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Body Weight Gain, Feed Consumption, FCR in Breeder and their Post Hatch Chicks by Sea Buckthorn Leaf Meal Supplementation During Summer

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Abstract

The present experiment was conducted to study the effect of dietary supplementation of sea buckthorn leaf meal (SBTLM) in colored breeder chicken and their post hatch on growth performance in different phases of 0-4, 4-8 and 0-8 weeks during summer season. Ninety colored Chabro breeder hens and eighteen viable cocks in 1:5 sex ratio were randomly distributed into three treatment groups: Control (Basal), standard breeder diet (BB) (BIS, 2007); basal+0.5% and basal+1.0% SBTLM. Thereafter, 90 chicks from each breeder groups were further subdivided into three groups each groups having three replicates of 10 birds. Control (Basal), Broiler starter till 4 weeks, broiler finisher till 8 weeks of age, (BP) (BIS 2007); basal+0.5% supplementation and basal+1.0% supplementation of SBTLM. It was observed that the average body weight gain (g) during 0-4 week and 0-8 weeks were significantly higher ($P<0.05$) in breeder diet groups BB+0.5% SBTLM and BB+1.0% SBTLM dietary supplemented groups compared to BB. The weekly body weight gain of 0.5% SBTLM supplemented group during post hatch and obtained from breeders subjected to 0.5% SBTLM supplementation was significantly ($P<0.01$) higher during 0-4, 4-8 and 0-8 weeks of experimentation. The interaction of (breeder diet × post hatch diet) supplementation of sea buckthorn leaf in 4-8 weeks and 0-8 weeks average body weight gain were significantly higher ($P<0.01$) in (BB+0.5%SBTLM)+(BP+0.5%SBTLM) group compared to BB+BP (1469.60g vs.1277.00g). However, in breeder as well as in post hatch dietary group no significant effect on feed consumption were observed in 0-4, 4-8 and 0-8 week of experimentation. Similarly, no significant effect was observed in interaction groups at 0-8 weeks. It was also observed that the overall FCR (0-8 weeks) were significantly better ($P<0.05$) in both sea buckthorn leaf meal supplemented groups in breeder diet as well as in post hatch diets while interaction effect for FCR were significantly better ($P<0.05$) in (BB+0.5% SBTLM)+(BP+0.5% SBTLM) supplemented group as compared to control group during different phases (0-4 weeks and 4-8 weeks) of experimentation. It was also observed that supplementation of 0.5% SBTLM had synergistic effect in improving the FCR of coloured breeder birds. Results of study concluded that dietary supplementation of 0.5% SBTLM in both breeder and post hatch chicks resulted in better growth performance and FCR during the study period.

Keywords: Breeder; Chabro FCR; Post Hatch and SBTLM.

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Introduction

Now a day's impressive growth in global poultry industry due to technological advancements in feeding, breeding, management and health care (Pathak et al., 2015). Herbal supplementation may serve as safer alternatives for growth promoters and welfare due to their suitability and preference, lower cost of production, improved feed efficiency (Singh et al. 2016, Singh et al. 2019 a), fast growth, reduced mortality, reduced risk of diseases, minimum health hazards and environmental friendliness (Fiza et al., 2017).

Sea buckthorn (Hippophae rhamnoides L.), is a thorny, dioecious, wind pollinated, multipurpose temperate bush plant bearing yellow or orange berries with nitrogen fixing abilities.a unique and valuable plant has gained worldwide attention, mainly for its medicinal and nutritional potential (Nazir et al., 2017). Every part of the Sea buckthorn plant has an abundant source of bioactive plant phytomolecules such as polyphenols, flavonoids, vitamins, carotenoids, organic acid, polyunsaturated fatty acids, and amino acids (Saggu et al., 2007 and Beveridge et al., 1999). It is commonly known as "cold desert gold" due to its various beneficial effects over plant, animal, human and soil health. Sea buckthorn is an important medicinal resource and is found in abundance in Indian subcontinent especially in the North Western Himalayan regions (Dhanze et al., 2013). In India, it is widely distributed at high altitude, cold arid condition of Ladakh and Lahul-Spiti, parts of Chamba and upper Kinnaur districts of Himachal Pradesh, Sikkim and Arunachal Pradesh. Sea buckthorn is a small shrub comprising of fruit and leaves that are rich in nutrients and bioactive components such as vitamins (Kudritskaya et al., 1989), amino acids (Repyakh et al., 1990), lipids (Goncharova and Glushenkova, 1993), sugars and acids (Yang, 2009), and flavonoids (Häkkinen et al., 1999). Studies showed that the leaves and fruit residues of sea buckthorn could be used to feed poultry and livestock without the accumulation of toxins, and that the feed also had a stimulating effect on growth and performance of poultry and livestock (Liu et al., 1989). The cake and leaves of SBT can be used as poultry feed supplements to decrease production cost and improve the production efficiency (Aminullah, 2012). Thus, SBT leaves, seeds and fruit residues play an important role in improving the efficiency of feed and may be considered to be utilized as an alternative feedstuff, particularly in poultry to maintain their production, performance and high quality yield (Shaker et al., 2018).

