EFFECT OF INCLUSION OF CORN GERM MEAL IN COLORED BROILER (RAJA-II) RATIONS

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Abstract: An experiment was conducted with 120 one day old colored broiler chicks to study the effect of inclusion of Corn Germ Meal (CGM). Birds were divided into four groups with five replicated of six birds each on completely randomized design. Four dietary treatments Viz., T_1, T_2, T_3 and T_4 contains 0, 15 20 and 25 per cent of expeller pressed CGM (by partly replacing maize and SBM) were tried. Weekly individual body weights and feed consumption of the groups were recorded. The cumulative average body weight gains of birds in T_1, T_2, T_3 and T_4 were1309, 1295, 1263,and1293g/birdrespectively and found to be non significant (P>0.05). The cumulative feed consumption of birds during 42 days feed trial was recorded as 2734, 2796, 2950 and 2569 g/ bird respectively for T_1, T_2, T_3 and T_4 and found to be non significant (P>0.05). The FCR of birds in T_1, T_2, T_3 and T_4 were 1.997, 2.057, 2.241 and 1.975 and differing non significantly (P>0.05).The carcass characteristics of birds Viz., dressing percent breast angle, meat to bone ratio abdominal fat per cent and giblet percent were found to be non significant (P>0.05) among four treatment groups.From the findings of present study CGM can be included in diets of colored broiler birds up to 25 per cent level without affecting growth performance and carcass characteristics.

Keywords: Corn Germ Meal (CGM), colored broiler, FCR, carcass traits.

Introduction: Poultry feed accounts for about 60-70 per cent of total cost of production which is one of the most serious challenges for the poultry industry. The yield of maize, the most important ingredient of poultry feed in India is about 40 percent of the world's average with annual production of 13, 075 Mmt. The consumption of maize growing at 6 percent per annum has clearly outstripped production growth due to stagnant productivity and acreage at about 6.6 million per hectare. Thus, the maize consumption and production gap will keep rising due to growth of human and animal population and also due to its increasing industrial use. Instability in production and indiscriminate exports of SBM resulted in its shortage for the poultry industry. These are the main reasons for price hike of maize and SBM, leading to increase in cost of production. Researches have undertaken regarding the incorporation of various agro industrial byproducts in poultry diets at different levels to reduce the pressure on maize and soya bean meal requirements, which are the main feed ingredients for poultry.

In India, corn industry with products such as ethanol, maize starch and high fructose corn syrup growing at rapid rate resulting in production of corn gluten meal, corn gluten feed, corn germ meal, dry and wet distiller grain solubles (DDGS & WDGS) as by products. These by products from corn industry have the potentiality for inclusion in livestock and poultry diets.

CGM is a byproduct from corn industry obtained after the extraction of corn oil from germ portion and has nutritional characteristics (with medium energy and protein) for inclusion in poultry diets. CGM has been investigated as a substitute for corn in diets of monogastric animals (pigs). Not much research work has been conducted for inclusion of CGM in diets of poultry. Present study was aimed to know the effect of inclusion of CGM in the diets of colored broilers upto 25 per cent level on growth performance and carcass characteristics.

Materials and Methods: To study the effect of feeding of different levels of CGM on growth performance and carcass characteristics a feeding experiment was conducted with 120 day old colored broiler chicks for a period of six weeks and birds were slaughtered at 42 days of age to study carcass characteristics. The birds were divided into each having five replicates of six birds each. As per NRC 2005 a practical type basal diet comprising of maize and SBM was prepared to serve as control (T_1). Treatment diets were prepared by incorporating CGM at 15 20 and 25 percent levels by partly replacing maize and SBM. The 42 day days experimental period was conveniently divided into three phases each having 14 days Viz., 0-14 days prestarter, 15-28 days starter and 29-42 days finisher phases. The experimental diets were prepared afresh for each phase.

The proximate composition of maize, SBM and CGM were analyzed before formulating the diets and presented in Table1. The ingredient composition and analyzedproximate composition of the experimental diets for each phase have been presented in Table 2 & 3 respectively. The day old chicks were weighed, wing banded and reared on wire floor battery raised brooders of single tire system. Al standard managementalpractices were followed throughout the experimental period. Weekly individual body

weights and feed consumption of the groups were recorded. At the end of feeding trial 6 birds were characteristics. The data generated was subjected to statistical analysis (Snedor and Cochran 1980) by using two way ANOVA procedure of SAS 9.1 portable software.

Results and discussion: The analyzed proximate composition and calcium phosphorus contents of CGM waspresented in Table 1. The EE content of CGM was 10.85 percent on DM basis and it is due to expeller processing of corn germ. The proximate composition of present study was in close agreement with results obtained by Calderano*et al* (2010). The variations in nutrient composition of CGM reported by various authors might be due to differences in climate, soil, cultivation practices, veritiesof corn and method of processing of corn germ meal.

The average body weight gain, feed consumption, FCR of colored broilers during prestarter, starter finisher phase and also cumulatively was presented in Table **3**. There was significant (P<0.05) differencein body weight gain during prestarter phase but not in starter finisher phase and also cumulatively. The difference in prestarter phase may be due to higher CGM level of inclusion (25 per cent) as CGM is rich in CF and EE. CF increased rate of passage of ingesta in GI tract and EE was not effectively digested by the chicks in early stages of life. The body weight gain of the birds during later stages was comparable with control group indicating the ability of birds to digest fat and fiber with adversemnt of age.

randomly collected from each group and slaughtered after 12 hours of fasting to study the carcass There was no significant difference (P>0.05) in feed consumption and FCR during prestarter starter, finisher phases and also cumulatively. These findings were in agreement with Brito*etal*(2005). However Brunelli*et al* (2006) reported significantly increased body weight gain with the inclusion of defatted CGM (EE-0.60%) in broiler diets. The cumulative survivability of birds at the end of 6th week was found to be 96.67, 96.67, 93.33 and 83.33 percent respectively. During the experiment mortality observed only during the first three weeks and was found to be of non dietary origin.

