Wayamba Journal of Animal Science – ISSN: 2012-578X; P471 - P474, 2012
First Submitted October 03, 2012; Number 1349256760

IMPACT OF SORGHUM SUBSTITUTION IN MASH ON GROWTH AND FEED CONVERSION EFFICIENCY OF LAYER CHICKS

` **Pal, V.N.,* Gobade, M.R., Shende, P.H., Trishna.B.Kayastha, Suradkar, U.S. and Nimkar, D.D.**
Department of Livestock Production and Management, Apollo College of Veterinary Medicine, Jaipur-302031

**Corresponding author: email id- vilaspal@gmail.com*

Two hundred and forty sexed layers chicks (B.V.300) were randomly assigned to four groups (T1,T2,T3 and T4) of 60 chicks each and were respectively brought up on maize based feed (T1), substituted by sorghum 50% (T2) ,75% (T3),100% (T-4) groups where as chicks in group T1 served as control. The feeding trial continued for eight weeks, so as to assess the impact of incorporation of sorghum in layer chick mash. The productivity parameters that has been studied are weekly live body weight, weekly body weight gain, mean feed consumption and mean FCR. A significant variation in weekly live body weight and weekly body weight gain up to 6 weeks where as during 7^{th} and 8^{th} weeks non-significant differences($P<0.05$) were recorded in these parameters among all the experimental groups. Mean Feed consumption and mean FCR were highest in 100% sorghum based diet followed by other treatment groups which might be due to high crude fibre content in the ration of these groups. It could be concluded that upto75% of sorghum can be incorporated in layer chick ration without affecting the growth performance.

Key words: Sorghum, maize, layer chick

In poultry business, cost of feed has been recognised major and large expensive input and accounts for 70% of total production cost. The profit margin to the large extent depends more upon the prevailing prices of feed ingredients and their demand and vice–a-versa in market. At time availability of common feed ingredients for poultry mash becoming scare with increased competitive demand for human population. Maize is a major energy source ingredient, commonly incorporated in poultry ration. However, due to less yield and increase demand by human population during past few years it has become a costly proposition and margin of profit has become considerably lower. This prompted the author to search a suitable millet origin substitution of maize in chick mash.

Sorghum is one of the kharif season cereal crop with almost comparable composition to maize and easily available at much cheaper market price in rural areas. The present trail was therefore taken up to study the possibility of incorporation of sorghum in layer chick mash.

MATERIALS AND METHODS

Two hundred and forty sexed layer chicks of white leghorn (B.V.300) were procure from Venkateshwara hatcheries ltd. were randomly distributed in four groups (T1,T2,T3,& T4) of 60 chicks each. Plan of experiment, composition of chick mash and composition of diet offer to different groups of chicks has been summarised in Table -1. The chicks were reared on deep litter system and scientific managemental practices were offered adlib chick mash throughout period of feeding trial(8 weeks). Vaccinations were carried out as per vaccination schedule. Live body weight, gain in body weight, feed consumption and feed conversion ratio were recorded weekly and the data generated were analyzed statistically as per the methods of Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Live body weight:

Experimental data generated during trial period (Table 2) revealed variation in body weight up to six weeks amongst four diets,

Table: 1 Feed ingredients and chemical composition of feed mash offered to respective groups of layer chicks and chemical composition experimental diets.

Ingradients	Exprimental groups			
	T1 Contol maize diet	**T2** 50% replacement diet	**T3** 75% replacement diet	**T4** 100% replacement diet
Percent composition of experimental diets.				
Maize	40	20	10	00
Sorghum	00	20	30	40
Deoiled rice bran	05	00	00	00
Rice polish	20	26	28	28
Deoiled soyabean cake	21	21	22	21
Deoiled sunflower cake	07	06	03	04
Meat meal	04	04	04	04
Mineral mixture	03	03	03	03
Chemical composition of experimental diets				
Dry matter %	88.88	90.20	91.40	92.31
Crude protein %	19.90	19.86	19.77	19.72
Crude fibre %	6.22	6.49	6.58	6.76
M.E.(Kcal/kg)(calculated)	2796.25	2708*	2660*	2593*
Ether extract %	3.19	2.85	3.2	3.13
NFE %	53.01	54.70	55.55	56.15
Ash%	6.48	6.30	6.30	6.55
Lysine (calculated)	1.1	0.86**	0.87**	0.85**
Methionine(calculated)	0.4	0.35***	0.36***	0.37***

