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COMPARATIVE GROWTH PERFORMANCE AND ECONOMIC EFFICIENCY OF INDIGENOUS ASEEL VARIETIES FED ON DIFFERENT DIETARY LYSINE REGIMENS

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ABSTRACT

This study was planned to investigate the growth performance and economic efficiency of Lakha, Mianwali, Mushki and Peshawari varieties of Indigenous Aseel Chicken. For this purpose, 240 day old Aseel chicks 60 from each variety were selected and kept under randomized complete block design having factorial arrangement of 20 replicates with one bird in each [4(varieties)×3(lysine regimens)×20(replicates)=240]. Each of the 20 birds from four varieties were fed on lysine regimens containing 1.3 % lysine (L1) for 6 weeks, 1.4% and 1.2 % (L2) each for 3 weeks and 1.5%, 1.3%, 1.1% lysine (L3) each for subsequent 2 weeks. Data regarding different growth parameters were collected and analyzed by ANOVA technique while Duncan's Multiple Range (DMR) Test was applied to compare the treatment means. The economic efficiency was also calculated. Significant ($P<0.05$) differences were observed in body weight, weight gain, FCR and feed efficiency (FE) of birds fed with L3 lysine regimen while the overall growth performance was better in Mushki variety of Aseel. The current study revealed that Mushki Aseel should be preferred in terms of its better growth performance while Lysine is better to be fed in L3 regimen.

Key words: Lysine regimens, Aseel varieties, Growth, Livability and Economic efficiency.

INTRODUCTION

The indigenous poultry genotypes comprise of 80-99 % of the total poultry populations in developing countries and are mostly being maintained in villages (Batool, 2017). The rural poultry has a significant role in total meat and egg production in countries like Pakistan and is sharing about 15 and 32%, respectively (PARC, 2017). The indigenous poultry birds, Aseel has a great historic importance as being ancestor of certain breeds like Cornish (male line of broiler parent) and the major pioneer of "Indian Game" (Panda and Mahapatra, 1989; Platt, 1925). It has been mostly maintained for cock-fighting due to its inherent pugnacious nature. (Khan, 2004; Rao and Preetem, 2009). Aseel has marvelous gait, robustness, resistivity to diseases making it an unvulnourable breed to survive in drastic climatic zones (Rao and Preetem, 2009; Usman *et al*, 2014). In spite of all these good characteristics, Aseel chicken has poor growth and productive potential (Chaudhry, 1965; Yaqoob, 1965) yet, there is substantial dwelling to make it a more valued and profitable breed through better house management and feeding program as was adopted for free-ranged broilers to gain the maximum efficiency (Pinheiro *et al*., 2011).Among different feeding programs, phase-feeding is an impressive strategy which fulfills the bird's feeding requirement and desire according to its growth avoiding over supply of feed ingredient(s), therefore, providing the double advantage of profit of low feed consumption and its better efficiency due to increased growth (Abbas *et al*., 2016). Usually with the progress of age, the dietary protein requirements are decreased, whereas, energy requirements are increased (Plavnik *et al*., 1997). As a consequence, the optimal period for altering the feeding requirement is of monetary value as was reported by Walkins *et al.* (1993). Therefore, multiphase feeding with supplementation of amino acid(s) is more efficient and better to optimize the growth. The supplementation of lysine amino acid is vital in this admiration as it contributes 7% to the breast meat protein of poultry birds and being used as a reference for other fundamental amino acids (Dozier *et al*., 2007; Eits *et al*., 2003; Farkhoy *et al*., 2012). Aseel is also a meat type bird and has high ultimate body weight. It possess the variable growth pattern in different stages of the life therefore, its supplement requirement might shift with age. The initial growth performance of Aseel is poor that affected the worth of this birddue to high rearing cost. Therefore, the present study was planned with the objectives to optimize initial growth and economic efficiency in varieties of indigenous Aseel chicken.

MATERIALS AND METHODS

A trial was executed to assess the comparative growth and economic efficiency in Mianwali Mushki, Lakha, and Peshawari varieties of Indigenous Aseel Chicken. Mianwali (Origin Mianwali, Pakistan) variety has somewhat chocolate brown plumage shading with dark circles, pea comb, and little in stature.

