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Studies on the Performance of Layers with Different Combinations of Oilseed Meals

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Abstract

The study was conducted on 450 birds BV- 300 of 21 weeks at department of animal nutrition, college of veterinary science and animal husbandry, Jabalpur. There were fifteen dietry treatment allotted to different groups of birds with three replicates in each treatment of equal birds. Maximum feed intake was recorded in birds fed control diet (group-1) while, it was lowest in those fed group-5 diet. Hen day production percent (HDP %) showed wide variation among all the treatments. The maximum Hen day production percent was recorded in group-1 diet, while it was minimum in birds assigned diet to group-5. Average egg weight (g) of birds assigned different diets did not differ significantly (P<0.05). Cost of feed Rs per dozen eggs was lowest in those allotted diets to group-3. The cost of feed Rs per kg egg also had similar pattern as cost of feed per dozen egg.
Keywords: *Ragi, Sorghum, Niger cake, sesame cake and Layer poultry.*

Introduction

India has 215 million layers and is the largest producer of egg in the world with annual output of 103 billion eggs. The overall growth rate of poultry industry is 15-20% per annum. The most important aspect of poultry industry is the economics of feed which accounts nearly 65-75% of the total intensive system of rearing. The most expectable poultry feed is corn-soya diet which is also known as conventional feed. Since the conventional feeds are costly and high in demand[2], there is need of alternative feed ingredients which will replace the conventional feeds. In order to give momentum to poultry industry, we have to reduce the cost of feed, which can be made true by using locally available and cheaper ingredients like sorghum and ragi in place of maize (Energy feed), til and niger cake in place of soybean[4] (Protein feed). Hence, in present investigation gradual replacement of cereals and by product of oil seed were evaluated by studying the utilization of nutrient and performance of egg laying birds.

Materials and Methods

The study was undertaken by using 360 chicks of 21 weeks of age. These birds were distributed in to fifteen dietary treatments with three replicates in such a way so that each replicate had 10 chicks. Diets were formulated using maize, sorghum, ragi, deoiled rice polish, soybean meal, sesame cake, niger cake, fishmeal and other supplements. These ingredients were analyzed for proximate constitutes[1] before formulation of diets. Diet 1 to 12 were treatments. However, T_1 was control. Different diets have ingredients maize, sorghum. ragi soybean meal, niger cake,

sesame cake, rice polish, mineral mixture and vitamin mixture. The study was conducted for a period of 16 weeks. During the study, biweekly body weight and weekly feed intake was recorded. Using the data of feed consumption and body weight gain, feed efficiency ratio and performance index[1], egg production, egg quality and egg parameters were calculated. Data obtained in the study were analyzed statistically using the standard methods and significance between the treatments was also measured[3].

Dietary treatments

1.Maize + Soybean meal + Fishmeal Group-1

2.Maize + Soybean meal – without Fishmeal Group-2

4.$Maize_{30}$+$Sorghum_{35}$+$Ragi/Kodo_{35}$+Soybean meal $_{50}$+Niger $cake_{25}$+Sesame $cake_{25}$Group-3

5.$Maize_{30}$+$Sorghum_{35}$ + $Ragi/Kodo_{35}$ + Soybean meal $_{40}$+Niger $cake_{30}$+Sesame $cake_{30}$Group-4

6.$Maize_{30}$+$Sorghum_{35}$ + $Ragi/Kodo_{35}$ + Soybean meal $_{30}$+Niger $cake_{35}$+Sesame $cake_{35}$Group-5

7.$Maize_{15}$+$Sorghum_{42.5}$+$Ragi/Kodo_{42.5}$ +Soybean meal $_{50}$+Niger $cake_{25}$+Sesame $cake_{25}$ Group-3

8.$Maize_{15}$+$Sorghum_{42.5}$ +$Ragi/Kodo_{42.5}$ +Soybean meal $_{40}$+Niger $cake_{30}$+Sesame $cake_{30}$Group-4

9.$Maize_{15}$+$Sorghum_{42.5}$ $Ragi/Kodo_{42.5}$ + Soybean meal $_{30}$+Niger $cake_{35}$+Sesame $cake_{35}$Group-5

