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Effect of Kankrej Cow Urine Distillate and Panchgavya Supplementation on Growth Performance, Carcass Characteristics and Blood Biochemical Profile of Broiler Chickens

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ABSTRACT

A study was conducted during the month of December, 2023 and January, 2024 to evaluate the effect of cow urine distillate and Panchgavya supplementation on growth performance, nutrient digestibility, carcass characteristics and blood biochemical parameters of broiler chickens. A total of 200 day-old broiler chicks were uniformly distributed into four treatment groups with 50 birds per treatment for a period of 42 days. The dietary treatments were T_1: Basal diet, T_2: Basal diet+1 ml cow urine distillate (CUD) in drinking water bird^{-1} day^{-1}, T_3: Basal diet+1 ml Panchgavya in drinking water bird^{-1} day^{-1} and T_4: Basal diet+50 mg of Commercial feed grade antibiotic (Tylosin phosphate) kg^{-1} of feed. Results revealed that the mean final body weight and body weight gain in broiler chickens were not influenced by the inclusion of CUD and Panchgavya. There was no effect on feed intake, nutrient digestibility, carcass characteristics and blood biochemical parameters due to CUD and Panchgavya supplementation in broiler chickens. The feed conversion ratio was better in Panchgavya and feed antibiotic groups than the control group. The serum cholesterol level was significantly (p<0.05) reduced in Panchgavya and feed antibiotic groups followed by CUD group than the control. It may be concluded that supplementation cow urine distillate and Panchgavya in broiler chickens did not influence growth performance, feed intake, nutrient digestibility, carcass characteristics and blood biochemical parameters. Panchgavya and feed antibiotic supplementation improved feed conversion ratio and reduced serum cholesterol level in broiler chickens.

KEYWORDS: Cow urine distillate, carcass characteristics, chicken, growth, panchgavya

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1. INTRODUCTION

Poultry plays a significant role in providing supplementary income and livelihood to millions of farmers in India. As per 20th Livestock Census, the total poultry in the country was 851.81 million in 2019, increased by 16.8% (Anonymous, 2019). In India, the meat production from poultry was 4.995 mt, contributing about 51.14% of total meat production during year 2022–23 (Anonymous, 2023). Poultry products, such as eggs and meat, are an important source of proteins, vitamins, and minerals, contributing significantly to human nutrition. The demand for poultry products in India has been growing steadily, driven by the rising population, increasing disposable incomes, and changing dietary preferences (Singhvi and Menaria, 2020). The use of antibiotics in broilers is aimed at controlling enteric diseases, optimizing their performance and reducing the production costs (Eid et al., 2020). However, the use of antibiotic growth promoters has been associated with antibiotic residues in animal products leading to bacterial resistance to these drugs, posing a global health challenge (Anee et al., 2021). With increasing health awareness, consumers are demanding high-quality, safe, and nutritious food products. In light of this, several alternatives have been proposed to replace antibiotic growth promoters in poultry to improve growth performance, product quality and health (Choudhary et al., 2022; Devi et al., 2023; Dey et al., 2023; Gosai et al., 2023; Jain et al., 2023).

Indigenous cattle in India are robust, resilient and are particularly suitable to the climate and environment of their respective breeding tracts (Srivastava et al., 2019). In the Indian system of medicine, cow urine has a special significance. Cow urine and dung extract is used for nutrient supply and also for pest and disease management in plants and animals (Gopi et al., 2016; Rai et al., 2022). Cow urine distillate (CUD) contains many beneficial substances like calcium, phosphate, potassium, magnesium and growth-promoting substances in form of glucose, amino acids, and vitamins. The distillate portion of cow urine is also used as bio-enhancer for the actions of widely used antibiotics, antifungal, and anti-cancer medications (Raad et al., 2013). Panchagavya indicates a combination of cow dung, urine, milk, curd, and ghee together (Parkavi et al., 2021). Panchgavya is a living preparation of many beneficial microorganisms like bacteria, fungi and contains nutrients like proteins, carbohydrates, fats, amino acids, vitamins, etc (Kishor et al., 2020). Moreover, fermentation of these different ingredients results in the production of volatile fatty acids and reduction in pH leads to increased *Lactobacillus* count. Panchgavya can act as a source of both prebiotics and probiotics for poultry which will reduce the pH of the gut and helps in the growth of beneficial microbes and inhibiting the growth of pathogenic microorganisms. Earlier studies reported that Panchgavya has bioactive properties of like antioxidant (Sharma, 2009), immunostimulant (Gajbhiye et al., 2014) and antimicrobial activity (Ram and Garg, 2020). Cattle dung is a rich source of beneficial microbiota which may be utilized as a supplement of various nutrients and growth promoter in plants and animals (Dhiman et al., 2021). The literature is very scant on the effect of supplementation of cow urine distillate (Patel and Sharma, 2013; Sushma et al., 2021) and Panchgavya (Mathivanan et al., 2006; Priya et al., 2020; Mehala et al., 2021a) on the growth performance, carcass quality and health of broiler chickens. Therefore, the present study was carried out to assess the effects of Kankrej cow urine distillate and Panchgavya supplementation on growth performance, nutrient digestibility, carcass characteristics and blood biochemical parameters of broiler chickens.