Mushkiknown as “Siyah” was made by the Nawab (ruler) of Rampur, has dark black plumage, pea comb, white eyes, white or yellow shanks, spurs and nails. Lakha variety commonly known as “Cheena” having white dots on the head and plumage with pea-comb (Ahmad *et al.,* 2013). Peshawari variety (origin is Peshawar, Pakistan), has dull brown neck with light plumage shading and pea-comb.For this trial, 240 day-old Aseel chicks including 60 from each of, Lakha, Mianwali, Mushki and Peshawari varieties were randomly picked up from the available stock. These birds were kept under factorial arrangement of 4(varieties) × 3(lysine regimens) × 20 birds (replicates), each replicate having one bird in it. The birds of each variety were further divided into three equal sub-groups on the basis of lysine regimens, L1, L2 and L3 as they were fed on three various lysine regimens containing lysine 1.3 % (L1), 1.4% and 1.2 % (L2) and 1.5, 1.3 and 1.1% (L3). In L1 lysine regimen 1.3% lysine was supplemented for 6 weeks (42 days in one phase), while, in L2 1.4% and 1.2% each for 3 subsequent weeks (21+21days in two phases), whereas, 1.5%, 1.3%, 1.1% each was supplemented for 2 subsequent weeks (14+14+14 days in three phases) in L3 lysine regimen (The composition of ingredients and nutrients of various lysine levels/regimens is mentioned in Table 1). The basic aim of this lysine supplementation in phases, was to provide the lysine as per growth requirement/pattern of the bird. The Aseel birds were placed in blocks with randomized complete block design (RCBD) in well ventilated and illuminated house under optimal management conditions. The growth performance parameters including weekly body weight (g), weight gain (g), feed intake (g), feed conversion ratio, folds of increase, feed efficiency and livability (%) were calculated while economic efficiency of Aseel birds was also noted. Data were analyzed according to Steel *et al.* (1997) through Analysis of Variance (as a statistical tool because there were more than two treatment groups i.e., dietary lysine regimens, Aseel varieties and the interactions among dietary lysine regimens and Aseel varieties as main effects) using SAS(2002-03) software, while comparisons of treatment means were made by using Duncan’s Multiple Range (DMR) test (Duncan, 1955).

RESULTS AND DISCUSSION

Feed intake (g): Significant ($P<0.05$) differences were observed in cumulative feed intake (g) among various lysine regimens and L3 (1.5-1.3-1.1% lysine) indicated more feed intake (g) than L2 (1.4-1.2 % lysine) and L1 (1.3 % lysine) regimen (Table 2). Non-significant ($P>0.05$) differences in feed intake were observed among the four varieties. However, interactions among lysine regimens and varieties revealed Mushki variety to be a better feed consumer with in L3 lysine regimen than the other varieties and lysine regimens (Table 2). The weekly feed intake also showed an increasing trend. The maximum feed intake (g) in 1.5-1.3-1.1% (L3) lysine regimen may be due to the improved growth level which might be attributed to the supply of the optimum dietary lysine as per developmental requirement of the bird. A decreased trend in protein need with increasing age was reported by Abdel Majeed (2012).The similar results of feed/protein intake were also reported by Attia *et al.* (2012) in Japanese quails during their growing age (1st-6th week) and also by Gheisari *et al*. (2011) in the rearing phase (15th-28th week) of Japanese quails. Among different varieties and strains the differences in feed intake might be attributed to the genomic diversity with variable lysine requirements as was reported by Mehmood *et al*. (2012). Jatoi *et al.* (2012, 2014) working separately on Japanese quails and Aseel chicken varieties, reported that the varying trend in feed intake was due to genetic effect of the strains and varieties on feed intake. According to Oliveira *et al*. (2013), when broilers were given the diets containing adjusted lysine ratios obtained through corn and soybean meal sources, they showed a straight relationship between feed intake and lysine levels. However, according to Sterling *et al*. (2005), the feed intake was increased during 7th to 17th day of age, parallel with increase of lysine and CP levels, respectively. The variations in feed intake containing various lysine ratios obtained through various protein sources or through industrial amino acids were related with the strength of the decrease in CP and other amino acid ratios (Gonzales, 2002). The results of the following study are in coherence with the findings of Abbas *et al.* (2016) on Japanese quails where, they reported a significantly highest feed intake in local-1 CBS in 3-phase feeding regimen when interaction between lysine regimens and CBS were considered.

