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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

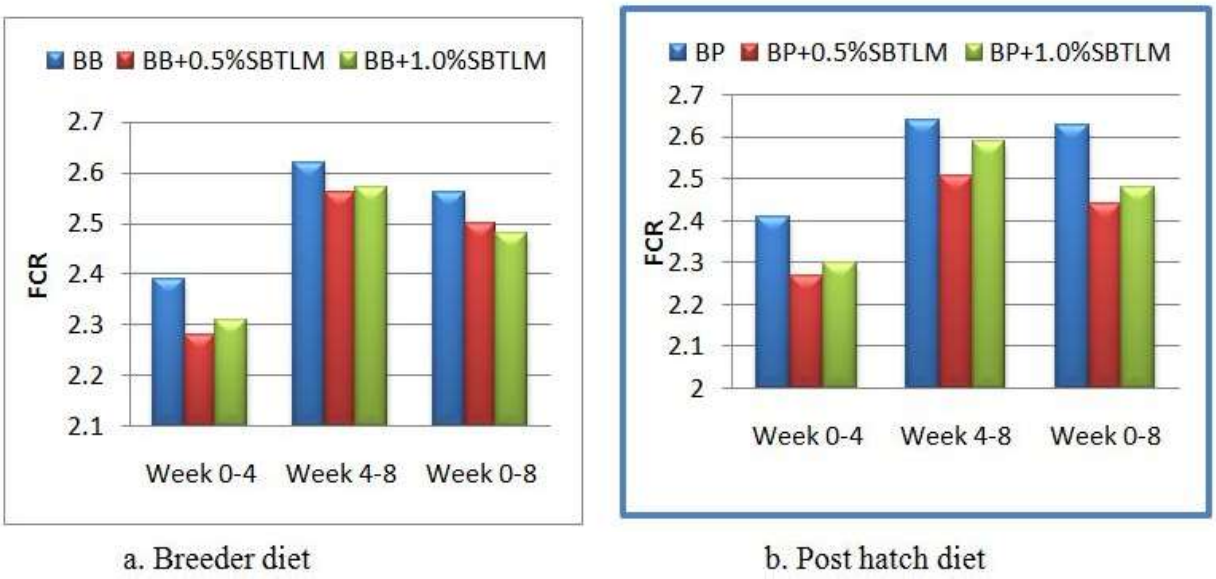
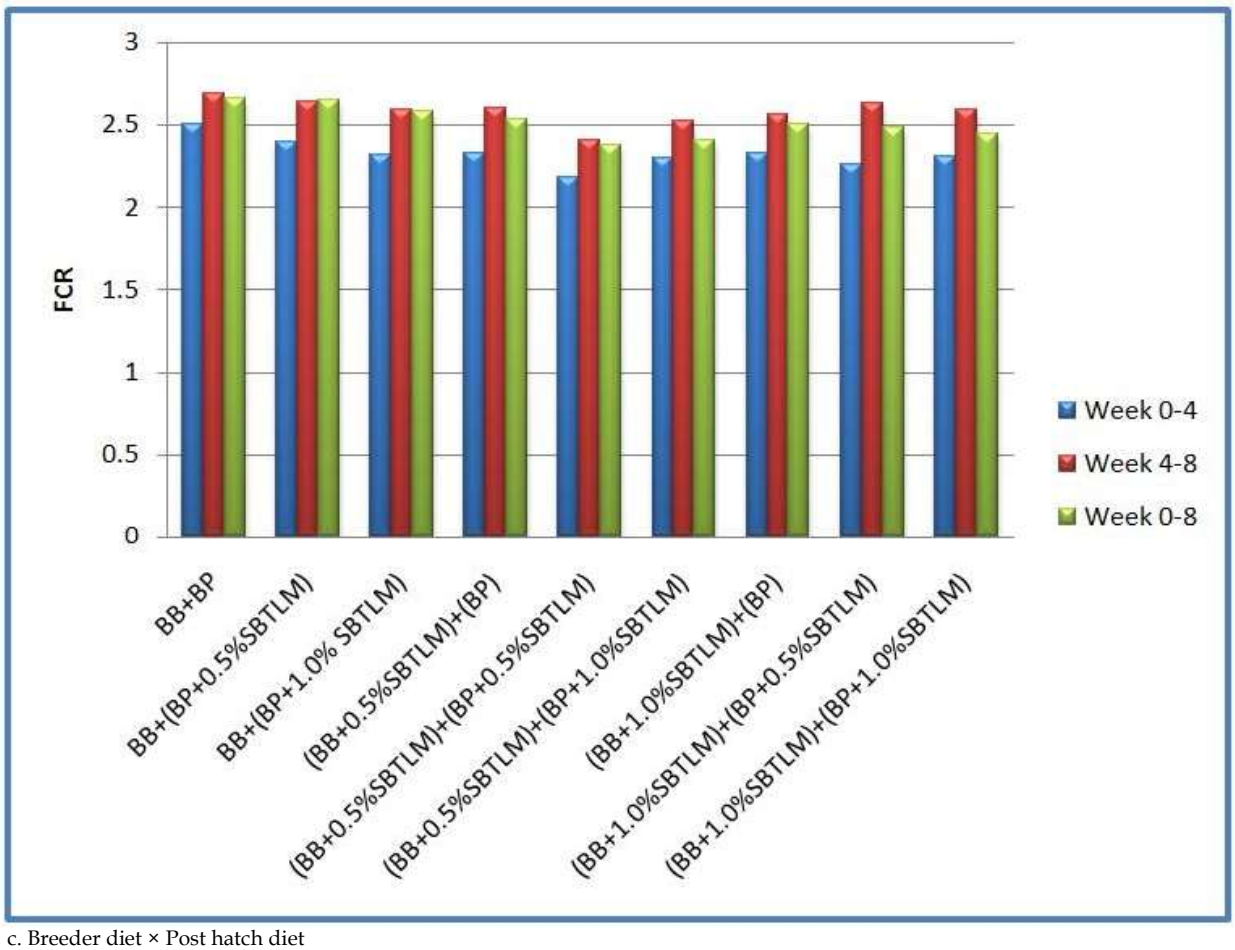


Fig. 1: Effect of dietary supplementation of SBTLM in coloured breeder and their post hatch chicks on FCR during different phases and overall FCR during summer season.