As protein is the most expensive nutrient, by introducing new protein source in breeder and their post hatch diet, we can certainly decrease the cost of production and increase the . Till date, no systematic study has been done to assess the performance of coloured breeder birds and their post hatch subjected to SBT leaf meal feeding during different seasons. In view of the above fact, the present study was designed to study the effect of sea buckthorn leaf meal supplementation in the diet of coloured breeder birds vis-à-vis their post hatch on growth and performance and FCR during summer season.

Materials and Methods

The present experiment was carried out at Poultry Farm of College of Veterinary Science and Animal Husbandry, U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan (DUVASU), Mathura, Uttar Pradesh, India. Ninety coloured breeder (Chabro) hens and eighteen viable cocks in 1:5 sex ratio were randomly distributed into three treatment groups: Control (Basal), standard breeder diet (BIS, 2007) (BB); basal+0.5% and basal+1.0% SBTLM. Thereafter, two hundred seventy chicks were obtained from these groups and ninety chicks from each breeder group were further subdivided into three groups: Control (Basal), Broiler starter till 4 weeks, broiler finisher till 8 weeks of age (BP), (BIS 2007); basal diet +0.5% and basal diet +1.0% supplementation of SBTLM supplementation. These chicks were reared in deep litter system under standard managemental conditions. Throughout the experimental period, the feed and water were offered ad lib. Data obtained were analyzed as per the standard statistical procedure given by Snedecor and Cochran (1994). Significant differences among treatment means were calculated as per DMRT test Duncan (1955).

Dried sea buckthorn leaves were procured from CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur (HP), India. The leaves were further sun-dried in a clean and dust free environment to obtain a fine powder. The powder formed was packed in an airtight container and used for supplementation in various treatment groups. The percent dry matter content, crude protein, ether extract, crude fiber, calcium and phosphorus contents were 90.46, 12.33, 7.14, 16.86, 1.49 and 1.14 were observed on dry matter basis. Experiments were carried out

in accordance with the guidelines laid down and after taking approval by the Institute Animal Ethics Committee for the use of poultry birds.

Results and Discussion

1. *Body weight gain*

Breeder dietary group

The average body weight gain (g) during 0-4 week were significantly higher (P<0.05) in BB+0.5%SBTLM and BB+1.0%SBTLM dietary supplemented groups as compared to BB (Table 1). At 0-8 week (Overall), the average body weight gain (g) were significantly (P<0.01) better in both the SBTLM supplemented group compare to control group, while there was no significant effect on body weight gain were observed during 4-8 week of experimentation. It was also observed that in BB+0.5%SBTLM group chicks had attain better body weight gain compared to BB and BB+1.0%SBTLM group chicks.

Post hatch dietary group

The average body weight gain (g) at 0-4 weeks of experimentation in post hatch chicks were 485.02, 519.42 and 516.76g, in 4-8 weeks 829.38, 890.44 and 858.91g, while the overall body weight gain at 0-8 week of age were 1314.40, 1409.87 and 1375.67g in BP, BP+0.5%SBTLM and BP+1.0%SBTLM dietary supplemented groups, respectively, revealed that the chicks in BP+0.5%SBTLM and BP+1.0%SBTLM had significantly higher (P<0.01) body weight gain as compared to BP group chicks (Table 1).

Interaction

The interaction of breeder diet × post hatch diet during 4-8 week the average body weight gain at 4-8 week were significantly higher (P<0.01) in (BB+0.5%SBTLM)+(BP+0.5%SBTLM) group compared to BB+BP (931.33g vs.794.00g). Similarly, the overall (0-8 weeks) average body weight gain were significantly higher (P<0.01) in (BB+0.5%SBTLM)+(BP+0.5%SBTLM) group compared to BB+BP(1469.60gvs.1277.00g) (Table 2).

2. *Feed consumption*

Breeder dietary group

The average weekly feed consumption (g) in the 0-4 week were not differed significantly in BB, BB+0.5%SBTLM and BB+1.0%SBTLM supplemented groups (Table 3). However, at 0-4 week, the feed consumption was comparatively lower in group BB+0.5%SBTLM, where as in 4-8 week the average feed consumption was lowest in BB+1.0%SBTLM group. The overall average feed consumption (g) during 0-8 week were 3435.40, 3464.97 and 3394.08 respectively in BB, BB+0.5%SBTLM and BB+1.0%SBTLM dietary supplemented groups. The data revealed that overall average feed consumption were not significantly different between the dietary groups.