2. MATERIALS AND METHODS

The present study was conducted during the month of December, 2023 and January, 2024 at Livestock Farm Complex, College of Veterinary Science and Animal Husbandry, Sardarkrushinagar, Gujarat, India which is located in semi-arid region of North Gujarat, India having latitude of 24.32' North and longitude of 72.31' East and at an elevation of 189 meters above the mean sea level. A total of 200 day-old broilers (Vencobb 400) straight run chicks were weighed on arrival and uniformly distributed into four treatment groups having 50 birds per treatment with five replicates of 10 chicks in each treatment for a period of 42 days. The dietary treatments were T_1: Basal diet (Anonymous, 2007), T_2: Basal diet+1 ml cow urine distillate in drinking water bird^{-1} day^{-1}, T_3: Basal diet+1 ml Panchgavya in drinking water bird^{-1} day^{-1} and T_4: Basal diet+50 mg of Commercial feed grade antibiotic (Tylosin phosphate) kg^{-1} of feed. The experimental protocol was approved (No. VETCOLL/IAEC/2021/18/PROTOCOL-01) by the Institutional Animal Ethics Committee.

2.1. Preparation of cow urine distillate and panchgavya

The early morning first urine of six apparently healthy Kankrej cows from Livestock Research Station, Sardarkrushinagar were collected. Cow urine was distilled using by glass distillation apparatus. The Panchgavya was prepared as per Natarajan (2002) procedure. Briefly, the fresh Kankrej cows dung (7 kg) and cow ghee (1 kg) was mixed thoroughly and incubated it for two days. Then, cow urine (3 litres) along with 10 litres of water was added to above mix and stirred them properly for one week daily at morning and evening. Then, add sugarcane juice (3 litres), cow milk (2 litres), cow curd (2 litres), tender coconut water (3 litres), yeast (100

g) and ripened banana (12). Stir the solution thoroughly and properly for three weeks daily at morning and evening. Finally, Panchgavya was ready, which was filtered through muslin cloth and used in this experiment.

The body weights and feed intakes were recorded at weekly intervals. The body weight gain (g) and feed conversion ratio (FCR=feed intake/weight gain) was calculated at weekly intervals. A metabolic trial of 5 days duration was conducted at the end of experimental feeding. Total 20 experimental birds (one bird from each replicate) were selected for metabolic trial. It involved quantification of feed intake and faeces excreted for assessing the digestibility of nutrients. The samples of feeds and faeces were collected, composited and dried at 60°C. The chemical compositions of samples were analyzed according to Anonymous (2007). The chemical composition of basal diet fed to experimental birds is given in Table 1.

Table 1: The chemical composition of basal diet fed to experimental birds

Chemical composition (%)	Pre-starter feed	Starter feed	Finisher feed
Dry matter	92.28	92.14	91.29
Crude protein	23.16	22.12	20.50
Ether extract	3.76	3.62	4.70
Crude fibre	3.17	3.78	3.61
Total ash	7.54	8.07	6.19
Nitrogen free extract	62.37	62.41	65.01
L-Lysine*	1.34	1.20	1.06
DL-Methionine*	0.54	0.51	0.47
Calcium*	1.00	1.00	1.00
Available phosphorus*	0.45	0.45	0.45
ME (kcal kg^{-1})*	3000.85	3101.26	3200.65

*Calculated values

The carcass traits such as carcass and dressed weight, dressing percentage, yields of breast, back, thigh, neck, wing and weights of spleen, liver, heart and gizzard were studied at the end of the experiment on eight birds from each treatment. On 42nd day, the blood samples were collected from experimental birds. The samples were analyzed for glucose, total proteins, albumin, triglycerides, cholesterol, serum glutamic pyruvic transaminase (SGPT) and serum glutamic oxaloacetic transaminase (SGOT) concentrations using commercial diagnostic kits. The return over feed cost was calculated as difference between income generated through sale of birds and the expenditure on feed during experimental period.