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).

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Original Article

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Milk Quality Consciousness Among the Small Holder Dairy Farmers in Ambedakar Nagar District of Uttar Pradesh

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Abstract

Awareness about the good quality milk in necessary not only due to reason that a large fraction of milk produces in India is domestically consumed and it has direct relation with the health of that large milk consuming population but also to increase acceptability of Indian milk in international market. Present study was purposively conducted in Ambedakar Nagar district of Uttar Pradesh. For the study 78 small holder dairy farmers were selected. During study it was found that majority of the small holder dairy farmers have medium to low level of consciousness about the quality of good milk. There is need for increasing milk quality consciousness among the dairy farmers by educating about it.

Keywords: Small Holder Dairy Farmers; Milk Quality; Adulteration; Flavor of Milk; Color of Milk.

Introduction

Milk is the cheapest source of protein for the large vegetarian population of India. Milk is also nutrient rich media and act as complete food. India is largest milk producing country. Its milk production for year 2016-17 was 165.4 mmt. India is second most populous country in the world. However, producing largest amount of milk and currently per capita milk availability in 355 gms/day (BAHS, 2017) but export of milk and milk products to other countries is very low. In the age of globalization and liberalization competition in dairy sector becomes very intense. In India still 80% of the milk is handled by unorganized sector. Quality of milk in Indian market remains uncertain because majority of dairy farmers were small holder and cannot affords dairy technologies. Quality uncertainty of milk not only make Indian dairy farmers devoid of large fraction of remunerative profit but also it is directly associated with the health risk of large milk and milk product consuming population in country. Poor quality milk may lead to serious health related issues. Quality consciousness among the dairy farmers because major crux for the development of a dairy sector. So, it is of paramount importance to

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know the quality consciousness among the small holder dairy farmers. The study was conducted with objective to assess the quality consciousness among the dairy farmers.

Material and methods

The study was conducted in Uttar Pradesh purposively because it is not only the highest milk producing state (BAHS, 2017) but also it has a large population depend on livestock beside agriculture for their livelihood security. For the study 78 small holder dairy farmers were selected from Ambedakar Nagar district through proportionate random sampling method in different land holding category. A well tested milk quality consciousness schedule was developed for milk quality. Milk quality consciousness were measured as mean score obtained by dairy farmers for all milk productions.

Result and Discussion

Result related to quality consciousness about milk among the small holder dairy farmers is presented in Table 1 revealed that majority of the respondents (74.36%) were found aware about

Table 1: Distribution of respondents according to their consciousness about different parameter of milk quality.

Parameters	Respondents (f)	n=78	
Name the adulterant of the milk and milk products	One adulterant	Two adulterant	More than two adulterant
	8 (10.26)	12 (15.38)	58 (74.36)
Whether or not adulterated milk clot after boiling.	Clot after boiling	Do not know	
	49 (62.82)	29 (37.17)	
Fresh and good quality milk remain sick to the surface without any precipitates of the utensils pouring off that utensil	Yes	Do not know	
	42 (53.84)	36 (46.15)	
There is formation of cream layer on the surface of pure milk when left for some time.	Yes	Do not know	
	56 (71.79)	22 (28.21)	
pH of milk	Acidic	Slight acidic	Basic
	22 (28.20)	19 (24.36)	37 (47.44)
Pure milk not coagulate on heating	Yes	Do not know	
	28 (35.90)	50 (64.10)	
Chemical residues in milk may come in milk after.	High use of chemical like herbicides and pesticides for fodder production	Use of drugs in treatment	Do not know
	17 (21.79)	20 (25.64)	41 (52.56)
Smell of fresh milk	Sweetish milky	Others	
	41 (52.56)	37 (47.44)	
Color of fresh milk	White to milky yellow	Others	
	46 (58.97)	32 (41.03)	

Figure presented in parenthesis represents percentage

Table 2. Mean score distribution of respondents according to theiroverall consciousness about milk quality.

Quality consciousness category	Respondents(n=78)	
	Frequency (f)	Percentage
Low (<0.44)	29	37.18
Medium (0.45 to 0.78)	45	57.69
High (>0.78)	04	05.13

more than two adulterant of milk. It was found that they were known about thickening agents like cane sugar, starch, vegetables oils etc. Beside this water is well known as general adulterant for all the farmers. Suruchi (2012) and Tiwari (2016) also reported that majority of the respondents were aware about the milk adulterant.

It was also found that a fair number of respondents (30.77%) were aware about the fact that poor quality milk got clot after boiling. Clot on boiling is a plate farm test for milk and a considerable incidence of clot on boiling were also reported by Nirwal et.al. (2013). Majority of producers (53.85%) was also aware about the fact that after pouring out the milk from utensils there should not be precipitation on the surface of utensil. However a very less fraction of respondents were found aware about the pH value of the fresh milk. Slight acidic nature of milk from dairy farms were also asserted by Indumathi and Obula Reddy (2015). It was found that only (30.77%) of respondents were aware about slight acidic nature of milk. Chemical residues in the milk are one of the major quality issues, which show the effect on immunity status of the consumers. Slightly less than half (47.44%) of the respondents were know about the chemical residues in milk which was comes in milk either due to indiscriminate use of chemicals during fodder production and drug use for treatment of animals. However majority of the respondents were known about smell and color of fresh milk.