Post hatch dietary group

The overall feed consumption (g) during 0-8 week were 3449.66, 3438.89 and 3405.91g in BP, BP+0.5%SBTLM and BP+1.0%SBTLM supplemented group also not differed significantly (Table 3). The phase wise feed consumption (g) at 0-4 week of were 1166.37, 1176.62 and 1187.25g and in 4-8 week of 2188.02, 2235.31 and 2227.49g respectively in BP, BP+0.5%SBTLM and BP+1.0%SBTLM supplemented group, revealed that the average feed consumption not differed significantly among the dietary treatment groups.

Interaction of breeder diet × post hatch diet

The feed consumption among interaction of breeder diet × post hatch diet in nine interaction groups, revealed that there were significantly lower (P<0.01) feed consumption in BB+ (BP+1.0% SBTLM) group compared to other groups (Table 4). The average feed consumption at 4-8 and overall 0-8 week was not significantly different between the dietary interaction groups.

3. *Feed Conversion Efficiency (FCR)*

Breeder dietary group

FCR in 0-4 week in BB, BB+0.5%SBTLM and BB+1.0%SBTLM were 2.39, 2.28 and 2.31 respectively. The statistical data revealed that FCR in BB+0.5%SBTLM and BB+1.0%SBTLM supplemented group had significantly better (P<0.01) as compared to BB, while in 4-8 week the FCR values 2.62, 2.56 and 2.57 were not significantly different between the various treatment groups (Table 5 and Fig. 1a).

The overall FCR (0-8 week) were 2.56, 2.50 and 2.48 in BB, BB+0.5%SBTLM and BB+1.0%SBTLM respectively. The results revealed that in BB+0.5%SBTLM and BB+1.0%SBTLM supplemented groups showed significantly better (P<0.01) FCR compared to BB.

Post hatch dietary group

The phase wise FCR at 0-4 week of experimentation in coloured chicken were 2.41, 2.27 and 2.30 amongst the BP, BP+0.5%SBTLM and BP+1.0%SBTLM groups, respectively. The data revealed that significantly better (P<0.01) FCR were observed in both sea buckthorn supplemented groups viz. BP+0.5%SBTLM and BP+1.0%SBTLM compared to BP, while In 4-8 week, the FCR values were 2.64, 2.51 and 2.59 amongst the three post hatch dietary groups respectively, group BP+0.5%SBTLM showed significantly better (P<0.01) FCR compared to BP and BP+1.0%SBTLM groups (Table 5 and Fig. 1b).

Table 1: Effect of dietary supplementation of SBTLM on phase wise body weight gain (g) in coloured breeder and their post hatch chicks during summer season.

Treatments	Week 0-4	Week 4-8	Week 0-8
Breeder diet			
BB	494.93^{a}	847.58	1342.51^{a}
BB+0.5%SBTLM	514.93^{b}	871.91	1386.84^{b}
BB+1.0%SBTLM	511.33^{b}	859.24	1370.58^{b}
Post hatch diet			
BP	485.02^{a}	829.38^{a}	1314.40^{a}
BP+0.5%SBTLM	519.42^{b}	890.44^{c}	1409.87^{c}
BP+1.0%SBTLM	516.76^{b}	858.91^{b}	1375.67^{b}
SEM	4.57	7.81	10.49
Sig. Level			
Breeder diet	P<0.05	NS	P<0.01
Post hatch diet	P<0.01	P<0.01	P<0.01

Means bearing different superscripts within a column differ significantly (P<0.05)
NS: Not significant (P>0.05) SEM: Pooled standard error of means
BB: Basal breeder diet
BP: Basal post hatch diet
SBTLM: Sea buckthorn leaf meal

Table 2: Interaction (breeder diet × post hatch diet) of supplementation of SBTLM on phase wise body weight gain (g) in coloured breeder and their post hatch chicks during summer season.

Treatments	Week 0-4	Week 4-8	Week 0-8
BB+BP	483.00	794.00^{a}	1277.00^{a}
BB+(BP+0.5%SBTLM)	484.80	844.53^{b}	1329.33^{b}
BB+(BP+1.0%SBTLM)	487.27	849.60^{b}	1386.87^{bc}
(BB+0.5%SBTLM)+(BP)	500.73	867.93^{b}	1368.67^{bcd}
(BB+0.5%SBTLM)+(BP+0.5%SBTLM)	538.27	931.33^{c}	1469.60^{e}
(BB+0.5%SBTLM)+(BP+1.0%SBTLM)	519.27	872.07^{b}	1391.33^{d}
(BB+1.0%SBTLM)+(BP)	501.07	880.80^{b}	1381.87^{cd}
(BB+1.0%SBTLM)+(BP+0.5%SBTLM)	521.73	839.87^{b}	1361.60^{bcd}
(BB+1.0%SBTLM)+(BP+1.0%SBTLM)	527.47	856.07^{b}	1383.53^{bc}
SEM	4.57	7.81	10.49
Sig. Level	NS	P<0.01	P<0.01