The carcass characteristics of birds slaughtered at 42 days of age were presented in Table **4.** There was significant difference (P<0.05) in dressing percentage of birds (T_1, $T_2$and T_4). T_3 group resulted in least (64.18 percent) dressing percentage on live weight basis, where as T_4 group showed highest dressing percentage value of 71.35. Breastangle, abdominal fat percent, meat to bone ratio, heart, liver, gizzard and giblet percentage were not differing significantly (P>0.05) among four treatment groups.

Conclusion: From the results of the present experiment it can be concluded that CGM cam\n be included in the diets of colored broiler birds up to 25 percent level without affecting growth performance, livability and carcass characteristics.

Table 1: Chemical composition of maize, SBM and CGM (percent DM Basis)

Chemical composition (%)	**Maize**	**SBM**	**CGM**
Proximate principles			
Moisture	10.76	10.66	8.603
Dry matter	89.24	89.34	91.39
Organic matter	87.16	86.25	88.95
Crude protein	8.75	48.54	21.13
Ether extract	4.11	1.51	10.85
Crude fiber	2.86	7.19	13.56
Total ash	2.08	3.09	2.44
Nitrogen free extractives	71.44	29.01	43.42
Mineral composition			
Calcium	0.015	0.322	0.345
Phosphorus	0.240	0.687	0.624

Table 2: Proportion of ingredients and calculated nutrient composition of experimental diets

	Pre starte				Starter				Finisher			
Ingredient	**T_1**	**T_2**	**T_3**	**T_4**	**T_1**	**T_2**	**T_3**	**T_4**	**T_1**	**T_2**	**T_3**	**T_4**
Corn	56.00	46.60	43.90	41.00	60.20	51.10	48.20	42.02	63.20	54.00	50.40	46.70
SBM	40.30	34.80	32.80	30.50	36.50	30.60	28.50	26.05	31.50	25.30	23.40	22.00
CGM	0.00	15.00	20.00	25.00	0.00	15.00	20.00	25.00	0.00	15.00	20.00	25.00
Veg.oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	2.00	2.50	2.60
Min.mix[1]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
DCP	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Salt+ Premixes[2]	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Calculated nutrient compositions												
ME Kcal/Kg	2856	2813	2812	2790	2899	2871	2863	2854	3046	3038	3053	3043
CP	23.00	23.15	23.10	22.92	21.21	21.12	21.05	21.00	19.86	19.54	19.47	19.36
EE	2.45	3.35	3.72	4.05	2.58	3.53	3.86	4.18	4.35	5.60	6.40	6.80
CF	3.54	4.76	5.24	5.65	3.40	4.66	5.07	5.49	3.15	4.4	4.8	5.25
Ca	0.98	0.96	0.96	0.95	0.97	0.95	0.95	0.94	0.95	0.94	0.93	0.93
P_{av}	0.43	0.41	0.40	0.39	0.42	0.40	0.39	0.38	0.41	0.39	0.38	0.38
Lys	1.20	1.26	1.32	1.33	1.12	1.19	1.21	1.24	0.99	1.06	1.08	1.12
Meth	0.56	0.57	0.50	0.53	0.39	0.43	0.46	0.49	0.32	0.42	0.45	0.49

1Mineral Mixture:Contains calcium–32%, phosphorus-6%, copper-100 ppm, cobalt-60 ppm, manganese-2700 ppm, iodine-100 ppm, zinc-2600 ppm, iron-0.1%.
2Premixes: Contains 0.1% heptocare, 0.05% colidox(antibiotic), 0.05% coccidiostat,0.05%, 0.05% choline chloride, 0.025%Vit-AB_2D_3K(Per gram contains Vit. A-82, 500 IU, D_3-12,000 IU, B_2-50 mg and K-10 mg), 0.025% Vit-B –complex (Per gram contains Vit B_1-4 mg, B_6-8 mg, B_{12}-40 µg, E-20 mg, Niacin-60 mg and calcium panthothenate-12.5 mg).

Table 3:Body weight gain, Feed consumption, FCR of colored broilers

	Body wt gain (g/bird)				Feed consumption (g/bird)				FCR			
	T_1	**T_2**	**T_3**	**T_4**	**T_2**	**T_3**	**T_4**	**T_4**	**T_1**	**T_2**	**T_3**	**T_4**
Pre starter	229.4[a]	232.9[a]	214.5[ab]	195.7[b]	299.9	295.87	276.67	262.9	1.307	1.271	1.290	1.343
Starter	428.2	401.2	382.1	360.8	872.3	901.5	902.5	834.1	2.037	2.247	2.362	2.312
Finisher	711.7	725.4	719.4	744.2	1562	1598	1770	1472	2.195	2.203	2.461	1.978
Cumulative	1369	1359	1316	1301	2734	2796	2950	2569	1.997	2.057	2.241	1.975

Table 4: carcass characteristics of colored broilers slaughtered at 42 days of age					
		T_1	T_2	T_3	T_4
Dressing %		71.08 [a]	69.93[ab]	61.18[b]	71.53[a]
Breast angle		94.60	87.60	88.20	95.20
Abd. Fat%		1.441	1.553	1.583	1.076
Meat: Bone		2.119	3.252	3.641	3.05
Organometry (as % live Wt)	Heart	0.647	0.691	0.519	0.508
	Liver	2.476	2.425	2.426	3.089
	Gizzard	2.690	2.366	2.857	2.550
	Giblet	5.813	5.482	4.796	6.148

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