The result of overall quality consciousness about the milk among the small holder dairy farmers is present in Table 2. It reveals that majority (57.69%) of the respondents were in the medium level of awareness about the milk quality consciousness followed by a considerable numbers of respondents (37.18%) were in low level of quality consciousness about the milk.

Conclusion

It was found that majority of small holder dairy farmers were in medium to low level of quality consciousness about the milk. There need to create awareness among the small holder dairy farmers about presence of chemical residues, pH level and different adulterants. There awareness can be created by organizing awareness campaign, Kisan gosthi etc.in the regions.

Conflict of Interest

The authors declare no conflict of interest with this manuscript.

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Indian Journal of Anesthesia and Analgesia	6	8000	7500	625	586
Indian Journal of Biology	2	6000	5500	469	430
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Indian Journal of Communicable Diseases	2	9000	8500	703	664
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International Journal of Pediatric Nursing	3	6000	5500	469	430
International Journal of Political Science	2	6500	6000	508	469
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Journal of Cardiovascular Medicine and Surgery	4	10500	10000	820	781
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Journal of Food Additives and Contaminants	2	6000	5500	430	391
Journal of Food Technology and Engineering	2	5500	5000	430	391
Journal of Forensic Chemistry and Toxicology	2	10000	9500	781	742
Journal of Global Medical Education and Research	2	6400	5900	500	461
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Journal of Plastic Surgery and Transplantation	2	8000	7500	625	575
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Ophthalmology and Allied Sciences	3	6500	6000	508	469
Pediatric Education and Research	4	8000	7500	625	586
Physiotherapy and Occupational Therapy Journal	4	9500	9000	742	703
RFP Gastroenterology International	2	6500	6000	508	469
RFP Indian Journal of Hospital Infection	2	13000	12500	1016	977
RFP Indian Journal of Medical Psychiatry	2	8500	8000	664	625
RFP Journal of Biochemistry and Biophysics	2	7500	7000	586	547
RFP Journal of Dermatology (Formerly Dermatology International)	2	6000	5500	469	430
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RFP Journal of Gerontology and Geriatric Nursing	2	6000	5500	469	430
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Review Article

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Concerns Related to Health Hazards from Livestock Waste

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Abstract

Livestock rearing is an important component in the rural India and domestic and commercial livestock are cows, buffalo, sheep, goat, pigs, rabbits, poultry etc. Huge amount of livestock waste is mostly handled by traditional way. Waste from animal production sites can greatly affect the surrounding environment, leading to increases in greenhouse gas emissions and decreases in water and air quality. Waste management practices can also determine the health of the animals, affecting the spread of disease between animal production sites and from animals to humans. The knowledge about livestock faecal pathogens, livestock waste & environment and health concerns of livestock wastes is crucial for control and prevention of transmission of such zoonotic faecal pathogens. The rapid growth of livestock production highlights the urgent need for effective policies to regulate intensive livestock operations and support environmentally and economically sustainable approaches to handling waste.

Keywords: Livestock; Waste; Environment; Quality; Health Hazards.

Introduction

Livestock rearing is an integral part of the Indian culture and is an important component of the agriculture and economic activities. The domestic and commercial livestock includes cattle, buffalo (heifer), sheep, goat, camel, pig, chicken, etc. In India, cattle and buffalo produce more than 70% of total excreta production annually. About 50% of cattle dung is used for the preparation of dung cakes used as fuel in rural India. The remaining 50% is a serious health hazard for the communities living in the vicinity and consuming contaminated water due to this large quantum of excreta.

India has topped a list of countries worst-affected by zoonotic diseases with widespread illness and death. Globally, 60% of all human diseases and 75% of all emerging infectious diseases have been found to be zoonotic. The International Livestock Research Institute (ILRI), Kenya and the Institute of Zoology, UK reported that most of these human infections were acquired from the world's 24-billion livestock. The study showed that 27% of livestock in developing countries like India showed signs of current or past infection with bacterial food-borne disease — a source of food

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contamination and widespread illness. While a lot of focus is being given on human excreta for the prevention and control of mortality and morbidity of humans, but very little attention or effort is paid for controlling and proper management practices for the animal excreta, which also pollutes the environment equally, if not more. It was therefore thought worthwhile to conduct a literature survey to understanding the health concerns of livestock waste and various diseases of zoonotic origin.

1. Wastes generated in Livestock farms

A waste is a resource remaining unutilized or a resource out of place. In India livestock waste is mostly handled by traditional way. India has vast resource of livestock and poultry, which play a vital role in maintaining and improving the socio-economic conditions of rural masses. The livestock sector utilizes large volume of agricultural byproducts including crop residues and converts these into nutrient rich animal products. Manure should promptly and completely be removed from the sheds so that it may not cause any disease. It should be well conserved so that it may not loose plant nutrients. Cattle dung has 77.5% water, 20.3% organic matter, 0.34% nitrogen, 0.16% phosphoric acid, 0.40% potash and 0.31% lime. Others are food waste like slaughterhouse waste, hatchery waste and dead animal carcasses pose threat on bio-security aspect of human and animal population.