* Shortfall of energy was met with addition of oil to make diets isocaloric to control diet with addition of 11ml, 17ml and 25.3ml oil in the T2, T3, and T4 treatment groups respectively.
** Shortfall of lysine was met with supplementation of synthetic lysine in the diets of treatment groups T2, T3 and T4 @ 0.24, 0.23 and 0.25% respectively to make the level equal to control diet.
*** Shortfall of methionine was met with supplementation of synthetic methionine in the diets of treatment groups T2, T3 and T4@ 0.05, 0.04 and 0.03% respectively to make the level equal to control diet.

control(T1) and other treatment groups (T2,T3 and T3). Maize diet showed superiority with respect to live body weight over treatment groups up to 6 weeks. Mean live body weight of chicks decline linearly ($P<0.05$) with increasing level of replacement of maize in chick ration. Further 50% substitution in mash (T2) and in control group (T1) did not differ significantly except during 2^{nd} week ($P<0.05$). However, during 7^{th} and 8^{th} weeks of trial, non-significant differences were witnessed in all groups as documented earlier, Mehta et al.(1985) and Nagra et al.(1987) .

Gain in body Weight

From 2^{nd} to 6^{th} weeks, significantly higher body weight gain was recorded in control group over most of maize replacement groups.(T2,T3 & T4). However, non significant difference ($P<0.05$) in average body weight gain were observed between control and 75% replacement group during 3^{rd} week, and control & 100% replacement group during 4^{th} weeks of age. Non significant differences were recorded amongst all replacement groups during 2^{nd} & 6^{th} weeks of age. But during 7^{th} and 8^{th} weeks non significant differences in weight gain were recorded among all the four groups (T1,T2,T3 & T4). The results

Table: 2 Mean Values (+SE) of weekly live body weight and weekly body weight gain of experimental chicks.

Parameters	Groups	Weeks							
		1	2	3	4	5	6	7	8
Live body weight(g)	T1	59.8^{b} ±1.39	92.2^{b} ±1.83	136.8^{b} ±2.20	186.4^{b} ±2.84	262.6^{b} ±5.45	329.2^{c} ±2.20	408.4 ±5.20	491.6 ±3.78
	T2	59.2^{b} ±1.22	86.6^{a} ±1.46	133.6^{b} ±1.99	189.2^{b} ±2.49	259.2^{b} ±2.85	326.6^{bc} ±3.70	400.4 ± 4.26	477.8 ± 4.15
	T3	58.0^{ab} ±1.38	86.0^{a} ±2.91	127.2^{a} ±3.13	182.6^{b} ±3.6	247.8^{a} ±4.66	318.8^{ab} ±4.65	396.6 ±5.25	477.0 ±4.27
	T4	56.0^{a} ±1.43	84.8^{a} ±2.16	124.0^{a} ±2.59	173.0^{a} ±3.40	241.8^{a} ±4.45	312.4^{a} ±4.80	393.4 ±6.24	470.6 ±6.80
Body weight gain (g)	T1	22.0 ±0.71	32.4^{b} ±1.23	43.8^{b} ±1.55	49.6^{a} ±1.18	76.2^{c} ±2.21	76.8^{b} ±2.71	79.6 ±1.74	83.2 ±2.81
	T2	22.0 ±0.64	27.4^{a} ±1.12	47.0^{b} ±2.33	55.6^{b} ±1.32	70.0^{b} ±2.26	67.4^{a} ±2.54	73.8 ±3.15	77.4 ±2.81
	T3	21.6 ±0.80	28.0^{a} ±1.40	41.2^{ab} ±2.41	55.4^{b} ±1.42	65.2^{a} ±1.63	71.0^{a} ±2.11	77.8 ±2.32	78.6 ±2.11
	T4	20.0 ±0.77	28.8^{a} ±1.3	39.2^{a} ±1.50	49.0^{a} ±1.79	68.8^{b} ±1.74	70.6^{a} ±2.89	81.0 ±2.74	77.2 ±3.77

Mean values with different superscripts differed significantly. ($P<0.05$)

Table: 3 Mean Values of weekly feed consumption and weekly feed conversion ratio of experimental chicks.