Body Weight (g): Significant ($P<0.05$) differences were observed in body weight (g) among various dietary lysine regimens as well as with in varieties and L3 showed highest body weight (g) followed by L2 and L1 lysine regimen. Among varieties, the mean body weight (g) of Mushki variety was greater than Lakha, Mianwali and Peshawari (Table 2). Jatoi *et al.* (2014) also reported the Mushki variety as the heaviest weight among the Lakha, Mianwali and Peshawari varieties. According to Chambers (1990) the variance in growth pattern of different breeds may be due to the interaction of multiple alleles and could be improved by genomic assortment. Jatoi *et al.* (2012) and Akram *et al*. (2014) also indicated the similar strain variations in body weight gain among Japanese quails. The weekly body weight also showed an increasing trend. As far as, interactions among lysine regimens and varieties are concerned, Lakha showed a significantly ($P<0.05$) higher body weight (g) with L3 lysine regimen than the other said varieties and lysine regimens (Table 2). It was reported that the differences in body weight among varieties or strains may be due the substantial impact of genetic group (Chatterjee *et al.*, 2007; Devi and Reddy, 2005; Mohammed *et al.*,2005). The significant differences of body weights in the following study may be attributed to the provision of optimal levels of dietary lysine harmonious with bird's growth pattern. Similar increase in body weight (g) was made known by Abbas *et al.* (2016) in their study on Japanese quails fed with different lysine regimens where, highest body weight was observed in 3 phase feeding lysine regimen. Mehmood *et al.* (2012) also displayed the improved body weight in broilers fed under 4-phase feeding regimen. Eits *et al.* (2003) reported the progressive increase in body weight when high CP or ideal protein grades were added in sequential phases.

Body Weight gain (g): Significant (P<0.05) differences in body weight gain (g) were observed both in lysine regimens and varieties. L3 indicated highest body weight gain followed by L2 and L1 lysine regimens. However, the mean body weight gain (g) of Mushki was greater than Lakha, Mianwali and Peshawari varieties (Table 2). The weekly body weight gain is shown in Figure 1. As far as, the interactions among lysine regimens and varieties are considered, Lakha variety depicted a significantly (P<0.05) higher body weight gain (g) with L3 lysine regimen than the other said varieties and regimens (Table 2). This escalation in weight gain might be owed to the fulfilment of bird's lysine need rightly at the time when required and is parallel in lines with the work of Abbas *et al.* (2016) who reported the maximum weight gain in local-3 CBS fed with 3-phase lysine regimen and revealed that increase in weight gain with the treatment effect. In another study by Oliveira *et al.* (2013), it was shown that when digestible lysine levels were changed in bird's diet by varying proportions of corn and soybean meal, a better weight gain and feed conversion was obtained. According to the findings of Mehmood *et al*. (2012), the improved body weight (g) was obtained from broilers when fed under 4-phase feeding program. Eits *et al*. (2003) also reported the increase in body weight gain when feed with high CP or protein grades was offered in continuous phase.

Folds of increase: Significant (P<0.05) differences were shown among lysine regimens and varieties in folds of increase with respect to body weight (g) of the previous week of Aseel birds (Table 3). The birds fed on lysine regimen L3 indicated higher folds of increase in body weight than L2 and L1 lysine regimens. Among varieties, the folds of increase in body weight was significantly higher in Mushki than Lakha, Mianwali and Peshawari varieties. The weekly folds of increase with respect to the previous week also showed an irregular trend and when the interactions among lysine regimens and four varieties are considered, Mushki variety showed a significantly (P<0.05) better folds of increase in body weight with L3 lysine regimen than the other varieties and regimens (Table 3). Present results might be due to the fulfilment of the lysine need of the bird rightly at the time when required and are in agreement with the results of Abbas *et al.* (2016). They showed that higher folds of increase in various CBS of Japanese quails fed on three-phase feeding program. Sahota *et al.* (2012) in their findings, also showed the maximum body weight in four-phase feeding regimen. The findings of Dozier *et al.* (2008) also indicated the lysine requirement of 0.85% (total basis) based on NRC. (1994) to be insufficient for growth from 6^{th}-8^{th} week of age for Ross x Ross 708 broilers.