Sr. No.	Species/animal	Total excreta /annum (million tons)
1.	Cattle	1152.76
2.	Buffalo	471.41
3.	Sheep	31.69
4.	Goat	50.52
5.	Pig	13.85
6.	Horse and Ponies	3.10
7.	Poultry	27.95
Total excreta production/annum (million tons)		1750.35

Non-green food waste:

Dead animals, dead poultry, slaughter house waste (birds and animals), hatchery waste, dead fishes and fish processing waste are non-green food waste, which are rich in nitrogen and adequate care should be taken to handle. The bio-security aspect of handling such waste is of serious concern. Improper handling of waste leads to obnoxious odor, fly problem and spread of diseases.

2. Livestock Faecal Pathogens

The main livestock are dairy and beef cattle, swine, sheep and poultry. Faeces from each livestock species contains a varied population of normal gut flora and pathogens, and represents risk to human health.

Cattle: Cattle, both dairy and beef, are present in high numbers around the world. The cattle pathogens likely to cause risk to human health are: E. coli, Campylobacter, Salmonella, Cryptosporidium parvum, and norovirus.

Swine: The enteric pathogens most likely present in swine manure include Clostridium perfringens, pathogenic E. coli, Salmonella, Campylobacter, Cryptosporidium, Giardia and norovirus. Of these, E. coli O157:H7 is most likely to survive manure storage and contaminate water. Campylobacter and Giardia have the greatest die offs in manure and would be less likely to contaminate water.

Poultry: Chicken and turkey manure contains a variety of microbes potentially pathogenic to humans. Most important as pathogens are: Salmonella, Campylobacter, and Clostridium perfringens. Cryptosporidium is not detected in poultry manure. Poultry litter (manure) contains faecal coliforms in concentrations (up to 9.5 x 108 CFU/g wet weight) greater than in the other livestock species. Manure is stored and often dried prior to application to agricultural fields. The process of storage and drying can reduce microbial concentrations in manure. Application of dried turkey litter to fields resulted in lower E. coli concentrations in field runoff than if cow manure was applied.

Sheep: Sheep production has an important place in animal agriculture. The zoonotic pathogen most likely to be present in sheep manure is Campylobacter, Salmonella, E. coli O157:H7. Cryptosporidium parvum and Giardia are not frequently isolated from sheep manure.

3. Livestock waste and the environment

Water quality

Animal wastes are spread as slurry over crops and pastures to fertilize the ground and enrich the soil with various forms of nitrogen. If an excess amount of animal droppings are applied to crops that are unable to fully utilize the nitrogen, the residual large nitrate content may leach through the soil to the ground water after harvesting and causes problems. One of the main pathways of field nitrogen loss is through leaching and runoff

losses to ground and surface water (Rotz, 2004). The resulting leachate and runoff enters the ground water and subsequently the drinking water sources of both human and livestock are polluted by high concentration of nitrates. According to international standards, nitrate concentration in ground and surface water that can be used for the preparation of drinking water should not exceed 50 mg per litre (i.e. 11.3 mg nitrate-N per litre) (EEC, 1980; CEC, 1991). In addition, a target concentration of 25 mg nitrate per litre has been established (EEC, 1980; CEC, 1991) and nitrate content exceeding 50 mg per litre is unacceptable (Van Der Meer and Wedin, 1989).

Soil contamination

Nitrogen and phosphorus may pollute the soil after manure application. Inorganic fertilizer (e.g. nitrogen) is lost by ammonia volatilization, depending on the rate and period of application, weather conditions and soil type. The volatility of nitrogenous source is important when selecting the mode of application of animal dropping. After volatilization, about 30% of the ammonia returns as wet or dry deposition to soils and vegetations within 5000 m of the source. A large part of the remaining 70% reacts in the atmosphere with SO2 and NOx and is transported over a distance of 5 to about 1×106m (Lekkerkerk et al., 1995). High rates of N deposition cause ecological damage to forests and nutrient-poor natural ecosystems (Heij and Schneider, 1995). These vegetations absorb and accumulate this N effectively with a resultant undesirable floristic changes, loss of biodiversity and physiological problems to trees, such as increased susceptibility to abiotic and biotic stress and deficiencies of other nutrients. Besides, deposition of NHx potentially contributes to soil acidification which may also affect vegetation. This acidifying effect only occurs after nitrification of NHx in the soil, particularly when part of the nitrates produced is lost by leaching (Lekkerkerk et al., 1995). It has been reported that when animal droppings are applied to the soil surface only about, ½ of the nitrogen and other components are available for the plant to use (FDACS, 1999). The excess phosphorus presents special problem, as a result of its low solubility in the soil, contaminates surface water and cause erosion.

Heavy metal contamination

Intensive livestock farming generally contributes to the accumulation of heavy metals in soils. Some heavy metals, in particular copper (Cu), and zinc (Zn) are essential minerals for farm animals. Although the requirement of these metals by most livestock categories can be completely or almost completely met by the feed ingredients, it is a common practice to supplement them via mineral mixtures, thereby resulting in excess supply. Other heavy metals, like cadmium (Cd), chromium (Cr), mercury (Hg), lead (Pb) and nickel (Ni) are nothing but pollutants. Livestock farms import heavy metals via purchased feeds, chemical fertilizers, sewage sludge and other types of waste. Large fractions (generally > 90%) of the heavy metals in livestock diets are excreted in manure. A study on soil-crop balances of the heavy metals Cd, Cr, Cu, Hg, Ni, Pb, and Zn in agricultural soils in The Netherlands showed surpluses of all the metals studied (Delahaye et al., 2003). This is a point of concern, because accumulation of heavy metals in the soil increases their availability and uptake by plants as well as leaching to groundwater and surface water. A prerequisite to sustainable agriculture is to control inputs of heavy metals in such a way that soil and water functions and product quality will not be impeded in the future (Moolenaar et al., 1998; Moolenaar,1999). Consequently, the concentrations of heavy metals in manure strongly depend on their concentrations in the feeds consumed and the subsequent use of such manures on soils leads high concentration of the metals. Other toxic substances that require attention in livestock production are antibiotics, hormones, and veterinary medical residues. These elements may have negative effects on food quality and human health as well as on the health of aquatic ecosystems.