Means bearing different superscripts within a column differ significantly (P<0.01)
NS: Not significant (P>0.05) SEM: Pooled standard error of means
BB: Basal breeder diet
BP: Basal post hatch diet
SBTLM: Sea buckthorn leaf meal

Table 3: Effect of dietary supplementation of SBTLM on phase wise feed consumption (g) in coloured breeder and their post hatch chicks during summer season.

Treatments	Week 0-4	Week 4-8	Week 0-8
Breeder diet			
BB	1179.43	2216.31	3435.40
BB+0.5%SBTLM	1172.03	2229.10	3464.97
BB+1.0%SBTLM	1178.78	2205.41	3394.08
Post hatch diet			
BP	1166.37	2188.02	3449.66
BP+0.5%SBTLM	1176.62	2235.31	3438.89
BP+1.0%SBTLM	1187.25	2227.49	3405.91
SEM			
Sig. Level	5.63	10.52	16.84
Breeder diet	NS	NS	NS
Post hatch diet	NS	NS	NS

NS: Not significant (P>0.05) SEM: Pooled standard error of means
BB: Basal breeder diet
BP: Basal post hatch diet
SBTLM: Sea buckthorn leaf meal

Table 4: Interaction (breeder diet × post hatch diet) effect of dietary supplementation of SBTLM on phase wise average weekly feed consumption (g) in coloured breeder and their post hatch chicks during summer season.

Treatments	Week 0-4	Week 4-8	Week 0-8
BB+BP	1206.67^{cd}	2133.67	3390.38
BB+(BP+0.5% SBTLM)	1163.48^{b}	2230.60	3515.38
BB+(BP+1% SBTLM)	1128.96^{a}	2199.80	3443.21
(BB+0.5%SBTLM)+(BP)	1166.59^{b}	2260.00	3467.57
(BB+0.5%SBTLM)+(BP+0.5%SBTLM)	1171.42^{b}	2244.57	3499.99
(BB+0.5%SBTLM)+(BP+1%SBTLM)	1191.84^{bcd}	2201.37	3349.12
(BB+1%SBTLM)+(BP)	1165.02^{b}	2255.27	3448.26
(BB+1%SBTLM)+(BP+0.5%SBTLM)	1181.19^{bc}	2212.13	3379.55
(BB+1%SBTLM)+(BP+1.0%SBTLM)	1215.53^{d}	2215.07	3389.91
SEM	5.63	10.52	16.84
Sig. Level	P<0.01	NS	NS

Means bearing different superscripts within a column differ significantly (P<0.05)
NS: Not significant (P>0.05) SEM: Pooled standard error of means
BB: Basal breeder diet
BP: Basal post hatch diet
SBTLM: Sea buckthorn leaf meal

Table 5: Effect of dietary supplementation of SBTLM on the FCR during different phases in coloured breeder and their post hatch chicks during summer season.

Treatments	Week 0-4	Week 4-8	Week 0-8
Breeder diet			
BB	2.39[b]	2.62	2.56[b]
BB+0.5%SBTLM	2.28[a]	2.56	2.50[a]
BB+1.0%SBTLM	2.31[a]	2.57	2.48[a]
Post hatch diet			
BP	2.41[b]	2.64[b]	2.63[b]
BP+0.5%SBTLM	2.27[a]	2.51[a]	2.44[a]
BP+1.0%SBTLM	2.30[a]	2.59[b]	2.48[a]
SEM	0.02	0.02	0.02
Sig. Level			
Breeder diet	P<0.01	NS	P<0.05
Post hatch diet	P<0.01	P<0.01	P<0.01

Means bearing different superscripts within a column differ significantly (P<0.05)
NS: Not significant (P>0.05) SEM: Pooled standard error of means
BB: Basal breeder diet
BP: Basal post hatch diet
SBTLM: Sea buckthorn leaf meal

Table 6: Interaction (breeder diet × post hatch diet) effect of dietary supplementation of SBTLM on the FCR during different phases in coloured breeder and their post hatch chicks during summer season.