Feed Conversion Ratio (FCR): Significant (P<0.05) differences were observed in mean feed conversion ratio among lysine regimens, whereas, the birds fed on lysine regimen L3 specified best FCR followed by L2 and L1 (Table 3). Non-significant(P>0.05) differences in FCR were noted among Aseel varieties (Table 3). The weekly FCR showed an inconsistent trend (Fig. 2). The better FCR (performance of feed) in L3 lysine regimen may be due to better growth rate which intern is attributed to the supply of the optimum dietary lysine levels as per developmental requirement of the birds which resulted in the better performance of the birds. Abbas *et al*. (2016) also reported the improved FCR of Japanese quails in three-phase feeding lysine regimen. They also reported the significantly higher FCR in local-3 CBS in terms of its interaction with lysine regimens and similar results were also reported in Japanese quails during 0-3 weeks of age where improved FCR was observed when the birds were provided with feed manipulated in dietary CP level (Kaur *et al*., 2008). Jatoi *et al.* (2014) reported the significant (P<0.05) variation in mean FCR at 1^{st}, 4^{th}, 5^{th}, 8^{th}, 9^{th}, 11^{th} and 12^{th} weeks of age in four varieties of Aseel chicken might be due to the genetic effect among the different strains and varieties. Akram *et al*. (2014) also reported the impact of strain and varieties on FCR in Japanese quails.

Feed Efficiency (FE): Mean six weeks feed efficiency of the Aseel birds showed a significant (P<0.05) difference in lysine regimens, the birds fed on lysine regimen L3 showed highest feed efficiency followed by L2 and L1. However, non-significant (P>0.05) differences in feed efficiency were observed among the varieties (Table 3). The weekly feed efficiency showed an erratic trend (Fig. 3). In terms of interaction among Lysine and Aseel varieties Lakha variety showed the better feed efficiency than other varieties and lysine regimens (Table 3). The better feed efficiency in L3 lysine regimen may be due to the increased growth rate which intern is attributed to the endowment of optimum dietary lysine levels as per developmental requirement of the bird with more efficacy (Batool *et al*, 2017). Abbas *et al.* (2016) depicted the same sort of results in their study on Japanese quails and reported that three-phase lysine regimen was better with respect to feed efficiency than two and one-phase, however, Mehmood *et al*. (2012) described that broilers could have improved feed efficiency when reared in four-phase feeding system.

Livability Percent (%): Mean livability (%) of six weeks among Aseel birds was not significantly (P>0.05) different within lysine levels as well as within varieties. In terms of interaction among Lysine regimens and Aseel varieties, Mushki and Peshawari varieties showed 100% livability with lysine regimen L3 conversely, Lakha variety showed the maximum livability (%) with both L1 and L2 lysine regimens (Table 3). The weekly trend among Aseel birds showed an increase in first two weeks and then a consistent stability in livability (%) in next three weeks (Fig. 4). It has been reported that protein synthesis and immune responses were decreased in chicken taking lysine deficient diets which resulted in more morbidity and mortality due to increased infection (Kidd *et al*., 1997; Konashi *et al*., 2000). Moreover, Chen *et al*. (2003) had also proved that if the dietary lysine was inadequately taken by chicken, this may lead to decreased antibody responses and cell mediated immunity resulting in mortality of birds. The better livability (%) and decreased mortality in the present study may be attributed with the fulfilment of lysine requirement at a particular age and the genetic impact of the varieties or strains. Abbas *et al*. (2016) reported the complementary results of mortality (%) in their work on Japanese quails fed with different dietary lysine regimens.