Air quality

Most gaseous pollutants from the livestock industries originate from the breakdown of fecal matter and the concentration of such gases in part depend on the ventilation efficiency and rate of emission, as well as stocking density. Aerial pollutants include organic and inorganic dust, pathogens and other micro-organisms as well as gases such as ammonia, nitrous oxide, carbon dioxide, hydrogen sulphide and methane (Harry, 1978; Okoli et al, 2006). When the pH of livestock waste increases, the ammonium ion is converted to ammonia gas which easily volatilized to air. Ammonia volatilization contributes strongly to the high rates of atmospheric N. Ammonia emissions from wet animal droppings were found to coincide with odours, which are nuisance in area of intensive livestock production (Chavez et al., 2004).

Decomposition of organic materials in livestock manure results in the generation of malodorous and low molecular weight compound (Merril and Haverson, 2002). O' Neil and Philips (1992) reported that 60% of the compounds with the lowest odour thresholds in animal manure contain sulphur. The environment in the animal house is a combination of physical and biological factor which interact as a complex dynamic system of social interactions, husbandry system, light, temperature and the aerial environment. The high stocking density in modern animal house may lead to reduced air quality with high concentration of aerial pollutants (Ogbuewu et al, 2012)

4. *Health concerns of Livestock Wastes*

Animal manure is principally composed of organic material, moisture and ash. Decomposition of animal manure can occur either in an aerobic or anaerobic environment. Under aerobic conditions, CO2 and stabilized organic materials (SO2) are produced. Under anaerobic conditions, CH4, CO2 and SO2 are produced. Zoonosis means spreading of various diseases to humans either directly through excrement or by animal products. 27% of livestock in developing countries like India showed signs of current or past infection with bacterial food-borne disease — a source of food contamination and widespread illness.

India has topped a list of countries worst-affected by zoonotic diseases with widespread illness and death followed by Ethiopia, Nigeria and Tanzania. The first-of-its-kind global study mapping human-animal diseases has pinpointed an "unlucky" 13 zoonoses that are responsible for 2.4 billion cases of human illness and 2.2 million deaths per year. The 13 zoonoses were identified as most important. At least one-third of global diarrheal diseases are because of zoonotic causes. From cyst-causing tapeworms to avian flu, zoonoses present a major threat to human and animal health. 80% of pathogens — with a high potential for bio-terrorism — are zoonotic (Sewak, 2016). Cattle dung is a serious health hazard for the communities living in the vicinity and consuming contaminated water due to this large quantum of excreta. The operation of large farms housing high numbers of animals in one location often creates problems. Such diseases include parasitic diseases (e.g. helminthoses), viral diseases (e.g. rotavirus infections) and a variety of bacterial diseases.

Further bacterial endotoxins and exotoxins may spread through aerosols and cause respiratory problems. There is a potential risk to humans from exposure to livestock pathogens via the food chain or through direct or indirect contact with the environment, animals and animal manure. Storage of manure may not ensure elimination of these pathogens.

Table 2: Selected Faecal-Oral Pathogens and their Transmission Routes.

Pathogen	Important Reservoir/ Carrier	Transmission			X in Food
		Water	Food	p-to-p	
Campylobacter jejuni	Variety of animals	+	+	+	+
Salmonella typhi	Man and animals	±	+	±	+
Vibrio cholera	Man and animals	+	+	±	-
Cryptosporidium Parvum	Man and animals	+	+	+	-
Giardia lamblia	Man and animals	+	±	+	-

X in food = multiplication in food
p-to-p = person to person
+ = yes ± = rare - = no (Sewak, 2016)

Table 3: Prevalence of Enteric Pathogens in Humans and Cattle.

Pathogens	Human	Cattle
Salmonella spp	1%	0-13%
E.coli O157:H7	1%	16%
Campylobacter jejuni	1%	1%
Yersinia enterocolitica	0.002%	1%
Giardia lamblia	1-5%	10-100%
Cryptosporidium spp	1%	1-100%

(Sewak, 2016)

Table 4: Source of pollution vis-a vis Ratio of Faecal Coliform Bacteria to Faecal Streptococci.

Ratio	Indication
>4	Evidence suggests that the pollution is of human origin
2-4	Good evidence of predominance of human waste along with domestic animal waste
1-2	Good evidence of predominance of domestic animal waste along with human waste
<0.7	Stong evidence of domestic animal waste origin

These ratios are valid only for recent (within 24 hour) pollution.Such diseases include parasitic diseases (e.g. helminthiases), viral diseases (e.g. rotavirus infections) and a variety of bacterial diseases such as haemolytic uraemic syndrome from some of the following microorganisms contained in livestock waste.