Treatments	Week 0-4	Week 4-8	Week 0-8
BB+BP	2.50[d]	2.69[c]	2.66
BB+(BP+0.5% SBTLM)	2.40[cd]	2.64[bc]	2.65
BB+(BP+1% SBTLM)	2.32[bc]	2.59[bc]	2.58
(BB+0.5%SBTLM)+(BP)	2.33[bc]	2.60[bc]	2.53
(BB+0.5%SBTLM)+(BP+0.5%SBTLM)	2.18[a]	2.41[a]	2.38
(BB+0.5%SBTLM)+(BP+1%SBTLM)	2.30[bc]	2.52[ab]	2.41
(BB+1%SBTLM)+(BP)	2.33[bc]	2.56[bc]	2.50
(BB+1%SBTLM)+(BP+0.5%SBTLM)	2.26[ab]	2.63[bc]	2.48
(BB+1%SBTLM)+(BP+1.0%SBTLM)	2.31[bc]	2.59[bc]	2.45
SEM	0.02	0.02	0.02
Sig. Level	P<0.05	P<0.05	NS

Means bearing different superscripts within a column differ significantly (P<0.05)
NS: Not significant (P>0.05) SEM: Pooled standard error of means
BB: Basal breeder diet
BP: Basal post hatch diet
SBTLM: Sea buckthorn leaf meal

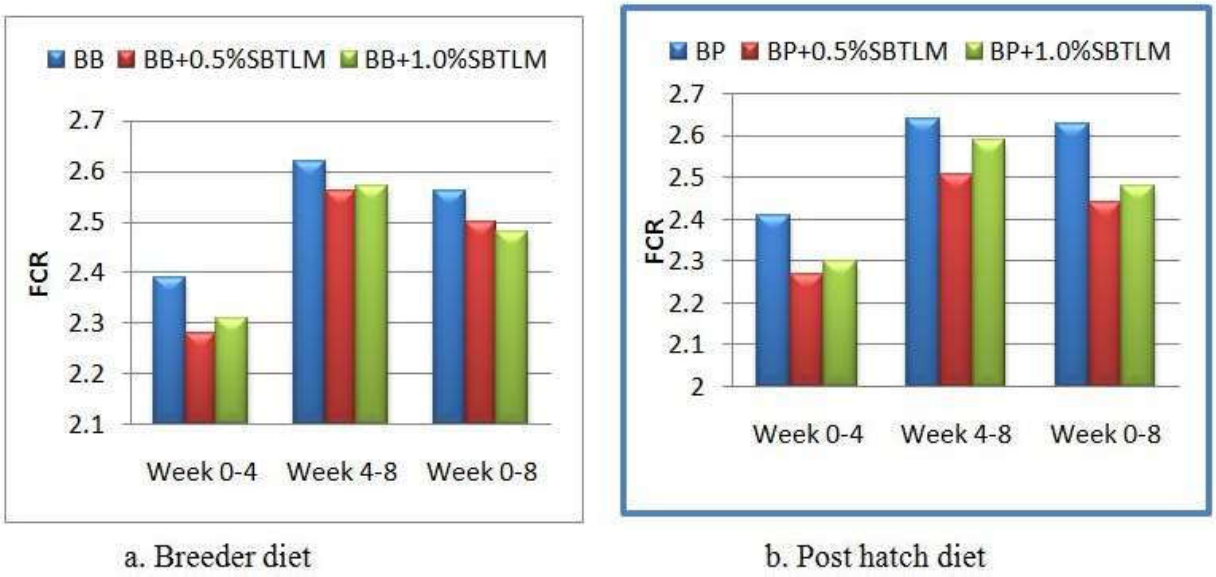
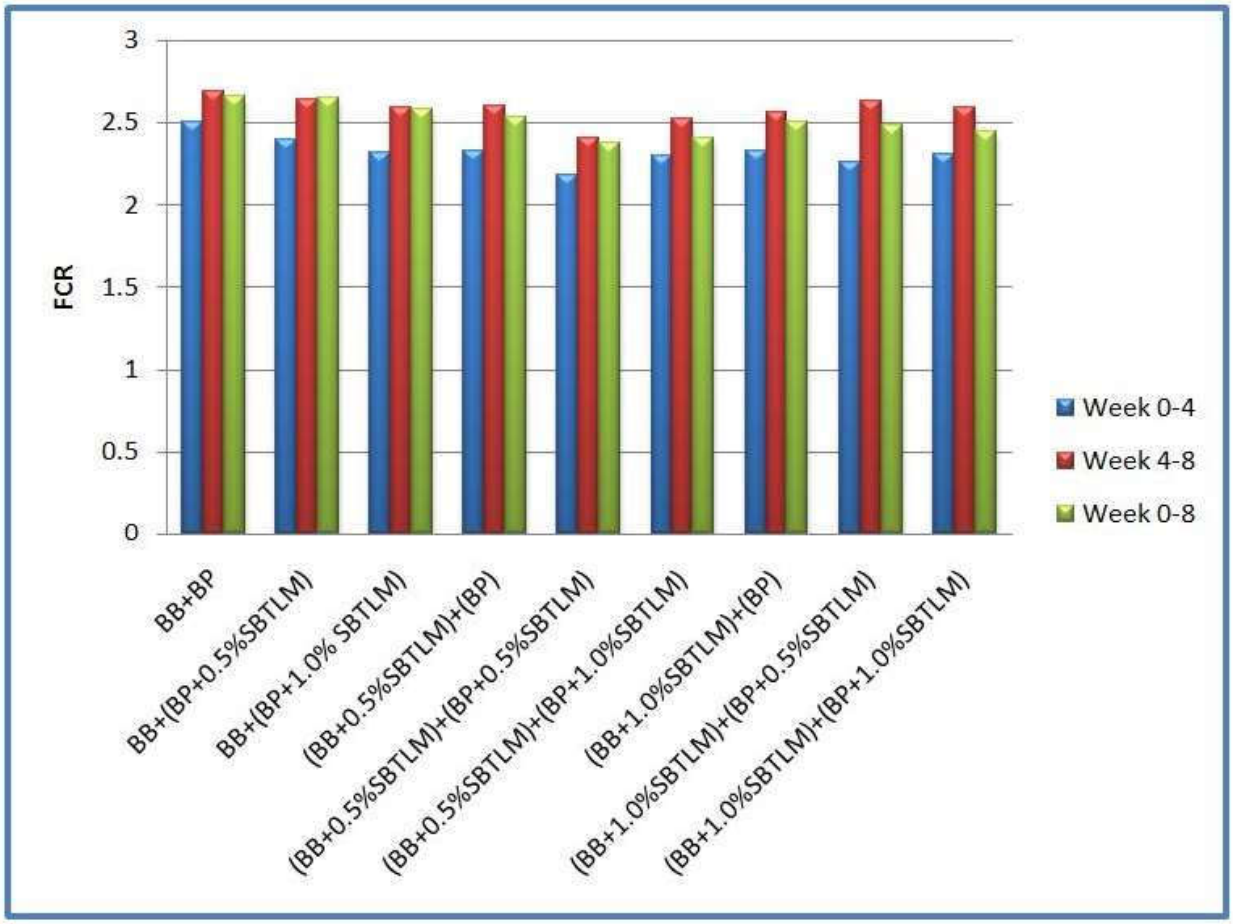