Parameters	Groups	Weeks								Treat.Mean
		1	2	3	4	5	6	7	8	
Feed consumption	T1	57.4	85.4	147.0	210.0	262.5	294.7	308.0	319.2	210.53
	T2	58.4	85.0	147.6	210.0	263.0	295.0	306.0	316.0	210.13
	T3	70.0	87.5	153.3	224.0	269.5	285.0	311.5	329.0	216.23
	T4	76.3	88.1	155.0	228.0	275.0	292.0	314.0	332.0	220.05
Feed conversion ratio(FCR)	T1	2.61	2.64	3.34	4.23	3.44	3.84	3.87	3.84	3.48
	T2	2.65	3.10	3.14	3.78	3.76	4.38	4.15	4.08	3.63
	T3	3.24	3.13	3.72	4.04	4.13	4.01	4.00	4.19	3.81
	T4	3.82	3.06	3.95	4.63	4.00	3.99	3.88	4.30	3.95

are in accordance with Mehta *et al*. (1985); Nagra *et al.* (1987) and Sawant *et al.* (2000).

Mean feed consumption

Groups with 100 % replacement by sorghum showed highest feed consumption followed by 75% and 50 % replacement. Amongst maize diet, 50%, 75%, and 100% replacement of maize by sorghum groups (T1, T2,T3 and T4 respectively), feed consumption was highest in T4 (220.05) followed by T3(216.23) , T1 (210.53) and T2 (210.13) respectively. The feed consumption in T1 and T2 groups are near about same. However, in T4 and T3, it was more and may be due to high crude content in ration of these groups. Nagra *et al.* (1987) reported similar findings where as Khandare (1992) and Muley (1997) reported non significant difference in feed consumption.

Mean feed conversion ratio (FCR):

Amongst the replacement of maize by sorghum groups (T2, T3, and T4), 100% replacement groups show the highest FCR (3.95) followed by 75% and 50% replacement groups (3.81 and 3.63 respectively). Superior FCR for maize diet group indicates less feed consumption and less crude fiber content than sorghum based diets. Similar findings of higher FCR for high fiber diet were reported by Gerencser *et al.* (1966); Rostango *et al.* (1973); Blaha *et al.* (1984) and Sawant *et al.* (2000). However, Hulan and Prood-Foot (1982); Rama-Rao *et al.* (1995) reported non significant difference in FCR.

CONCLUSION

From the present study, it is concluded that upto75% of sorghum can be incorporated in

layer chick ration without affecting the growth performance. 100% replacement of maize by sorghum diet fed chicks showed poor performance as compare to control and other replacement groups though the differences were non-significant.

REFERENCES

1. Blaha, J. Salaha El Din H. M.,Christodoulou, V. and Mudrik Z. 1984. The possibility of replacing maize by sorghum in broiler chick mixture.*Poult.Abstr.*, **11:**2156.
2. Gerencser, V., Duduk, V. and Vincze, L. 1966.Nutritive value of sorghum and maize in grower rations for chicken. *Nutr.Abstr.and Rev.*, **37**:1803.
3. Hulan, H.M. and Prood-Foot, F.G. 1982. Nutritive value of sorghum grain for broiler chicken.*Can.J.Anim.Sci.* **62**(3):869-875.
4. Khandare, M.W. 1992. Studies on replacement of maize by jowar(Sorghum vulgare) in broiler ration. *M.V.Sc.Thesis* submitted to Dr.P.D.K.V. Akola.
5. Mehta, M.K., Bhaid, M.V. and Singh, J.D. 1985. Effect of replacement of maize grain by jowar at different levels on the performance of starter chicken. *Poultry Adviser*, **18**(8):21-23.
6. Muley, N.S. 1997. Studies on utilization of black sorghum in broilers.*M.V.Sc.Thesis* submitted to Dr.P.D.K.V. Akola.
7. Nagra ,S.S., Pannu, M.S. and Chawla, J.S.1987. Comparative feeding value and economic implication of different cereals for growing white leghorn pullets.*Indian J.Poult.Sci.*,**22**(1):35-39.
8. Rama-Rao, S.V., Praharaj, N.K., Raju, L.N., Chawak, M.M., and Mishra, S.K.1995. Replacement of yellow maize with tannin free sorghum in WLH layer diet. *Indian J.Poult.Sci.*,**30**(1):59.
9. Rostango, H.S., Featherstone, W.R. and Rogler, J.C. 1973. Studies on the nutritional value of sorghum grains with varying tannin contents for chicks. *Poult.Sci.*, **52:**765-772
10. Sawant, D.M., Gaffar, M.A., Deshmukh, S.V. and Kalbande, V.H. 2000. Replacement of maize by sorghum grain in chick ration .P*oultry Adviser*, **33**(3):27-32.
11. Snedecor, G. and Cochran, W.G. 1967. Statistical methods , 6th Ed., Oxford and IBH publishing Co. , New Delhi.

