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Body Weight, Feed Consumption and FCR of Broiler Chicken upon Dietary Supplementation of Ajwain (*Trachyspermum ammi*)

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A B S T R A C T

The present study was aimed to study the effect of dietary supplementation of ajwain on the performance of broiler chicken. Two hundred and twenty five one-day old unsexed broiler chicks were used on a completely randomized design in 5 groups with 3 replicates, each consisting of 15 broilers. The treatments included the control group (basal diet) and four groups with basal diet + ajwain powder @ 0.1% in feed, basal diet + ajwain powder @ 0.2% in feed and basal diet + ajwain seeds soaked in drinking water over nightly @ 0.1% and basal diet + ajwain seeds soaked in drinking water over nightly @ 0.2% respectively. Temperature and humidity of the shed were recorded daily to calculate Temperature Humidity Index (THI). Standard feeding and all other managemental practices were followed during the experimental period. The results obtained regarding performance of the broilers showed that no significant difference was observed in body weight and body weight gain. However, feed intake and feed conversion ratio between the groups treated by ajwain and the control group differ significantly ($P<0.05$). Through this experimentation it can be concluded that ajwain can act as effective alternative to AGP in broiler industry.

Introduction

Ajwain (*Trachyspermum ammi*) is an aromatic, grassy and annual medicinal plant belonging to Apiaceae (Umbelliferae) family. It is mostly grown in areas like in Egypt, Iran, Iraq, Pakistan and east India. In India mostly it is grown in Rajasthan, Gujarat and M.P. The name Ajwain originated from Sanskrit word Yavanaka or Ajomoda. It is known by various vernacular names such as Bishop's weed (Sanskrit), Carom or Thyme seed (English name) and Ajowan or Ajwain or Omum (Indian name). Ajwain is highly esteemed as a remedial agent for flatulence, flatulent colic, atonic dyspepsia, diarrhoea - in short, as a digestive aid and also as an antiseptic (Bentely and Wrimen, 1999). Thymol, the major phenolic compound present in Ajwain, has been reported to be germicide, antispasmodic and antifungal agent (Murthy *et al.*, 2009). Some researchers proved an increase in body weight and decrease in feed efficiency when using these herbal plants in broilers diets (Great head, 2003).

Growth promoters are agents added to poultry feeds in order to enhance the feed conversion efficiency and body growth and broadly can be categorized as Antibiotic growth promoters (AGP) and Non–Antibiotic growth promoters (NAGP). In the past the major growth promoters were antibiotics. Antibiotic growth promoters have been helpful in improvement of growth performance and feed conversion ratio in poultry (Miles *et al.,* 2006; Dibner and Buttin, 2002 and Izat *et al.,* 1990). However, constant treatment of poultry by antibiotic may result in residues of these substances in poultry products and bacteria resistance against treatments in human body. Due to such threats to human health, use of antibiotics in poultry is banned in many countries (Owens *et al.,* 2008; Alcicek *et al.,* 2004 and Hinton, 1988).

On the other hand use of NAGP is commonly regarded as favourable alternatives to AGP in poultry production. The main advantage of NAGP over AGP is that they usually do not bear any risk regarding bacterial resistance or undesired residues in meat. Addition of NAGP to feeds of poultry may have a number of beneficial effects, including rapid development of a healthy gut microflora and stabilization of digestion along with improved feed efficiency. Keeping in view the facts stated above, the present study was planned to observe the effect of supplementation of ajwain on the body weight gain, feed consumption and feed conversion ratio (FCR) of broiler chicken.

Materials and Methods

Two hundred and twenty five day-old broiler chicks were obtained from a local commercial hatchery and were weighed; wing banded and randomly allotted to five treatment groups viz. T_1, T_2, T_3, T_4& T_5, with three replications having fifteen chicks in each. The control group $T_1$was fed a basal diet (BIS, 2007) while the birds in group T_2:control + Ajwain powder in feed @ 0.1 %; T_3: control + Ajwain powder in feed @ 0.2 %; T_4: control + soaked seeds of Ajwain in drinking water over nightly @ 0.1 % and T_5: control + soaked seeds of Ajwain in drinking water over nightly @ 0.2 % were supplemented. Before formulation of experimental rations (pre-starter, starter and finisher) the feed ingredients were analyzed for proximate composition(AOAC, 2005) and experimental diet offered is presented in Table 1. Ajwain seeds were grinded in a grinder-mixer to make fine powder. Ajwain seeds were soaked in drinking water over nightly and aqueous solution was prepared after sieving through muslin cloth twice.