Economic Impact/Benefit: The highest profit 12.88 (%) per chick was noted in L3 (1.5-1.3-1.1%) lysine regimen followed by 6.79 (%) in L2 (1.4-1.2 %) and 2.10 (%) in L1 (1.3%) lysine regimen (Table 4). The birds fed on L3 lysine regimen consumed more feed and lead to greater body weight in terms of meat so, more profit or income than those fed on L2 and L1 lysine regimens. The higher body weight/meat and economic efficiency of birds fed on L3 lysine regimen may be accredited to the fulfilment of bird's nutrient requirement and lysine deposition which changed the protein profile of the bird and resulted in increased lean meat. The findings of this study are in agreement with the results of Abbas *et al.* (2016) on Japanese quails wherein, they had reported the best economic efficiency of Japanese quails in three-phase feeding lysine regimen. Lomeli *et al.* (2009) also reported the increased CP diet *i.e*. 24% in 1st fourteen days of age and then 21% CP diet in later stages saved protein expenditure in Japanese quails.

Table 1:Chemical composition of experimental diets.

Ingredients	Dietary lysine levels (%)				
	1.1	1.2	1.3	1.4	1.5
Corn	59.08	59.08	59.08	59.08	59.08
Sunflower Meal (24%)	18.9	18.9	18.9	18.9	18.9
Soya bean Meal (44%)	7.04	7.04	7.04	7.04	7.04
Rapeseed Meal	3	3	3	3	3
Fish Meal (52%)	3	3	3	3	3
Poultry by-product Meal	3	3	3	3	3
Molasses	3	3	3	3	3
Limestone	1.14	1.14	1.14	1.14	1.14
Lysine Sulphate	0.7	0.9	1.1	1.3	1.5
Mono Calcium Phosphate	0.45	0.45	0.45	0.45	0.45
Vitamin-Mineral Premix*	0.2	0.2	0.2	0.2	0.2
Sodium Chloride	0.18	0.18	0.18	0.18	0.18
Alimet (Novus)	0.17	0.17	0.17	0.17	0.17
Betaine HCl	0.05	0.05	0.05	0.05	0.05
Threonine	0.04	0.04	0.04	0.04	0.04

*Vit-Min premix supplied per 1 kg of diet: Vit. A 12000 IU; Vit. D3 2200 ICU; Vit. E 10 mg; Vit. K 32 mg; Vit. B1 1 mg; Vit. B2 4 mg; Vit. B6 1.5 mg; Vit. B12 10 µg; nicotinic acid 20 mg; folic acid 1 mg; pantothenic acid 10 mg; biotin 50 µg; choline chloride 500 mg; copper 10 iron 30 mg; manganese 55 mg; zinc 50 mg; iodine 1 mg; selenium 0.1 mg.

Calculated values of nutrients:

Nutrients (%)	Dietary lysine level %				
	1.1	1.2	1.3	1.4	1.5
Metabolize Energy(k calories/kg)	2746.99	2753.69	2760.39	2767.09	2773.79
Dry Matter	87.17	87.36	87.56	87.76	87.96
Crude Protein	17.06	17.18	17.29	17.40	17.51
Crude Fiber	6.93	6.93	6.93	6.93	6.93
Ash	4.09	4.09	4.09	4.09	4.09
Either Extract	3.59	3.59	3.59	3.59	3.59
Calcium	0.84	0.84	0.84	0.84	0.84
Chloride	0.22	0.22	0.22	0.22	0.22
Sodium	0.16	0.16	0.16	0.16	0.16
Total phosphorus	0.68	0.68	0.68	0.68	0.68
Potassium	0.71	0.71	0.71	0.71	0.71
Digestible phosphorus	0.36	0.36	0.36	0.36	0.36
Linoleic Acid	1.42	1.42	1.42	1.42	1.42
Lysine	1.1	1.2	1.3	1.4	1.5
Methionine	0.45	0.45	0.45	0.45	0.45
Methionine+Cystine	0.78	0.78	0.78	0.78	0.78
Digestible Arginine	0.98	0.98	0.98	0.98	0.98
Digestible Tryptophan	0.14	0.14	0.14	0.14	0.14
Digestible Threonine	0.57	0.57	0.57	0.57	0.57
Digestible Lysine	0.99	1.09	1.20	1.31	1.41
Digestible methionine	0.42	0.42	0.42	0.42	0.42
Digestible Methionine + Cystine	0.67	0.67	0.67	0.67	0.67
Threonine	0.67	0.67	0.67	0.67	0.67
Tryptophan	0.19	0.19	0.19	0.19	0.19
Arginine	1.10	1.10	1.10	1.10	1.10
Cystine	0.32	0.32	0.32	0.32	0.32
Digestible Cystine	0.26	0.26	0.26	0.26	0.26
Valine	0.82	0.82	0.82	0.82	0.82
Digestible Valine	0.71	0.71	0.71	0.71	0.71
Histidine	0.43	0.43	0.43	0.43	0.43
Digestible Histidine	0.37	0.37	0.37	0.37	0.37
Phenylalanine	0.78	0.78	0.78	0.78	0.78
Digestible Phenylalanine	0.67	0.67	0.67	0.67	0.67
Leucine	1.44	1.44	1.44	1.44	1.44
Digestible Leucine	1.21	1.21	1.21	1.21	1.21
Isoleucine	0.66	0.66	0.66	0.66	0.66
Digestible Isoleucine	0.58	0.58	0.58	0.58	0.58

Table 2. Feed intake, Body weight and Weight gain in varieties of indigenous Aseel fed on different dietary lysine regimens for six week of initial growth period.

Parameters / Treatment	Feed intake	Body Weight	Weight gain
	--------------------(g)---------------------		
Lysine Levels (%)/Regimens			
1.3 (L1)	1196.05±11.59^{b}	366.06±3.95^{c}	336.39±3.98^{c}
1.4-1.2 (L2)	1198.76±12.45^{b}	383.05±4.39^{b}	352.15±4.35^{b}
1.5-1.3-1.1 (L3)	1234.34±11.99^{a}	409.59±4.62^{a}	379.25±4.68^{a}
Varieties			
Lakha	1208.52±14.03	384.57±6.00^{b}	354.05±6.05^{b}
Mianwali	1211.95±14.53	383.47±6.07^{b}	353.73±5.98^{b}
Mushki	1225.83±14.52	402.23±3.88^{a}	372.15±3.83^{a}

Peshawari		1192.57±12.88	374.67±5.24^{b}	343.78±5.32^{b}
Lysine Levels (%)/Regimens × Varieties				
1.3(L1)	Lakha	1167.45±20.89^{bc}	356.25±7.19^{f}	325.15±7.33^{f}
	Mianwali	1178.80±24.95^{bc}	352.00±8.34^{f}	325.00±8.58^{f}
	Mushki	1214.30±24.56^{abc}	385.70±6.36^{cde}	357.10±6.31^{cde}
	Peshawari	1223.65±21.38^{abc}	370.30±7.81^{ef}	338.30±7.75^{ef}
1.4-1.2(L2)	Lakha	1224.55±20.85^{abc}	375.90±8.98^{def}	345.00±8.90^{def}
	Mianwali	1217.85±26.80^{abc}	394.65±8.74^{bcde}	363.60±8.50^{bcd}
	Mushki	1203.65±26.88^{abc}	405.10±5.36^{abc}	373.85±5.37^{abc}
	Peshawari	1149.00±22.75^{c}	356.55±7.91^{f}	326.15±8.08^{f}
1.5-1.3-1.1(L3)	Lakha	1233.55±28.74^{ab}	421.55±9.23^{a}	392.00±9.17^{a}
	Mianwali	1239.20±22.97^{ab}	403.75±10.83^{abc}	372.60±10.96^{abc}
	Mushki	1259.55±23.38^{a}	415.90±6.80^{ab}	385.50±6.83^{ab}
	Peshawari	1205.05±20.30^{abc}	397.15±9.32^{abcd}	366.90±9.62^{abcd}

Values are mentioned as M±SEM and different superscripts on them indicate significant differences at P<0.05. The order of significance is as: a>b>c…….