10.$Sorghum_{50}$+ $Ragi/Kodo_{50}$ + Soybean meal $_{50}$+Niger $cake_{25}$+Sesame $cake_{25}$ Group-3

11.$Sorghum_{50}$+ $Ragi/Kodo_{50}$ + Soybean meal $_{40}$+Niger $cake_{30}$+Sesame $cake_{30}$Group-4

12.$Sorghum_{50}$+ $Ragi/Kodo_{50}$ + Soybean meal $_{30}$+Niger $cake_{35}$+Sesame $cake_{35}$Group-5

Results and Discussion

Effect of using oilseed meals replacing soybean meal on the performance of laying birds

Performance of laying birds offered diets containing different combinations of oilseed meal instead of soybean meals is presented in Table 1. To get the effect of replacement of soybean meal with niger cake and sesame meal data obtained with birds receiving different levels and combinations of oil seed meals was pooled together, irrespective of level of cereals in their diet.

Table1 Performance of laying birds fed different combinations of oil seed meals instead of soybean meal

Group	Treat.	Feed intake (g/bird/d)	Overall feed intake (kg/bird)	HDP (%)	Average egg weight (g)	FCR (kg feed/ dozen eggs)	FCR (kg feed/kg eggs)	Cost (kg feed/ dozen eggs)	Cost (kg feed/kg eggs)
1.	(T_1) SBM (100%)	98.68^{a}	11.05^{a}	66.97^{a}	49.93^{a}	1.77^{b}	2.95^{b}	11.37^{a}	18.97^{a}
2.	T_2 SBM (100%)	97.93^{a}	10.98^{a}	66.60^{ab}	49.83^{a}	1.76^{b}	2.96^{b}	10.93^{b}	18.33^{b}
3.	T_4,T_7, T_{10}) SBM (50%)	96.29^{a}	10.78^{a}	67.37^{a}	49.97^{a}	1.70^{c}	2.86^{c}	10.35^{c}	17.34^{d}
4.	(T_5, T_8, T_{11}) SBM (40%)	95.81^{a}	10.73^{a}	65.77^{b}	49.73^{a}	1.75^{bc}	2.93^{bc}	10.53^{c}	17.63^{c}
5.	T_6,T_9, T_{12} SBM (30%)	91.76^{a}	10.28^{b}	58.20^{c}	49.60^{a}	1.89^{a}	3.19^{a}	11.27^{a}	18.97^{a}

abcd. Values bearing the same superscript did not differ significantly (P>0.05).

Average daily feed intake due to different dietary treatments did not differ significantly among different groups of birds. Similarly, overall feed intake did not differ among different groups of birds except group 5 in which it was significantly (P<0.05) lower.

Hen day production percent (HDP %) was maximum and significantly higher (P<0.05) in birds of group 3. However, it was true only in comparison to those raised on groups 4 and 5. The lowest hen day production percent was recorded in birds of group 5. The average egg weight among birds of different groups did not differ significantly (P>0.05) due to change in proportion of oilseed meals in their diet.

FCR kg feed per dozen eggs as well as kg feed per kg eggs was highest in birds of group 5. While, FCR was minimum in birds maintained in group 3. Between birds of group 3 and 4 statistically no significant (P<0.05) difference was noted.

Cost of feed per dozen eggs as well as per kg egg was highest in birds of group 1 and 5. Whereas, it was minimum in birds maintained in groups 3. Thus, based on the performance of birds and economics of their egg production, it was realized that birds maintained in group 3 were most economical.

Effect of using oilseed meals replacing soybean meal on egg quality traits in layers

Egg quality traits of layers offered diets containing different combinations of oilseed meals replacing soybean meal is presented in Table 2.