The chicks were routinely vaccinated and reared under strict hygienic conditions on deep litter system maintaining all standard managemental practices including brooding, lighting, raking of litter, cleaning of feeders, drinkers etc.

Chicks were individually weighed at arrival and after that at weekly interval. Feed intake was also measured at weekly interval during the experiment and feed conversion ratio (FCR= feed intake/weight gain) was calculated for the same interval. The data pertaining to various parameters were analyzed statistically (Snedecor and Cochran, 1994). All the data were subjected to ANOVA using the General Linear Models procedure of SAS software (SAS Institute, 2003). The significant mean differences were tested as per Duncan's multiple range test and significance was declared at $P<0.05$.

Results and Discussion

Body weight

The mean body weight of broilers fed on ajwain supplemented diet recorded at 0, 7, 14,

21, 28, 35 and 42 days of age is presented in Table 2. The mean body weight of day old chicks was about 46.12g (45.87 to 46.53g). On supplementation of diet with ajwain, the average body weight of broiler chicks showed statistically non-significant differences among various treatments at all ages. The corresponding body weights of broilers recorded on 7, 14, 21, 28, 35 and 42 days of age ranged from 120.53 (T2) to 125.98 (T5), 328.20 (T1) to 337.09 (T3), 628.79 (T4) to 655.45 (T3), 1047.14 (T2) to 1082.19 (T3), 1575.65 (T4) to 1660.03 (T5), and 2106.48 (T4) to 2201.64 (T5) grams, respectively.

Cumulative weight gain

The average cumulative weight gain of broilers showed statistically non-significant differences among various treatments at all ages (Table 3). The mean cumulative body weight per bird recorded at 7, 14, 21, 28, 35, 42 days of age ranged from 74.67 (T2) to 79.44 (T1 and T5), 282.29 (T1) to 290.96 (T3), 582.76 (T4) to 609.33 (T3), 1001.24 (T2 and T4) to 1036.07 (T3), 1529.75 (T4) to 1613.44 (T5) and 2060.57 (T4) to 2155.05 (T1) grams, respectively.

Weight gain/bird/week

The average body weight gain/bird/week of broilers showed statistically non-significant differences among various treatments at all ages (Table 4). The data recorded at weekly interval ranged from 74.67 (T2) to 79.44 (T1), 202.84 (T1) to 214.13 (T3), 297.81 (T4) to 319.66 (T3), 406.14 (T2) to 433.83 (T5), 534.75 (T4) to 585.97 (T2) and 530.08 (T3) to 543.72 (T2) grams during 1, 2, 3, 4, 5 and 6 week of experiment, respectively.

Daily weight gain

The values showed non-significant differences among all the treatments at all ages (Table 5). The daily weight gain values recorded at weekly interval ranged from 10.67 (T2) to 11.35 (T1 and T5), 28.98 (T1) to 30.59 (T3), 42.54 (T4) to 45.67 (T3), 58.02 (T2) to 61.98 (T5), 76.39 (T4) to 83.71 (T2) and 75.73 (T3) to 77.67 (T2) grams at 1, 2, 3, 4, 5 and 6 week, respectively.

The supplementation of ajwain in broilers diet has shown non-significant effect on body weight. These results are in agreement with most of the findings of earlier researchers (Demir *et al.,* (2005); Arczewska-Włosek and Swiątkiewicz (2012); Tripathi, *et al.,* (2013); Haselmeyer *et al.,* (2015) and in contrast, Muhammad *et al.,* (2000); Awad *et al.,* (2008); Srivastava *et al.,* (2012); Valliolahi*et al.,* (2014); Dinodiya *et al.,* (2015) and Omar *et al.,* (2016). The significant results observed by some of the previous research workers might be due to feeding of different diets and addition of ajwain having different composition in different ratio or in combination with other phytobiotics etc.