Fig. 1: Effect of dietary supplementation of SBTLM in coloured breeder and their post hatch chicks on FCR during different phases and overall FCR during summer season.



c. Breeder diet × Post hatch diet

The overall FCR (0-8 week) were 2.63, 2.44 and 2.48 among the dietary treatment groups BP, BP+0.5%SBTLM and BP+1.0% SBTLM, respectively. The data revealed that significantly better (P<0.01) FCR were observed in both sea buckthorn supplemented groups (BP+0.5%SBTLM and BP+1.0%SBTLM) compared to control group (BP).

Interaction of breeder diet × post hatch diet

The interaction effect of FCR during 0-4 and 4-8 week of experimental feeding in (BB+0.5%SBTLM)+(BP+0.5%SBTLM) group birds showed significantly better (P<0.05) FCR compared to BB+BP, while interaction between breeder × post hatch on means of overall FCR (0-8 weeks) were not significantly different among the various treatment groups, while the FCR in group (BB+0.5%SBTLM)+(BP+0.5%SBTLM) has at lower side compared to BB+BP. In addition it was found that phase wise and overall FCR were better in (BB+0.5%SBTLM)+ (BP+0.5%SBTLM) group among all treatment groups (Table 6 and Fig. 1c).

Discussion

1. Body weight Gain

Sea buckthorn leaves contains high crude protein and possess many bioactive substances notably lipids, fatty acids, vitamins, flavonoids, tannins, phenols, progestin, amino acids, minerals like calcium and phosphorus. Sea buckthorn leaves also contain coumarine, triterpenes, steroids, amyrinsm, organic acids, unsaturated essential fatty acids and posseses growth promoter, immune-modulator, anti-coagulant, anti-spasmodic, anti-pyretic, anti-oxidant and many more other beneficial properties.

The body weight gain was comparatively higher in 0.5%SBTLM supplemented group in both breeder and post hatch diet as compared to control group throughout the experimentation. The interaction effect of SBTLM supplementation were also comparatively higher in (BB+0.5%SBTLM)+(BP+0.5%SBTLM) supplemented group as compared to control group throughout the experimentation i.e. supplementation of 0.5%SBTLM in both breeder and post hatch diet had beneficial effect in terms of body weight gain due to synergistic effect of SBTLM in both breeder and post hatch diet. This may be due to supplementation of sea buckthorn leaf meal in chicken may result in optimization of growth and production traits in poultry due to its nutritional metabolites. The results obtained in the present study fall in line with the findings of Singh et al. (2019b), Xuchan (1989), Wang (1997), Shao et al. (2001), Geetha et al. (2002), Biswas et al. (2010), Ma et al. (2015), Pathak et al. (2015) and Sharma et al. (2018).