Escherichia coli	Streptococcus agalactiae
Mycobacterium bovis	Leptospirosis
Pasteurella multocida	Pseudotuberculosis
Erysopelothrix rhusiopathiae	Brucella suis
Salmonellosis	Tularemia
Yersinia	Campylobacter fetus
Brucella abortus	Listeria monocytogenes

Enterococci (Streptococci) like:

- S. faecalis
- S. faecium
- S. avium
- S. gallinarum

Aerobic Sporeformers like

- Bacillus anthracis
- C. tetani
- C. botulinum

Some such pathogenic organisms may cause diseases in animals as well as in human. Further, bacterial endotoxins (produced and retained within them) and exotoxins (produced and released into the medium) may spread through aerosols and cause respiratory problems. Pathogenesis of livestock wastes depends upon the type of livestock waste, animal species, health status of the animal and characteristics of the manure and manure storage facilities. To reduce pathogens, animal manure may be treated aerobically via composting or in anaerobic or aerobic lagoons. Temperature and treatment time are the two most important process parameters, when evaluating process variables for the reduction of pathogens in solid manure and liquid effluent. During composting of solid manure, aerobic decomposition of organic matter and impeded heat transport cause heating of the material, often to 60-70°C. This heating process effectively kills most pathogens and weed seeds. At low temperatures, the reduction rate of pathogens is slow. Thus, after a lagoon treatment period of more than 120 days, the concentration of microorganisms remaining in the effluent from lagoons in Europe were high, viz. 105 per 100 ml for faecal coliforms and faecal streptococci and 104 per 100 ml for clostridia. But because of higher ambient temperatures, storage of liquid effluents in lagoons may be a more efficient and reliable treatment in Asia than in Europe. Hence, the efficiency of storage on pathogen reduction should be assessed before using as the sole treatment measure.

The continual addition of effluent to a lagoon will affect the effective retention time. Fresh additions of slurry may short-circuit the nominal retention time to much less than the hydraulic retention time, thereby greatly reducing affectively of the treatment. Therefore, the storage and treatment of the liquid effluent may be more effective as a batch operation, which will ensure that the real retention time and treatment retention time are similar.Composting may facilitate production of hygienic solid manure that may be applied to land with minimal risk from pathogens. Sediment or sediment solids and poultry manure can be treated this way, as well as slurry mixed with straw or other porous organic solid residues. During composting, the temperature of the material should exceed 55-65°C for at least one week to give a good reduction in pathogens and weed seeds. These conditions are generally achieved during normal composting.

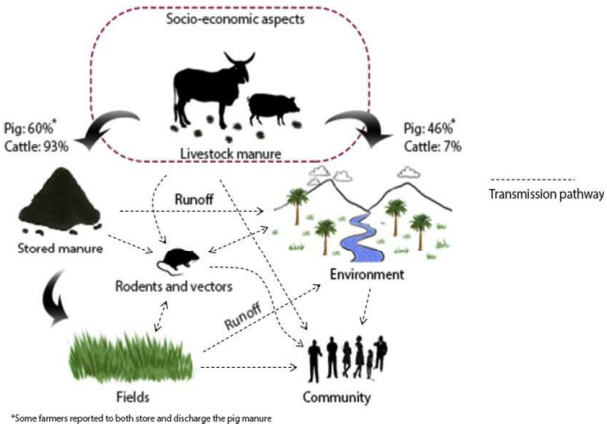

Diagram showing manure management and effect on public health.

Conclusion

Cows and buffalos are main milk producing animals and contribute more than 70% of total excreta production in India. 50% of the cattle dung is used to make dung cake and remaining 50% is required to be suitably utilized or disposed. It has number of pathogenic organism which is responsible for zoonotic diseases and unfortunately India has topped in zoonotic diseases with widespread illnesses. Microorganisms in livestock manure causes zoonotic diseases in humans include bacteria, protozoa, helminthic and virus. The bacterial pathogens are E. coli, Yersina enterocolittica, Salmonella, Campylobacter, etc. Faecal coliforms and faecal streptococci ratio indicate the presence of animal and human pollution. The ratio of 4 indicates the pollution is of human origin and <0.7 indicates pollution of animal waste origin. From the above collected literature, it may be concluded that livestock waste management and its handling & storage method play a crucial role in reducing adverse health impacts on humans.

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Review Article

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Glanders and Farcy Sero-Suerveillance in Uttar Pradesh: An Overview

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Abstract

Glanders and Farcy is a contagious and fatal disease of horses, donkeys and mules caused by infection with gram negative bacteria ***Burkholderia mallei***. The pathogen causes nodules and ulceration of mucus membrane in upper respiratory tract and lungs. A skin form also known as Farcy, which may be zoonotically importance in human beings. The disease was successfully controlled in UP state by continued sero surveillance at regular interval in each district of UP by National Research Center on Equines, Hisar with the help of veterinarian of department of animal husbandry UP and also adoption of Glanders and Farcy Act, 1899. It is rare disease in humans with cases having occurred in veterinarians and other people working closely with handling of horses and susceptible laboratory animals.

Key words: Glanders and Farcy; B mallei; Horses; Sero surveillance; Veterinarian.

Introduction

Glanders is a highly infectious and often fatal zoonotic disease[1,2,3] primarily affecting horses, donkeys and mules (solipeds) caused by gram negative rod shaped, non spore forming, facultative intracellular bacterium ***Burkholderia mallei***[4,3], characterized by nodules and ulcerations in the upper respiratory tract and lungs.[5,6,7] Carnivores like lion may be infected by eating meat. Lymphadenitis of submaxillary and retropharyngeal nodes is commonly seen.[8,9] A skin form also known as Farcy.[10] Entry of bacteria occurs through the skin abrasions, cuts and wounds through surface of eyes and nose. The bacteria can also infect humans through body fluids of an infected horse.

Laboratory animals are also susceptible to glanders including hamsters, mice and guinea pigs. Veterinarian, farriers and animal worker are susceptible to this important occupational disease.[11] The ***B. mallei*** are sensitive to the external environment and destroyed by direct sun light and common disinfectants. It can also be used as biological weapon and also as warfare agent.