Table 3. Folds of increase, Feed conversion ratio (FCR), Feed efficiency and Livability (%) in varieties of indigenous Aseel fed on different dietary lysine regimens for six week of initial growth period.

Treatment	Parameters	Folds of increase	FCR	Feed efficiency	Livability (%)
Lysine Levels (%)/Regimens					
1.3 (L1)		9.30±0.03^{b}	3.83±0.05^{a}	0.29±0.00^{c}	98.54±0.53
1.4-1.2 (L2)		9.36±0.03^{b}	3.66±0.05^{b}	0.30±0.00^{b}	99.38±0.36
1.5-1.3-1.1 (L3)		9.48±0.03^{a}	3.50±0.06^{c}	0.32±0.01^{a}	99.58±0.29
Varieties					
Lakha		9.34±0.03^{b}	3.70±0.06	0.30±0.01	99.72±0.28
Mianwali		9.35±0.03^{b}	3.69±0.06	0.30±0.00	98.33±0.65
Mushki		9.53±0.03^{a}	3.55±0.05	0.31±0.00	99.44±0.39
Peshawari		9.31±0.04^{b}	3.71±0.07	0.30±0.01	99.17±0.47
Lysine Levels (%)/Regimens × Varieties					
1.3 (L1)	Lakha	9.17±0.04^{e}	3.85±0.09^{a}	0.28±0.01^{d}	100.00±0.00^{a}
	Mianwali	9.27±0.05^{cde}	3.88±0.11^{a}	0.29±0.01^{cd}	96.67±1.53^{b}
	Mushki	9.51±0.07^{ab}	3.73±0.11^{ab}	0.30±0.01^{abc}	99.17±0.83^{ab}
	Peshawari	9.25±0.06^{cde}	3.84±0.11^{a}	0.29±0.01^{cd}	98.33±1.15^{ab}
1.4-1.2 (L2)	Lakha	9.34±0.05^{bcd}	3.83±0.10^{a}	0.29±0.01^{bcd}	100.00±0.00^{a}
	Mianwali	9.37±0.04^{bcd}	3.65±0.10^{ab}	0.31±0.01^{abc}	99.17±0.83^{ab}
	Mushki	9.51±0.06^{ab}	3.45±0.08^{b}	0.32±0.01^{ab}	99.17±0.83^{ab}
	Peshawari	9.23±0.05^{de}	3.73±0.13^{ab}	0.29±0.01^{bcd}	99.17±0.83^{ab}
1.5-1.3-1.1 (L3)	Lakha	9.49±0.05^{ab}	3.42±0.11^{b}	0.33±0.01^{a}	99.17±0.83^{ab}
	Mianwali	9.41±0.06^{abc}	3.55±0.11^{ab}	0.31±0.01^{abc}	99.17±0.83^{ab}
	Mushki	9.56±0.05^{a}	3.46±0.08^{b}	0.32±0.01^{ab}	100.00±0.00^{a}
	Peshawari	9.46±0.06^{ab}	3.56±0.14^{ab}	0.32±0.01^{ab}	100.00±0.00^{a}

Values are mentioned as M±SEM and different superscripts on them indicate significant differences at P<0.05. The order of significance is as: a>b>c…….

Table 4. Economic analysis of Aseel birds fed under different dietary lysine regimens for six week of initial growth period.

Cost items	Lysine Phases/ Regimens		
	L1 (1.3%)	L2 (1.4-1.2%)	L3 (1.5-1.4-1.1%)
Feed consumed/chick (g)	1180.50	1183.49	1218.90
Lysine consumed/chick (g)	15.55	15.27	15.44
Total Lysine cost (Rs)	3.27	3.21	3.24
Cost of day old chick (Rs)	60	60	60

Total feed cost (Rs)	47.22	47.34	48.76
Miscellaneous cost (Rs)	15	15	15
Total cost/ chick (Rs)	125.49	125.55	127.00
Total live weight/chick (g)	366.06	383.05	409.59
Sale price/Kg live weight (Rs)	350	350	350
Total Sale price/chick (Rs)	128.12	134.07	143.36
Net profit/chick (Rs)	2.63	8.52	16.36
Profit (%)/chick	2.10	6.79	12.88