2. Feed Consumption

During entire study period no clear cut trends were observed in breeder as well as in post hatch dietary treatment groups. The phase wise and overall feed consumption amongst various dietary groups were not significantly different. It was also observed that there was no adverse effect with respect to weekly and overall feed consumption due to SBTLM supplementation in post hatch chicks in various dietary treatment groups during summer season.

3. Feed Conversion Efficiency (FCR)

The overall FCR (0-8 weeks) were significantly better (P<0.05) in both SBTLM supplemented groups in breeder diet as well as in post hatch diets among the various dietary treatment groups. The interaction effect of SBTLM supplementation for FCR were significantly better (P<0.05) in (BB+0.5%SBTLM)+(BP+0.5%SBTLM) supplemented group as compared to control group during different phases (0-4 weeks and 4-8 weeks) of experimentation. It was also observed that supplementation of 0.5%SBTLM had synergistic effect in improving the FCR of coloured breeder birds. The findings of present study are in agreement with the findings of Liu et al. (1989), Singh and Sharma (2008), Chen et al. (2011), Kaushal and Sharma (2011), Zhao et al. (2012), Aminullah (2012), Ma et al. (2015), Pathak (2015) and Sharma et al. (2018), Singh et al. (2019) who have also reported, improvement in FCR with the supplementation of sea buckthorn.

Conclusions

Sea buckthorn (SBT) is a marvelous plant with having a lot of medicinal ant nutritional properties for the welfare and health issues of human as well as animal. The leaves, seeds and fruit residues contains high crude protein, amino acid, calcium and phosphorus, they have advantages as basic materials for feed formulations for poultry. Due to presence of several nutritional and bio active compounds leaves of sea buckthorn, it serves as good growth promoter. On the basis of above facts,

it can be concluded that dietary supplementation of 0.5% SBTLM in breeder diet and there after dietary supplementation of 0.5% SBTLM in post hatch chicks obtained from the aforesaid breeders resulted in better body weight gain and feed conversion efficiency (FCR).

