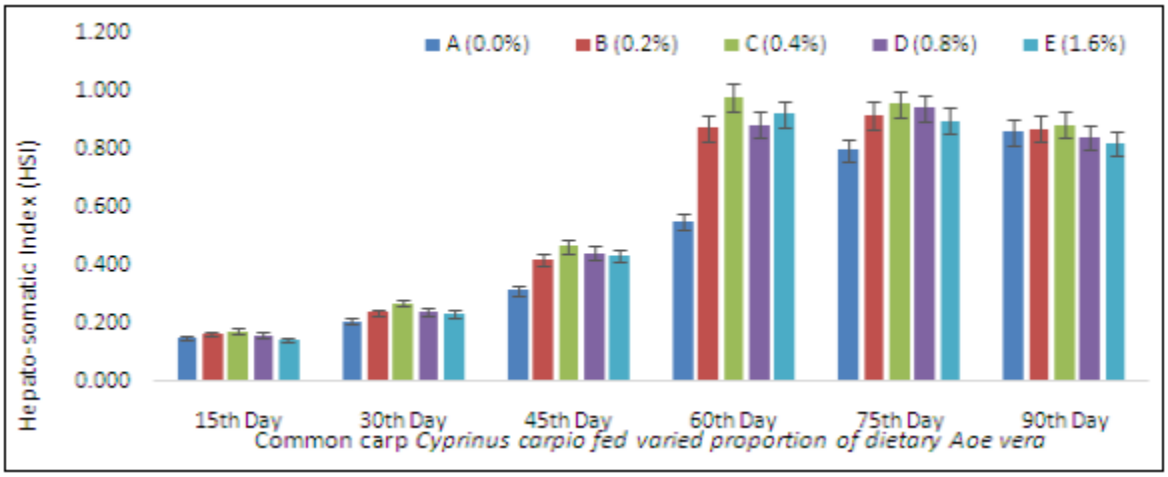

Figure 4: Hepatosomatic Index (HIS) level in Common carp *C. carpio* fed *Aloe vera* up to 90 days of feeding trials.

Discussion

Medicinal plants are as old as civilization, and as popular folk medicine because of their broad-spectrum medicinal properties **[9]**. The attempt to adopt them in aquaculture is a new development that got colossal attention virtually in every part of the globe, with Asia having the most researched herbs (Bulfon et al., 2013). Recently, *Aloe vera* serves as an alternative growth promoter, anti-stressor, immunostimulant, appetizer, and digestion stimulant in fish farming **[10]**. In this experiment, the cent-percent survival rate recorded in 0.4% dietary supplementation as compared to control and another treated group. Similar results observed by different medicinal fruits and leaves explained by different authors **[11, 12]**.

The beneficial effects of *A. vera* extract seem to be dose-dependent, as shown in our results, increasing the *A. vera* extract in the diet up to a specific concentration C (0.4%), causes increasing weight gain, SGR FCE and PER level while decreasing the food conversion ratio (FCR)as compared to control diet-fed group. Many workers have estimated the FCR values of various fish feed ingredients for *Cyprinus carpio* under controlled conditions **[13]**. Jhingran (1991) **[14]**. The trend of correlation between FCR and average body weight recorded in the present study matches the results given by Faturoti (1989) **[15]**, who reported that feed intake, protein intake, and FCR found positively correlated with average weight gain. Contradictory results observed by Shabir et al. (2003). They observed that the correlation between average body weight and FCR values was significant and negative in the case of wheat bran, whereas in the case of sunflower meal and maize gluten, the correlation was nonsignificant and negative. Similar results also observed by Seema et al. (2002), who observed that the correlation between average body weight and FCR values was non-significant and negative in the case of three ingredients viz. rice polish and maize oil cake.