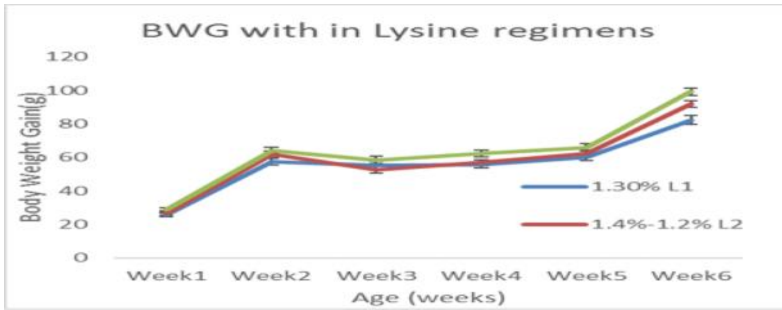

Fig. 1.

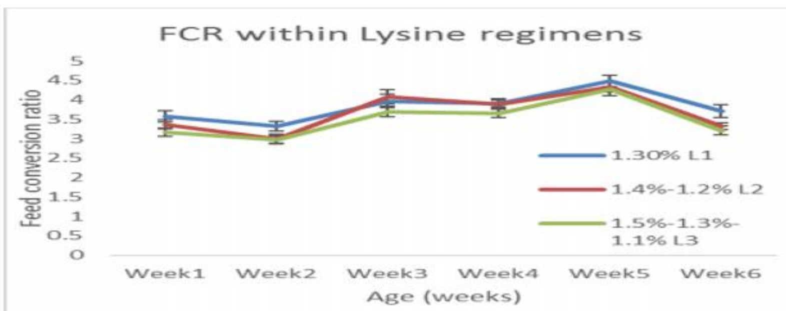

Fig. 2.

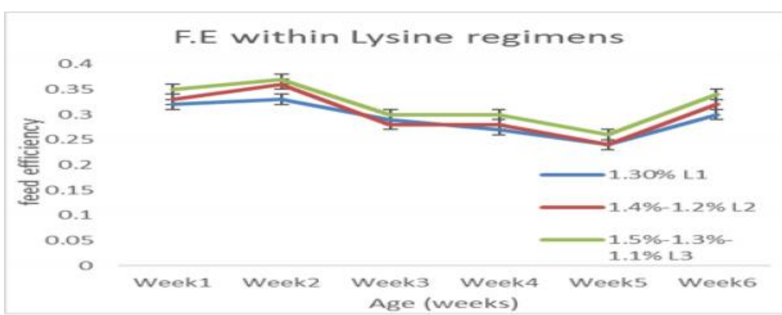

Fig. 3.

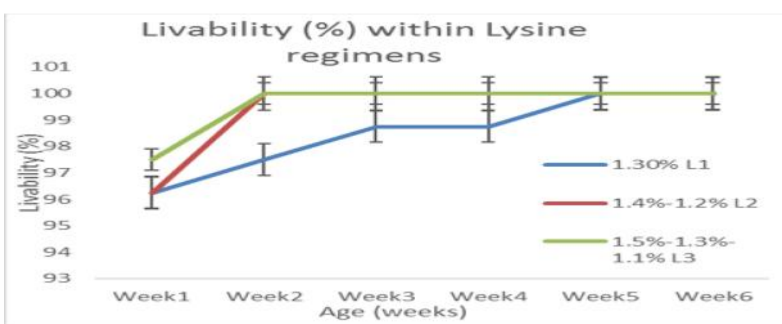

Fig. 4.

Conclusion: The results of the present study showed that Aseel birds reared under L3 lysine regimen consumed the maximum feed and gained highest weight with improved FCR (performance of feed), feed efficiency (performance of birds to convert feed into meat) and resulted in maximum profit percent. Among the Aseel varieties, Mushki variety revealed the better growth performance in terms of weight gain, feed efficiency and FCR. As an interpretation of the results of the present study the three phase lysine regimen L3 should be preferred for initial growth improvement of Indigenous Aseel chicken varieties.

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