References

1. Aminullah. 2012. Comparative evaluation of sea buckthorn cake and leaves fed as mash and pelleted feed for broiler production. Part of M.V.Sc. thesis submitted to Choudhary Sarwan Kumar Himachal Pradesh Krishi Vishwavidyalaya, Palampur (India).
2. Beveridge T, Li T S C and Oomah B D 1999. Sea buckthorn products: manufacture and composition. J. Agric. Food. Chem. 47, 3480–3488.
3. BIS. 2007. Bureau of Indian standards. Poultry feeds-specifications (fifth revised edition) IS-1374.
4. Biswas A, Roy B G, Gogoi D, Ahmed M and Singh S B 2010. Poultry farming in the cold, arid, Himalayan region of India. World's Poult Sci J, 66:297–307.
5. Chen X, Zhao, W Liu, H Su Jie, et al. and Li ,Y. 2011. Effect of sea buckthorn leaves on growth performance and calcium metabolism in Arbor Acres broilers. Dongbei Nongye Daxue Xuebao, 42(3):19–24.
6. Dhanze H, Khurana S K and Mane B G 2013. Effect of sea buckthorn on raw chicken during extended periods of storage. J Food Qual. 36:59–65.
7. Duncan D B 1955. Multiple Range and Multiple F-Test. Biometrics, 11:1–5.
8. Fiza N, Rehana S, and Mohsin B, 2017. Chemical and antioxidant properties of Sea buckthorn (Hippophae rhamnoides). The Pharma Innovation J. 6(12):173–176.
9. Geetha S, SaiRam M, Singh V, et al. 2002. Anti-oxidant and immunomodulatory properties of sea buckthorn (Hippophae rhamnoides)-An in vitro study. J Ethnopharma, 79:373–378.
10. Goncharova, N.P. and Glushenkova, A. I. 1993. Lipids of the leaves of Central Asian forms of sea buckthorn. Chemical Nat. Compound, 33:797–798.
11. Häkkinen S H; Kärenlampi S O; Heinonen I M; Mykkänen, H.M. and Törrönen A.R. 1999. Content of the flavonols quercetin, myricetin, and kaempferol in 25 edible berries. Journal of Agriculture Food Chemistry, 47:2274–2279.
12. Kaushal M. and Sharma P C 2011. Nutritional and antimicrobial property of sea buckthorn (Hippophae spp.) seed oil. J Sci Ind Res,70:1033–36.
13. Kudritskaya, S E, Zagorodskaya L M, and Shishkina E E 1989. Carotenoids of the sea buckthorn, variety Obil'naya. Chemical Nat Compound, 25:724–725.
14. Liu, D., Zhang, H., Zhang, S., Kou, X., Liu, R. and Wang, S. 1989. A food additives "sea buckthorn yellow". Proceedings of international symposium on sea buckthorn (H. rhamnoides L.), Xian, China, Oct 19–23:318−319.
15. Ma, J.S., Chang, W.H., Liu, G.H., Zhang, S., Zheng, A.J., Li, Y., Xie, Q., Liu, Z.Y. and Cai, H.Y. 2015. Effects of flavones of Sea buckthorn fruits on growth performance, carcass quality, fat deposition and lipometabolism for broilers. Poult Sci. 94(11):2641–2649.
16. Nazir Fiza, Salim, Rehana and Bashir Mohsin. 2017. Chemical and antioxidant properties of Sea buckthorn (Hippophae rhamnoides). The Pharma Innovation J, 6(12):173-176.
17. Pathak GP, Sharma N, Mane BG, Sharma D, Krofa D, and Khurana SK (2015) Effect of sea buckthorn (Hippophae rhamnoides) leaves, pulp & oil on growth performance, carcass characteristics and meat quality of broilers chickens. J Poult Sci Tech, 3(1):20-23.
18. Repyakh, S.M., Kargapol'tsev, A.P., Chuprova, N.A. and Yushipitsina, G.G. 1990. Amino acid composition and biological value of proteins of the woody verdure of sea buckthorn. Chemical Nature of Compound., 26:110–111.
19. Saggu, S., Divekar, H.M., Gupta, V., Sawhney, R.C., Banerjee, P.K. and Kumar.R. (2007). Adaptogenic and safety evaluation of seabuckthorn leaf extract: A dose dependent study. Food. Chem. Toxicol. 45, 609–617 (2007).
20. Shaker, Mohamed Momani, Al-Beitawi, Nafez, A., Bláha Jan and Mahmoud, Ziyad. (2018). The effect of sea buckthorn (Hippophae rhamnoides L.) fruit residues on performance and egg quality of laying hens. J. of Applied Animal Research, 46 (1):422-426.
21. Shao, Shu Li., Xing, X.U. Jun., Zhao, Jun. and Zhai, Shu Juan. 2001. The influence of fresh leaves and branches of sea buckthorn on the protein utilization of broilers. J Sci Teachers College and Univ.
22. Sharma, A., Shukla, P.K., Bhattacharyya, A., Kumar, U., Roy, D., Yadav, B. and Prakash, A. 2018. Effect of dietary supplementation of sea buckthorn and giloe leaf meal on the body weight gain, feed conversion ratio, biochemical attributes and meat composition of turkey poults. Vet. World, 11: 93-98.
23. Singh, D.N., Shukla, P.K., Bhattacharyya, A., Roy, Debashis., Singh, Yajuvendra., Rout, P.K. 2019b. Effect of dietary supplementation of sea buckthorn leaf meal in coloured breeder and their post hatch chicks on growth performance and serum biochemical attributes during summer season. Indian J. of Animal research. 54:(10.18805/ijar.B-3906).
24. Singh, D.N., Shukla, P.K., Bhattacharyya, A., Singh, Yajuvendra., Sirohi, R. 2019a. Effect of dietary supplementation of sea buckthorn leaf meal on egg production performances by coloured breeder during summer season. Journal of Animal feed

Science and Tech. 7 (1) pp 5-8.

25. D.N. Singh, P.K. Shukla, A. Bhattacharyya, R. Sirohi, Yajuvendra Singh, Ajay Kumar, Mamta. 2016. Sea buckthorn: A novel feed opportunity for livestock and poultry health, production & welfare. Journal of Animal feed Science and Tech. 4 (1) pp 13-17.
26. Snedecor, G.W. and Cochran, W.G. 1994. Statistical methods. 8th edn. The IOWA State University Press, Ames, IA.
27. Wang, H.S. 1997. Analysis on nutrition elements of Sea buckthorn. Hippophae, 10(2):24-25.
28. Xuchan, L. 1989. Tests on the toxicology of the residues and leaves of Hippophae and their effects upon the productive performance of animal and poultry. Hippophae, 3:14-17.
29. Yang, B. 2009. Sugars, acids, ethyl β-D-glucopyranose and a methyl inositol in sea buckthorn (Hippophae rhamnoides) berries. Food Chemistry, 112:9–97.
30. Zhao, Wei., Chen, Xin., Yan, Changjiang., Liu, Hongnan., Zhang, Z., Wang, P., Su, Jie., Li, Yao. 2012. Effects of sea buckthorn leaves on Inosine Monophosphate and Adenylosuccinatelyases gene expression in broilers during heat stress. Asian-Australian J of Anim. Sci., 25(1): 92-97.