Feed consumption

Statistically significant differences in the mean feed consumption at 7, 14, 21, 28 35 and 42 days of age were observed amongst all the groups (Table 6). The mean feed consumption of broilers at 7, 14, 21, 28 35 and 42 days of age remained significantly higher ($P<0.05$) in the treatment groups T_5 and T_4 as compared to control group T_1. The mean values of feed consumption of broilers ranged from 101.00 (T_1) to 113.00 (T_5), 427.89 (T_1) to 460.67(T_4), 956.78 (T_1) to 1030.22 (T_3), 1794.56 (T_1) to 1879.11 (T_3), 2805.67 (T_1) to 2921.33 (T_3) and 3898.99 (T_1) to 3993.55 (T_3) grams at 7, 14, 21, 28, 35 and 42 days of age, respectively.

Feed consumption/ bird/week

The mean feed consumption/ bird at weekly interval reared under different treatments is

presented in Table 7. The mean feed consumption of broilers during first 5 weeks of experiment remained significantly higher ($P<0.05$) in the treatment groups T_5 and T_3 as compared to control group T_1. Statistically no significant differences in the mean weekly feed consumption per bird were observed during last week of the experiment amongst all the groups. The mean values recorded during 1, 2, 3, 4, 5 and 6 week of experiment ranged from 101.00 (T_1) to 113.00 (T_4), 326.89 (T_1) to 350.67 (T_4), 528.89 (T_1) to 566.67 (T_2), 817.78 (T_4) to 848.89 (T_3), 1011.11 (T_1) to 1053.33 (T_5) and 1068.89 (T_4) to 1093.33 (T_1) grams, respectively.

Daily feed consumption/ bird

The mean daily feed consumption/ bird at weekly interval reared under different treatments is presented in Table 8. The mean daily feed consumption of broilers during first 5 week of experiment remained significantly higher ($P<0.05$) in the treatment groups T_4 and T_5 as compared to control group T_1. Statistically no significant differences in the mean daily feed consumption per bird were observed during 6^{th} week of the experiment amongst all the groups. The mean values ranged from 14.43 (T_1) to 16.14 (T_5), 46.70 (T_1) to 50.09 (T_4), 75.56 (T_1) to 82.16 (T_3), 116.83 (T_5) to 121.87 (T_3), 144.45 (T_1) to 150.48 (T_5) and 152.70 (T_4) to 156.19 (T_1) grams during 1, 2, 3, 4, 5 and 6 week, respectively.

The results showed that feed consumption was significantly ($P<0.05$) increased in the birds fed ajwain at 42 day of age. However feed consumption was influenced up to 5 weeks of age due to supplementation of ajwain in the diet as compared to the control group birds. Results of weekly feed consumption reveal that feed consumption was significantly ($P<0.05$) increased among treatment groups in comparison to control group. Although the birds fed ajwain had higher feed consumption up to 42 days of age, its effect was not observed on body weight. Arczewska-Włosek and Swiątkiewicz (2012) reported no significant difference in feed intake and FCR of herbal extract supplemented group compared to control group.

Guo *et al.,* (2004) reported higher feed intake and Omar *et al.,* (2016) higher feed intake in the groups that received natural herb extract than control group. Demir *et al.,* (2005) observed less feed intake in ajwain group than control group significantly. In addition, improvement in FCR was observed for broilers treated with ajwain compared to the control group, but the difference was not significant.

Feed conversion ratio

The mean cumulative feed conversion ratio (FCR) of broilers provided ration with supplementation of ajwain is presented in Table 9. The mean FCR values of T_4 and T_5 were significantly higher ($P<0.05$) as compared to control group (T_1) at 7, 14 and 21 days of experiment. The mean FCR values of T_5 were significantly lower as compared to control group (T_1) at 28 and 35 days of experiment. There is no significant difference in mean FCR at 42 days of experiment among various treatments. The FCR values ranged from 1.28 (T_1) to 1.46(T_5), 1.51 (T_1) to 1.68 (T_4), 1.62 (T_1) to 1.77 (T_4), 1.73 (T_5) to 1.87 (T_4), 1.76 (T_5) to 1.89 (T_4) and 1.87 (T_5) to 1.93 (T_4) at 7, 14, 21, 28, 35 and 42 days of age, respectively.