The data obtained were subjected to analysis of variance (ANOVA) using the statistical package of SPSS software v.20 (SPSS Inc./IBM Corp., Armonk, New York, NY, USA). Differences between treatments means were statistically compared using Duncan's post-hoc test procedure, when significant (p<0.05) treatment effects were detected.

3. RESULTS AND DISCUSSION

3.1. Growth performance

The mean final body weights at sixth week of age in broiler chickens were 2298.00±68.22, 2315.96±36.08, 2337.42±35.43 and 2328.22±42.06 g $bird^{-1}$ in T_1, T_2, T_3 and T_4 groups, respectively. The body weights at weekly intervals did not show any significant (p>0.05) differences among the treatments (Table 2). The overall body weight gain during experimental period in broiler chickens was 2255.08±67.93, 2271.80±36.27, 2294.34±35.69 and 2284.54±42.42 g $bird^{-1}$ in T_1, T_2, T_3 and T_4 groups, respectively. No significant (p>0.05) differences in the overall body weight gain in broiler chickens was observed among the treatments (Table 2).

The improved growth performance in broiler chickens supplemented with Panchgavya was expected as it contains beneficial microbes like *Lactobacillus* and *Bifidobacter*. Healthy microbes due to their ability of adhesion to the intestinal mucosa, allow to create a natural barrier against potential pathogens, and thus enhances immunity and production (Dankowiakowska et al., 2013). Similar to the present findings, Tadavi et al. (2017) observed that broiler chickens fed with cow urine distillate does not show any significant (p<0.05) effect on body weight. While, some studies reported significant increase (p<0.01) in body weight in broiler birds at different dosage and combinations of Panchgavya with phytogenic feed additives (Mathivanan et al., 2006; Kishor et al., 2020; Priya et al., 2020).

3.2. Feed intake and feed conversion ratio

The total feed intake during experimental period in broiler chickens was 4051.04±74.95, 3944.78±81.15, 3965.70±66.27 and 3943.54±108.83 g $bird^{-1}$ in T_1, T_2, T_3 and T_4 groups, respectively. The total feed intake during experimental period in broiler chickens showed no significant (p>0.05) differences among the treatments (Table 2). It indicates that there was no adverse effect of cow urine distillate or Panchgavya supplementation on palatability of feed. The overall feed conversion ratio during experimental period in broiler chickens was 1.84±0.11, 1.78±0.06, 1.70±0.04 and 1.70±0.04 in T_1, T_2, T_3 and T_4 groups, respectively. The overall feed conversion ratio during experimental period in broiler chickens showed no significant (p>0.05) differences among the treatments. However, overall better feed conversion ratios were observed

Table 2: Effect of Kankrej cow urine distillate and Panchgavya supplementation on growth performance of broiler chickens at weekly intervals