Clinical findings

The incubation period for glanders in equines ranges from few days to many weeks (2-8 weeks). There is chronic nasal grey color discharge from the nostrils. Submaxillary lymph nodes are oedematous in nature. The skin of the lower limbs and abdomen

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are found to be mostly affected. The skin affection is ascribed as Farcy. There is high rise of temperature, dyspnoea. Animal die due to anoxia or septicaemia in case of acute infection where as in chronic case, intermittent fever, cough and respiratory distress, affected animal looses their hair coat,oedema of the hind limbs and ulcer of the skin healing leave an irregular star shaped scar.

Policy

In 20 March 1899, Governor General of India passed Glanders and Farcy Act, 1899 (Act 13 of 1899) for testing and destruction diseased horses with glanders and the outbreak is notifiable by the veterinary authorities. It was the first act on animal diseases to be propogated in India and now substituted by the Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009 which was implemented in India to prevent, control and eradicate the infectious diseases.

Diagnostic test

Mallein test and Complement Fixation Test are international prescribed diagnostic test for diagnosed glanders in equine species by Sero surveillance. Besides, enzyme linked immunosorbent assay (ELISA) may be used for human glanders diagnosis.

Sero surveillance Programme

Since 1988 there was no outbreak till August 2006 when the same was reported from Maharashtra after a long gap almost 20 years from Maharashtra after a long gap almost 20 years. This was followed by outbreaks in UP, Punjab, Uttarakhand, Andhra Pradesh and Himanchal Pradesh. The sero positive sporadic incidence were also reported at regular interval ranging from 6-12 in a year via sero surveillance by scrutinized 3-5 ml serum samples/lymphnode biopsy aseptically of equines with great care handling through NRCE Hissar in almost each district of UP i.e. Banda, Hamirpur, Kanpur, Raebareli, Lakhimpur khiri, Fatehpur etc. Thereafter, the Department of Animal Husbandry, Dairying and Fisheries is continuously issuing advisories to states for prevention and control of glanders including public awareness. The state animal husbandry department of UP should carry intensive physical and clinical surveillance of susceptible animal population throughout the year on regular basis and covers all the equines in the villages/equine movement routes/stables/ fairs for glanders so as to detect latently infected carrier horses. However, in endemic states 100 percent equine population within 5 km radius of foci of glanders outbreak and 50 percent equine population in next 5 km radius should be covered under surveillance programme. The suspected cases should be quarantined and subjected to test for which samples need to send to National Research Centre on Equines (NRCE) Hisar working as national reference laboratory for diagnosis of many equine diseases and tested as per the OIE approved tests, if found positive on CFT and/ or by approved test, animal should be culled and eliminated immediately and all the zoo sanitary measures should be followed at the time of culling and disposal of carcasses. The compensation paid by UP Government through chief veterinary officer of corresponding district to the livestock keepers/ equine owners with a rate Rs 25,000/- and Rs 16,000/- for culling of each horses and donkeys respectively.

Awareness Programme

The state animal husbandry department also conducts mass public awareness programme at state, district, taluka, village or fair level to sensitize the stakeholders and also enhance awareness regarding importance of the disease, its implication on equines and human health with capacity building of livestock keepers, village people to infectious zoonotic disease Glanders and Farcy. Instead of this, another FMD control programme of immunization of 23 rd round in all states of India under RKVY of highly contagious viral origin Foot and Mouth disease also continued with hundred percent of immunization of cattle and buffaloes except animal calf below 4 months age, advanced stage of pregnancy and diseased animal status of livestock with sero surveillance of vaccine titre against four strain of FMD before vaccination and 21-30 days after vaccination.

The infected equines particularly the asymptomatic horses as carrier animals are the greatest risk to humans. Therefore, local, regional animal and public health authorities need to pay careful attention and work together in the eventually of a suspected outbreak to expedite identification and control of human infection. Lack of awareness among horse and donkey owners and the limited availability of veterinary services are key factors responsible for under reporting of the disease. Hence, control of glanders and farcy need strict implementation of ongoing policy comprising education by training of trainees, awareness of owners and stakeholders (Veterinarian, Livestock

Extension Officers, Paravets, Pashumatry, Young youth, Equine Owners, Fair organizers etc) and continuous veterinary education programs as well as using social media, facebook, twitter, whatsapp base for skill development or through collaboration with common national programme like "Swachhta Mission" with regular sincerely monitoring of sero surveillance of equine species samples by state coordinator or agency in keen interest of both humans and equines. Strict implementation of testing for glanders and destroying the positive ones has further reduced the occurrence of disease.

Treatment/ Prevention

No treatment is available except only for prophylaxis and control, so culling of equine species obligatory. In case of death due to glanders, carcass should not be opened; it must be buried or incinerated 7. Manure, bedding and feed residue should be buried or burnt with carely follow biosafety measures for handlers.

Conclusion

Glanders is a highly infectious and often fatal zoonotic disease. That's why control of glanders and farcy need strict implementation of ongoing policy comprising education by training of trainees, awareness of owners and stakeholders (Veterinarian, Livestock Extension Officers, Paravets, Pashumatry, Young youth, Equine Owners, Fair organizers etc) and continuous veterinary education programs as well as using social media, facebook, twitter, whatsapp base for skill development or through collaboration with common national programme like "Swachhta Mission" with regular sincerely monitoring of sero surveillance of equine species

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Key messages: Glanders and Farcy are a zoonotic disease, which is transmitted to human being and highly fetal disease in equines.