Weekly feed conversion ratio

The mean weekly feed conversion ratio (FCR) of broilers provided ration with supplementation of ajwain is presented in Table 10. The mean FCR values of T_2 and T_5

were significantly higher (P<0.05) as compared to control group (T_1) at 5th week of experiment. There is no significant difference in mean FCR at 6th week of experiment. The data recorded on mean FCR ranged from 1.28 (T_3) to 1.46 (T_5), 1.60 (T_1 and T_5) to 1.79 (T_4), 1.71 (T_1) to 1.87 (T_2), 1.90 (T_5) to 2.00 (T_1 and T_4), 1.81 (T_5) to 1.95 (T_3) and 2.00 (T_3) to 2.12 (T_5) at 1, 2, 3, 4, 5 and 6 week, respectively.

Table.1 Quantity of ingredients and chemical composition (% DM basis) of experimental diet (kg/100 kg feed)

Name of Ingredients	Quantity		
	Pre-starter (0-1 week)	**Starter (2-3 weeks)**	**Finisher (4-6 weeks)**
Maize	51	53	57
Soyabean meal	23	19	16
Ground nut cake	10	12	11
Rice polish	3	3	4
Fish meal	8	7	5
***Mineral mixture**	2	2	2
Vegetable oil	3	4	5
****Feed additives (g/100kg of ration)**	**0-1 week**	**2-3 weeks**	**4-6 weeks**
Spectromix (g)	10	10	10
Spectro BE (g)	20	20	20
Cocciwin (g)	50	50	50
Choline chloride (g)	50	50	50
Lysine (g)	50	50	50
DL - methionine (g)	80	80	80
Antibiotic (chlortetracycline)	150	150	150
Chemical composition	**Pre-starter**	**Starter**	**Finisher**
Moisture %	10.34	10.84	10.88
Crude protein %	23.28	21.96	19.76
Crude fibre %	3.64	3.61	3.32
Ether extract %	6.98	8.38	8.98
Total ash %	6.30	6.18	5.86
Nitrogen free extract %	49.53	48.97	50.88
Methionine %	0.45	0.40	0.35
Lysine %	1.26	1.15	0.94
Metabolizable energy (Kcal/Kg)	2960	3050	3162

*Mineral mixture (salt free): Ca (32%), P (6%), Mn (0.27%), Zn (0.26%), Iodine (0.01%), Fe (1000 ppm), Cu (100 ppm), and Co (50 ppm).

**Spectromix Powder: Each gm contained Vitamin A-82,500 IU, Vit. B2-50 mg, Vit. D3-12,000 IU, and Vit. K-10mg, Spectro BE Powder: Each gm contained Vit.B1-8 mg, Vit.B6-16 mg, Vit.B12-80 mg, Niacin- 120mg, Vit. E-160 mg, Lysine hydrochloride-10 mg, DL-methionine- 10 mg, Calcium pentothenate -80mg, and Calcium – 260mg, Cocciwin: Dinitro- O – Toluamide, Lysine: Contained 98 per cent lysine, DL- methionine: Contained 98 per cent methionine, Choline chloride: Contain 60 percent choline, Antibiotic chlortetracycline: Control group only

Table.2 Treatment means of average body weight (g/bird) during different growth periods