Age in weeks	Treatments				*p* value
	T_1	T_2	T_3	T_4	
Body weight (g bird^{-1})					
Initial	42.92±0.74	44.16±0.59	43.08±0.34	43.68±0.95	0.578
I	167.06±3.30	164.48±2.40	162.92±1.15	162.46±1.87	0.510
II	452.06±15.37	459.33±6.88	455.77±4.09	446.25±7.76	0.792
III	783.42±26.59	796.54±22.33	769.49±1.61	766.95±22.92	0.732
IV	1354.44±45.84	1361.71±38.00	1352.95±13.99	1332.08±46.86	0.953
V	1970.11±66.06	2044.31±43.76	1982.78±23.04	1949.75±33.82	0.495
VI	2298.00±68.22	2315.96±36.08	2337.42±35.43	2328.22±42.06	0.941
Body weight gain (g bird^{-1})					
I	124.14±3.87	120.32±2.18	119.84±1.21	118.78±2.71	0.531
II	285.00±16.46	294.85±8.02	292.85±3.36	283.79±6.03	0.810
III	331.36±13.16	337.21±18.77	313.73±5.36	320.70±15.97	0.656
IV	571.02±20.98	565.17±36.33	583.46±14.05	565.13±28.18	0.954
V	615.67±20.62	682.60±42.14	629.83±28.87	617.67±14.77	0.337
VI	327.89±74.83	271.65±28.24	354.65±25.13	378.47±48.79	0.464
Overall	2255.08±67.93	2271.80±36.27	2294.34±35.69	2284.54±42.42	0.942
Feed intake (g bird^{-1})					
I	148	148	148	148	-
II	429.52±3.61	432.66±14.32	421.92±5.03	428.68±26.43	0.966
III	656.16±10.82	649.72±11.72	632.60±10.38	628.10±15.82	0.349
IV	987.84±33.50	902.44±41.61	916.12±19.94	889.46±28.01	0.168
V	1120.16±18.56	1097.74±23.19	1097.64±30.31	1106.10±25.39	0.906
VI	709.36±24.39	714.22±23.84	749.42±33.53	743.20±48.62	0.789
Overall	4051.04±74.95	3944.78±81.15	3965.70±66.27	3943.54±108.83	0.780
Feed conversion ratio					
I	1.20±0.04	1.23±0.02	1.23±0.01	1.25±0.03	0.617
II	1.53±0.09	1.47±0.06	1.44±0.02	1.52±0.11	0.833
III	1.99±0.08	1.95±0.13	2.02±0.01	1.98±0.12	0.972
IV	1.73±0.02	1.64±0.16	1.57±0.05	1.59±0.09	0.664
V	1.82±0.04	1.63±0.11	1.75±0.07	1.79±0.06	0.323
VI	2.77±0.78	2.74±0.28	2.17±0.22	2.05±0.17	0.542
Overall	1.84±0.11	1.78±0.06	1.70±0.04	1.70±0.04	0.423

in T_3 and T_4 groups followed by T_2 group as compared to the T_1 group (Table 2). Similar to the present findings, Tadavi et al. (2017) reported that there was no significant difference (p>0.05) in feed intake in broiler chickens fed cow urine distillate and control group. Moreover, Priya et al. (2020) reported that there was no effect of Panchagavya and triphala supplementation on feed intake and feed conversion ratio in broilers. In contrast, Mehala et al. (2021a) reported that Panchgavya supplementation significantly (p<0.05) improved feed conversion ratio as compared to other dietary groups.

3.3. Nutrient digestibility

The nutrient digestibility (%) in broiler chickens fed on

the experimental diets, assessed at the end of feeding through the metabolism trial, is presented in Table 3. The apparent nutrient digestibility of dry matter, crude protein, ether extract and crude fibre were comparable and with no significant differences (p>0.05) among the treatment groups.

The difference in the apparent digestibility of dry matter, crude protein, ether extract and crude fibre were non-significant among the groups. Therefore, it is evident that supplementation of cow urine distillate and Panchgavya have no adverse impact on the digestive efficiency of the broiler chickens.

Table 3: Effect of Kankrej cow urine distillate and Panchgavya supplementation on apparent nutrient digestibility (%) of broiler chickens

Digestibility (%)	Treatments				p value
	T_1	T_2	T_3	T_4	
Dry matter	68.76± 0.95	69.65± 1.09	70.17± 1.64	69.75± 1.45	0.891
Crude protein	63.02± 0.80	63.32± 1.05	65.63± 1.89	63.84± 1.73	0.582
Ether extract	69.62± 0.92	71.48± 1.02	72.99± 1.49	70.68± 1.40	0.274
Crude fibre	46.69± 1.62	48.43± 1.97	48.73± 2.61	47.91± 2.48	0.918
Nitrogen free extract	73.06± 0.96	72.52± 1.21	73.26± 1.49	73.87± 1.25	0.896

3.4. Carcass characteristics

The mean dressing percentage in broiler chickens was 71.23±1.22, 72.49±0.52, 72.07±1.51 and 70.96±1.22 in T_1, T_2, T_3 and T_4 groups, respectively without any significant (p>0.05) differences among the treatments (Table 4). The yields of breast, back, thigh, neck and wing as well as weights of liver, heart and gizzard were not affected (p>0.05) by the dietary treatments (Table 4). In present study, results revealed that supplementation of cow urine distillate and Panchgavya in the diet of broiler chickens did not (p>0.05) influence carcass characteristics. Moreover, there was lack of changes in spleen, liver, heart and gizzard weights reveal that supplementation of cow urine distillate and Panchgavya in broiler chickens did not have any detrimental effect on these organs. In agreement to the present findings, Mehala et al. (2021b) observed that carcass characteristics of broiler chickens were not affected due to dietary inclusion of panchagavya and phytogenic feed additives.