Several studies have conducted about the usage of medical plant extracts as prophylactic products as a result of their usage as a feed additive in the general animal products and aquaculture, of increase in the growth, and achievement of positive results **[16, 17]**. Chi et al. (2014) **[11]** reported the growth stimulation capacity of a medicinal plant, *Dryopteris crassirhizoma*, as a food additive in grass carp. Farahi et al. (2012) **[18]** showed that aloe vera (10 g kg-1 of diet) and *Melissa officinalis* did not affect growth performance in *O. mykiss*. In Goldfish, *Carassius auratus* maximum specific growth rate and weight gain recorded in fish fed with diet containing 0.5 g kg-1 aloe vera **[19]**.

Common carp fed Aloe vera supplemented diet at different doses, and the hepatosomatic index (HIS) evaluated on every

15th day of sampling up to 90 days. HSI level found increased as the dose of Aloe vera increased in the diets. Similar results observed by different researchers and believed that the hepatosomatic index (HSI) in the liver of fish could be a good indicator of fish growth **[20]**. The use of medicinal plants in fishes in this field is new, and it has reported in a study conducted among channel catfishes that a type of oregano (*Origanum heracleoticum* L.) decreased HSI and VSI amounts **[16]**. In the same study, a decrease in HSI amount in parallel with the VSI amount might result from oregano's effect in reducing liver fat. The decrease in HSI amount acquired through the use of (*Quillaja saponin*, Astragalus radix + *Lonicera japonica*, and green tea) in different studies carried out among fishes [**21]**. The effects of the fig (*Ficus carica*) extract and onion (*Allium cepa*) extract addition to *Cyprinus carpio* feeds in the different amounts on the growth performance carried out by Cho et al., 2007) **[22]**.

Similar results observed in common carp, *Cyprinus carpio*, **[17]**; guppy, *Poecilia reticulate* **[23]**; convict cichlid, *Cryptoheros nigrofasciatus*, **[24]**; red seabream, *Pagrus major*, **[25]**; olive flounder, *Paralichthys olivaceus*, **[26]**; the Nile tilapia, *Oreochromis niloticus*, **[27]**; tilapia, *O. aureus*, **[28]**; rainbow trout, *Oncorhynchus mykiss* **[29, 30]**; and zander, *Sander lucioperca* **[31]** in which fish fed diets supplemented with plants. The extract of *A. officinalis* demonstrated to be potentially helpful in treating inflammation and enhances immunity in fishes **[32-35]**. Hence, the increase of HSI may be related to the weight gain in the fish liver due to increased dietary level of *Aloe vera* (Wilson, 1994).

Conclusion

In conclusion, the present study suggests that survival %, weight gain, %weight gain, specific growth rate (SGR), feed conversion efficiency (FCE), and protein efficiency ratio (PER) improves as the dose of dietary *Aloe vera* increased in the diet for carp culture. The feed conversion ratio (FCR) is an appropriate way to judge the acceptability and suitability of artificial feed for fish. The information of FCR on locally available ingredients may provide the basis to develop acceptable fish feed. Feed conversion ratio (FCR) always performs better results (lower in treated group) when fish fed 0.04% *aloe vera* in the diet. Finally, the hepatosomatic index (HSI) is the main factor for fish growth, and in this experiment, dietary *Aloe vera* increased the weight of the liver as compared to the control group. Finally, *Aloe vera*0.04% supplemented in the fish diets would be better for the fish farmer to produce healthy fish. Finally, the results of this study lead to the conclusion that *Aloe ver* supplemented diet is a more suitable and acceptable ingredient than other fruits for the better growth of fingerlings of Common carp, and this ingredient can include in the diet of the fish.

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Author Contribution Statement

Shyam Narayan Labh: Conceived and designed the experiments; performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools, or data; Wrote the paper.

Sirjana Lamichhane: Performed the experiments; Analyzed and interpreted the data; wrote the paper.

Munu Khanal: Conceived and designed the experiments; Performed 305 the experiments; Contributed reagents, materials, analysis tools, or data; Wrote the paper.

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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