Age (in days)	Treatments				
	T_1	T_2	T_3	T_4	T_5
0	45.91 ± 0.49	45.87 ± 0.45	46.13 ± 0.43	46.11 ± 0.62	46.53 ± 0.51
7	125.36 ± 2.36	120.53 ± 2.13	122.96 ± 2.39	125.00 ± 1.89	125.98 ± 2.63
14	328.20 ± 6.02	331.51 ± 5.18	337.09 ± 5.89	330.96 ± 7.00	331.31 ± 5.04
21	638.95 ± 9.73	641.00 ±12.81	655.45 ±12.35	628.79 ± 9.75	641.48 ± 10.63
28	1058.83 ± 16.25	1047.14 ± 27.83	1082.19 ± 18.36	1047.26 ± 16.74	1075.31 ± 16.93
35	1594.97 ± 26.33	1623.82 ± 28.26	1619.90 ± 37.13	1575.65 ± 26.89	1660.03 ± 23.93
42	2132.41 ± 32.25	2167.54 ± 37.03	2149.97 ± 44.11	2106.48 ± 31.83	2201.64 ± 31.86

Each value is a mean of three replicates

Table.3 Effect of ajwain on mean cumulative weight gain (g) of broilers

Age (in days)	Treatments				
	T_1	T_2	T_3	T_4	T_5
7	79.44 ± 2.20	74.67 ± 2.00	76.82 ± 2.25	78.89 ± 1.76	79.44± 2.50
14	282.29 ± 5.88	285.64 ± 5.09	290.96 ± 5.75	284.84 ± 6.83	284.78 ± 4.97
21	592.93 ± 9.61	595.10 ± 12.64	609.33 ± 12.23	582.76 ± 9.67	594.86 ± 10.60
28	1012.81±16.16	1001.24±27.77	1036.07±18.29	1001.24±16.63	1028.69±16.93
35	1594.18±26.31	1578.00±28.22	1573.87±37.13	1529.75±26.74	1613.44±23.89
42	2086.62±32.23	2121.72±36.97	2103.95±44.08	2060.57±31.70	2155.05±31.84

Each value is a mean of three replicates.

Table.4 Effect of ajwain on mean weight gain/bird/week (g) of broilers

Week	Treatments				
	T_1	T_2	T_3	T_4	T_5
1	79.44 ± 2.20	74.67 ± 2.00	76.82 ± 2.25	78.89 ± 1.76	79.44± 2.50
2	202.84 ± 4.22	210.98 ± 4.03	214.13 ± 4.26	205.96 ± 5.91	205.33 ± 4.44
3	305.64 ± 5.32	311.90 ± 11.12	319.66 ± 7.28	297.81 ± 7.86	309.14 ± 6.85
4	419.88 ± 8.31	406.14 ± 26.06	426.74 ± 8.17	418.48 ± 11.77	433.83 ± 8.34
5	544.97 ± 12.87	585.97 ± 34.28	542.41 ± 20.69	534.75 ± 12.28	574.72 ± 11.05
6	537.44 ± 10.65	543.72 ± 12.44	530.08 ± 11.53	530.83 ± 10.51	541.62 ± 13.58

Each value is a mean of three replicates

Table.5 Effect of ajwain on mean daily weight gain (g) of broilers

Week	Treatments				
	T_1	T_2	T_3	T_4	T_5
1	11.35 ± 0.31	10.67 ± 0.29	10.97 ± 0.32	11.27 ± 0.25	11.35 ± 0.36
2	28.98 ± 0.60	30.14 ± 0.58	30.59 ± 0.61	29.42 ± 0.84	29.33 ± 0.63
3	43.66 ± 0.76	44.56 ± 1.59	45.67 ± 1.04	42.54 ± 1.12	44.16 ± 0.98
4	59.98 ± 1.19	58.02 ± 3.72	60.96 ± 1.17	59.78 ± 1.68	61.98 ± 1.19
5	77.85 ± 1.84	83.71 ± 4.90	77.49 ± 2.96	76.39 ± 1.75	82.10 ± 1.58
6	76.78 ± 1.52	77.67 ± 1.78	75.73 ± 1.65	75.83 ± 1.50	77.37 ± 1.94