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I **Dinesh Kumar Kashyap**, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-

(Dinesh Kumar Kashyap)

Case Report

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Therapeutic Management of incomplete Cervical Dilatation in a Buffalo: A Case Report

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Rajesh Kumar , Bhoopendra Singh, R. P. Diwakar *et al*. Therapeutic Management of Incomplete Cervical Dilatation In A Buffalo: A Case Report. Journal of Animal Feed Science and Technology. 2020;8(1):29–31

Abstract

Incomplete cervical dilatation is the third most common cause of dystocia in buffaloes and typically a disorder of ruminant cervix, more common in pluriparous animals. A buffalo of five years old, with first parity and approximately 550 kg body weight was presented at Veterinary Clinical Complex Kumarganj, Ayodhya with the history of straining since last two days, anorexia and foul smelling vaginal discharge. The case was unsuccessfully treated by a quack. During anamnesis, owner stated that animal has completed full term. Clinical examination revealed depressed animal with continuous straining. On pervaginam examination, cervix was found incompletely dilated. On trans-rectal palpation, sluggish fetal reflex was observed. Thus, the case was diagnosed as incomplete dilatation of the cervix. The animal was treated with cloprostinol sodium, valethamate bromide, estradiol valerate, betamethasone and fluid therapy. To alleviate pain and prevent secondary bacterial infection a course of antibiotic, anti-inflammatory and antihistamine was also administered for five days. Owner was also advised to drench liquid uterotone 100 ml twice a day for one week. The case was recovered uneventfully. Thus, it can be concluded that a case of incomplete cervical dilation in bovines can be managed with aforesaid therapy.

Keywords: Buffalo; Cervix; Dystocia, and Uterus.

Case Description

Incomplete cervical dilatation is the third most common cause of bovine dystocia (Jackson, 2004) and typically a disorder of ruminant cervix. The degree of incompleteness of cervical dilatation varies from virtually complete closure to the situation in which there is just a small rim of cervical tissue present, which is sufficient to reduce the size of birth canal and cause dystocia (Noakes et al., 2019). Incomplete cervical dilatation is more common in pluriparous bovines (Mee et al., 2008).

A buffalo of five years old, with one parity and approximately 550 kg body weight was presented at Teaching Veterinary Clinical Complex Kumarganj, Ayodhya with the history of straining since last two days, inappetance and foul smelling vaginal discharge. The case was treated by the quack but there was no response. During anamnesis, owner stated that animal has completed full term. On clinical examination, animal was found depressed with continuous straining, by pervaginam examination it was found that cervix was incompletely dilated (approximately two finger dilation). On trans-rectal palpation, sluggish fetal reflex was noted. On the basis of history, clinical examination, pervaginam

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examination and per rectal examination, the case was diagnosed as incomplete dilation of the cervix.

Result

The animal was treated with inj. Vetmate 2ml (Cloprostinol sodium 500 microgram), inj. Epidosin vet (Valethamate bromide 50 mg), inj. Progynon depot 3ml (estradiol valerate 30mg) and inj. Betnesol 5ml (Betamethasone 20mg) through intramuscular route. In order to correct electrolyte imbalance normal saline (2 lit) and RL (2 lit) was given by IV route. After 48 hrs of treatment the buffalo expelled live calf, placenta was also expelled 2-3 hrs later. To alleviate pain and prevent secondary bacterial infection a course of antibiotic (inj. Intacef 3 g) along with antiinflammatory (inj. Melonex 20 ml) and antihistamine (inj. Anistamin 10 ml) was given through intramuscular route for five days. Owner was also advised to drench liquid uterotone 100 ml twice a day for one week. The case was recovered uneventfully within seven days.

Discussion

The mechanism of cervical dilation in bovines is poorly understood. However, there are various factors that contribute to the condition viz altered hormonal milieu, which in turn, is the consequence of environmental disturbances like continuous presence of an observer, confinement or overcrowding calving accommodations. As a consequence, there is reduced uterine motility, cervical dilation and abdominal contractions with resultant prolonged calving and dystocia (Mee et al., 2008). In addition, hypocalcemia (clinical or subclinical) probably involved in the pathogenesis, by impairing myometrial contractions of uterus (subsequently causing uterine inertia). Moreover, improper cervical dilation may be the result of failure of fetus to engage in the cervix (breech presentation or simultaneous presentation of the twins), uterine torsion (Kumar et al., 2014) and scar formation in the cervix due to previous obstetric damage. It should be remembered that premature intervention in calving (i.e. incomplete first stage of labor) can lead to incorrect presumption of failure of cervical dilation and iatrogenic damage to cervix. On the other end, it should always be kept in the mind that duration over which cervix is dilated is relatively short, if the calf is not delivered during that time window, the cervix will start to close again, trapping the fetus within the uterus. The cervical ripening is multifactorial process that involves synchrony in hormonal events, inflammatory process and enzymatic breakdown of collagen (Balamurugan et al., 2018). Inadequate pre-calving estrogen concentration, and raised cortisol to progesterone ratio can result in impaired relaxation of cervix and pelvic ligaments. To manage incomplete cervical dilation various approaches have been reported like dilation of cervix by mechanical means (Roberts, 1971), use of spasmolytics like vetrabutin hydrochloride (Jackson, 2004), combination of drugs like valethamate bromide and PGF2α (Das et al., 2008; Purohit et al., 2011), cervical massage, calcium and magnesium borogluconate along with combinations of estrogens, valethamate bromide, PGF2α , dexamethasone (Kumar et al., 2014), intracervical application of misoprostol, a PGF1 analogue (Azawi et al., 2011; Azawi et al., 2012), cervicotomy (Sathiamoorthy et al., 2011) and cesarean section.

Conclusion

Incomplte cervical dilatation caused by multiple etiology and it is one of the most common cause of dystocia in buffalo. The condition can be managed successfully with aforesaid therapeutic protocols.

Conflict of Interest

The authors declare no conflict of interest with this manuscript.

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