3.5. Blood biochemical parameters

The effect of cow urine distillate and Panchgavya supplementation on blood biochemical parameters of broiler chickens is presented in Table 5. The serum concentrations

Table 4: Effect of Kankrej cow urine distillate and Panchgavya supplementation on carcass characteristics of broiler chickens

Age in weeks	Treatments				p value
	T_1	T_2	T_3	T_4	
Pre-slaughter weight (g)	2309.00 ±57.72	2306.20 ±50.81	2313.30 ± 87.48	2310.90 ± 51.16	0.988
Dressed weight (g)	1644.70 ±48.69	1671.20 ±35.43	1672.90 ±79.62	1639.40 ±44.27	0.958
Dressing (%)	71.23 ±1.22	72.49± 0.52	72.07± 1.51	70.96± 1.22	0.777
% of live weight					
Breast	26.49± 0.95	26.25± 0.38	26.66± 0.69	26.35± 0.85	0.982
Back	12.76± 0.54	12.66± 0.53	12.28± 1.01	12.82± 0.58	0.946
Thigh	16.76± 0.76	18.11± 0.46	17.84± 0.25	17.06± 0.72	0.330
Neck	3.48± 0.15	3.33± 0.11	3.18± 0.25	3.32± 0.13	0.662
Wing	6.17± 0.41	6.43± 0.34	6.19± 0.43	5.87± 0.25	0.758
Liver	1.77± 0.14	1.85± 0.06	1.96± 0.05	1.82± 0.05	0.483
Heart	0.65± 0.05	0.70± 0.04	0.61± 0.02	0.63± 0.04	0.486
Gizzard	3.15± 0.15	3.17± 0.14	3.34± 0.10	3.09± 0.10	0.525

of glucose, total protein, albumin and triglycerides in broiler chickens did not differ among the treatment groups. The mean serum cholesterol level (mg dl^{-1}) was significantly (p<0.05) decreased in T_3 (140.19) and T_4 (143.17) groups followed by T_2 (160.08) group as compared to the T_1 (181.09) group. The serum triglycerides and cholesterol lowering effect of cow urine distillate and Panchgavya was attributed to its anti-hyperlipidemic properties. Similar to the present findings, Manubhai et al. (2014) reported that cow urine ark supplementation significantly (p<0.05) decreased cholesterol level. Chauhan and Jakhar (2022) found that there was significant reduction in cholesterol level in broilers due to supplementation of Badri cow urine distillate.

There was no difference in serum concentrations of SGPT and SGOT in broiler chickens supplemented with cow urine distillate and Panchgavya. No effect in serum levels of SGPT and SGOT in broiler chickens fed with cow urine distillate and Panchgavya indicate that there was no adverse effect of this supplementation on liver function of broiler chickens.

Table 5: Effect of Kankrej cow urine distillate and Panchgavya supplementation on blood biochemical parameters of broiler chickens

Parameters	Treatments				*p* value
	T_1	T_2	T_3	T_4	
Glucose (mg dl^{-1})	237.30±5.73	241.50±4.04	244.00±9.80	238.60±20.52	0.978
Total protein (mg dl^{-1})	4.50±0.34	4.36±0.19	4.39±0.38	4.33±0.08	0.974
Albumin (mg dl^{-1})	1.53±0.02	1.51±0.12	1.56±0.27	1.54±0.20	0.998
Triglycerides (mg dl^{-1})	46.84±2.33	46.77±3.65	44.92±3.89	45.54±1.20	0.958
Cholesterol (mg dl^{-1})	181.09^{b}±5.67	160.08^{ab}±6.97	140.19^{a}±14.15	143.17^{a}±12.31	0.049
SGPT (U l^{-1})	10.60±1.71	10.03±1.00	11.72±1.49	11.67±0.86	0.754
SGOT (U l^{-1})	341.77±14.68	332.18±17.86	331.26±46.04	336.51±25.67	0.993

abMeans in a row with different superscripts differ significantly (p<0.05); SGPT: serum glutamic pyruvic transaminase; SGOT: serum glutamic oxaloacetictransaminase

4. CONCLUSION

The mean final body weight and body weight gain in broiler chickens were not influenced by the inclusion of cow urine distillate and Panchgavya. Supplementation cow urine distillate and Panchgavya in broiler chickens had no adverse effect on feed intake, nutrient digestibility, carcass characteristics and blood biochemical parameters. Panchgavya and feed antibiotic supplementation improved feed conversion ratio and return over feed cost along with reduction in serum cholesterol in broiler chickens.

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