Each value is a mean of three replicates

Table.6 Effect of ajwain on mean cumulative feed intake (g/bird) of broilers

Age (in days)	Treatments				
	T_1	T_2	T_3	T_4	T_5
7	101.00^{e} ± 0.58	104.00^{d} ± 0.58	106.67^{c} ± 0.67	110.00^{b} ± 0.58	113.00^{a} ± 0.58
14	427.89^{c} ± 3.16	452.89^{ab} ± 0.95	455.11^{a} ± 4.24	460.67^{a} ± 1.45	445.22^{b} ± 3.96
21	956.78^{b} ± 7.58	1019.56^{a} ± 4.73	1030.22^{a} ± 9.69	1022.89^{a} ± 2.79	1011.44^{a} ± 10.41
28	1794.56^{c} ± 5.20	1864.00^{ab} ± 6.75	1879.11^{a} ± 18.19	1867.33^{a} ± 6.98	1829.22^{bc} ± 13.40
35	2805.67^{b} ± 12.47	2899.56^{a} ± 15.33	2921.33^{a} ± 30.79	2885.11^{a} ± 13.15	2882.55^{a} ± 17.20
42	3898.99^{b} ± 22.50	3981.78^{ab} ± 20.73	3993.55^{a} ± 47.16	3954.00^{ab} ± 21.69	3967.00^{ab} ± 21.97

Each value is a mean of three replicates
Means bearing different superscripts differ significantly (P<0.05) row wise

Table.7 Effect of ajwain on mean weekly feed intake (g/bird) of broilers

Week	Treatments				
	T_1	T_2	T_3	T_4	T_5
1	101.00^{e}±0.58	104.00^{d}±0.58	106.67^{c} ± 0.67	110.00^{b} ± 0.58	113.00^{a} ± 0.58
2	326.89^{b}±3.11	348.89^{a}±0.59	348.44^{a} ± 3.66	350.67^{a} ± 1.76	332.22^{b} ± 4.44
3	528.89^{b}±4.44	566.67^{a}±3.85	557.11^{a} ± 5.46	562.22^{a} ± 2.22	566.22^{a} ± 6.46
4	837.78^{ab}±9.69	844.44^{a}±4.44	848.89^{a} ± 8.89	844.44^{a} ± 4.44	817.78^{b} ± 4.44
5	1011.1^{b} ±11.11	1035.5^{ab} ±14.57	1042.2^{ab} ±14.57	1017.7^{ab} ±14.57	1053.3^{a} ± 3.85
6	1093.33±10.18	1082.22 ± 9.68	1072.22±16.37	1068.89 ± 8.89	1084.44 ± 5.88

Each value is a mean of three replicates
Means bearing different superscripts differ significantly (P<0.05) row wise

Table.8 Effect of ajwain on mean daily feed intake (g/bird) of broilers

Week	Treatments				
	T_1	T_2	T_3	T_4	T_5
1	$14.43^{e} \pm 0.08$	$14.86^{d} \pm 0.08$	$15.24^{c} \pm 0.10$	$15.71^{b} \pm 0.08$	$16.14^{a} \pm 0.08$
2	$46.70^{b} \pm 0.44$	$49.84^{a} \pm 0.09$	$49.78^{a} \pm 0.52$	$50.09^{a} \pm 0.25$	$47.46^{b} \pm 0.64$
3	$75.56^{b} \pm 0.63$	$80.95^{a} \pm 0.55$	$82.16^{a} \pm 0.78$	$80.32^{a} \pm 0.32$	$80.89^{a} \pm 0.92$
4	$119.68^{ab} \pm 1.38$	$120.63^{a} \pm 0.63$	$121.27^{a} \pm 1.27$	$120.63^{a} \pm 0.63$	$116.83^{b} \pm 0.64$
5	$144.45^{b} \pm 1.59$	$147.9^{ab} \pm 2.08$	$148.8^{ab} \pm 2.08$	$145.4^{ab} \pm 2.08$	$150.48^{a} \pm 0.55$
6	156.19 ± 1.45	154.60 ± 1.38	153.17 ± 2.34	152.70 ± 1.27	154.92 ± 0.84

Each value is a mean of three replicates

Means bearing different superscripts differ significantly (P<0.05) row wise

Table.9 Effect of ajwain on mean cumulative FCR of broilers

Age (in days)	Treatments				
	T_1	T_2	T_3	T_4	T_5
7	$1.28^{b} \pm 0.03$	$1.40^{ab} \pm 0.01$	$1.40^{ab} \pm 0.03$	$1.40^{ab} \pm 0.04$	$1.46^{a} \pm 0.07$
14	$1.51^{b} \pm 0.03$	$1.58^{b} \pm 0.03$	$1.57^{b} \pm 0.03$	$1.68^{a} \pm 0.02$	$1.56^{b} \pm 0.02$
21	$1.62^{b} \pm 0.03$	$1.73^{a} \pm 0.03$	$1.69^{ab} \pm 0.03$	$1.77^{a} \pm 0.04$	$1.70^{ab} \pm 0.02$
28	$1.77^{ab} \pm 0.03$	$1.82^{ab} \pm 0.02$	$1.81^{ab} \pm 0.03$	$1.87^{a} \pm 0.03$	$1.73^{b} \pm 0.07$
35	$1.81^{ab} \pm 0.02$	$1.84^{ab} \pm 0.02$	$1.86^{a} \pm 0.01$	$1.88^{a} \pm 0.02$	$1.76^{b} \pm 0.05$
42	1.88 ± 0.03	1.90 ± 0.02	1.89 ± 0.03	1.93 ± 0.01	1.87 ± 0.02

Each value is a mean of three replicates

Means bearing different superscripts differ significantly (P<0.05) row wise

Table.10 Effect of ajwain on mean feed conversion ratio of broilers

Week	Treatments				
	T_1	T_2	T_3	T_4	T_5
1	$1.28^{b} \pm 0.03$	$1.40^{ab} \pm 0.01$	$1.40^{ab} \pm 0.03$	$1.40^{ab} \pm 0.04$	$1.46^{a} \pm 0.07$
2	$1.60^{b} \pm 0.03$	$1.65^{b} \pm 0.04$	$1.64^{b} \pm 0.03$	$1.79^{a} \pm 0.01$	$1.60^{b} \pm 0.02$
3	$1.71^{b} \pm 0.03$	$1.87^{a} \pm 0.04$	$1.79^{ab} \pm 0.04$	$1.85^{ab} \pm 0.06$	$1.83^{ab} \pm 0.04$
4	2.00 ± 0.06	1.95 ± 0.02	1.99 ± 0.03	2.00 ± 0.06	1.90 ± 0.05
5	$1.88^{ab} \pm 0.03$	$1.87^{ab} \pm 0.03$	$1.95^{a} \pm 0.02$	$1.91^{a} \pm 0.02$	$1.81^{b} \pm 0.02$
6	2.07 ± 0.05	2.07 ± 0.05	2.00 ± 0.08	2.08 ± 0.02	2.12 ± 0.06

Each value is a mean of three replicates.

Means bearing different superscripts differ significantly (P<0.05) row wise

Similarly, significantly better FCR was observed in the birds at 5 week of age due to supplementation of ajwain seeds @ 0.2% soaked in drinking water over nightly. Srivastava *et al.,* (2012) found that feed conversion ratio was significantly better in herbal drug group than control group. Also, Dinodiya *et al.,* (2015) observed that a significant (P<0.05) difference in feed conversion ratio herbal supplement fed group

compared to other control groups, however, significant difference was observed in feed consumption. Tripathi *et al.,* (2013) witnessed the similar results.

Analogous to the findings of the present study, Valliolahi *et al.,* (2014) observed that the feed conversion efficiency were significantly ($P<0.05$) better in broilers given 0.02% ajwain powder. Contrary to the present findings no significant difference was observed between the antibiotic group and the ajwain group in terms of FCR by Haselmeyer *et al.,* (2015). Guo *et al.,* (2004) reported higher FCR in the groups that received CHM than VRG group. Omar *et al.,* (2016) higher FCR in the groups that received natural herb extract than control group.

It can be concluded that ajwain can be supplemented in the diet of broilers for improving nutrient absorption, enhancing gut micro-flora and increasing digestibility as an alternate to antibiotic growth promoters.

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