Table 2 Egg quality traits of laying birds fed diets containing different combinations of oilseed meals instead of soybean meal

Group	Treatment	Shape Index	Albumen Index	Yolk Index	Haugh Unit	Shell Thickness (mm)
1.	(T_1) SBM	78.99^{a}	8.62^{a}	41.21^{a}	87.33^{a}	0.35^{ab}
2.	(T_2) SBM	76.15^{b}	8.82^{a}	41.46^{a}	86.67^{a}	0.33^{c}
3.	(T_4,T_7,T_{10}) SBM (50%)	76.69^{b}	8.71^{a}	42.31^{a}	86.00^{a}	0.36^{a}
4.	T_5,T_8,T_{11} SBM (40%)	76.32^{b}	8.63^{a}	42.71^{a}	84.00^{b}	0.34^{bc}
5.	(T_6,T_9, T_{12} SBM (30%)	75.49^{b}	8.36^{a}	41.96^{a}	82.00^{c}	0.36^{ab}

abc. Values bearing the same superscript did not differ significantly (P>0.05)

Incorporation of RTC and sesame meal instead of soybean meal had no significant (P>0.05) influence on Albumen and Yolk index. However, shape index reduced significantly (P<0.05) in birds offered diets other than T_1. Among the birds of all these groups (T_2 to T_5), Shape index was statistically similar. Haugh unit was significantly (P<0.05) higher in birds pertaining to group 1, 2 and 3. While, it was significantly (P<0.05) lower in birds of group 5. Shell thickness was highest in

group 3. However, statistically it was comparable to those belonging to group 1 and 5.Significantly (P<0.05) lower shell thickness was measured in birds of group 2.Effect of using oilseed meals replacing soybean meal on retention of nutrients (%) in layers

Retention of nutrients in laying birds fed diets containing different combinations of oilseed meal replacing soybean meal is presented in Table 3.

Table 3 Retention of nutrients in laying birds offered diets containing different combination of oilseed meals instead of soybean meal

Group	Treatment	DM %	CP %	EE %	CF %	NFE %	Ca %	P %	Energy%
1.	(T_1) SBM	66.31^{a}	46.55^{a}	88.62^{a}	24.24^{b}	87.24^{a}	67.19^{a}	66.04^{a}	68.38^{a}
2.	(T_2) SBM	61.33^{a}	45.11^{b}	89.09^{a}	15.57^{c}	84.59^{a}	58.13^{c}	60.18^{b}	68.88^{a}
3.	T4,T_7 T_{10} SBM (50%)	66.01^{a}	43.78^{c}	86.01^{c}	21.56^{b}	88.03^{a}	55.17^{d}	61.92^{ab}	62.53^{a}
4.	T5,T8,T11 SBM (40%)	65.30^{a}	43.80^{c}	87.31^{b}	30.51^{a}	88.62^{a}	59.39^{c}	63.77^{ab}	62.42^{b}
5.	T6, T9, T12 SBM (30%)	62.88^{a}	44.12^{bc}	84.39^{d}	28.23^{a}	85.32^{a}	62.00^{b}	58.50^{b}	61.34^{b}

abcd. Values bearing the same superscript did not differ significantly (P>0.05).

Use of oilseed meals replacing soybean meal had no significant effect on the retention of dry matter and NFE, but it had reducing effect on the retention and utilization of other nutrients including energy. Crude protein retention was significantly high in birds of group 1. It was minimum in the birds of groups 3, however, statistically it differed significantly only in comparison to birds of group 1 and 2. The ether extract retention was also significantly (P<0.05) higher in birds of group 1 and 2. While, it was minimum in birds pertaining to group 5. The crude fibre retention was significantly (P<0.05) higher in birds of group 4 and 5. While, lowest retention was in birds of group 2. The calcium retention was maximum and significantly (P<0.05) higher in birds of group 1. While, it was minimum in birds belonging to group 3. Phosphorus retention was also highest in birds of group 1. However, it was significant only in comparison to birds pertaining to group 2 and 5. Minimum retention was noted in birds belonging to group 5.

Gradual replacements of soybean meal with RTC and sesame seed cake reduced the feed intake and egg production. However, this reduction was significant only at 70% replacement of soybean meal. Maximum hen day production was noted in birds offered 50% soybean meal and 50% RTC- SSC diet. This diet did not influence the egg quality traits of birds significantly (P<0.05). But retention of CP, EE, CF, Ca, P and energy was low. Better production performance in these groups of birds might be compensated by higher feed intake. Increasing the level of niger and sesame cake to 60% and 70% instead of soybean meal significantly reduced the hen day production percent. It may be attributed to lower feed intake. Use of oilseed meal (RTC-SSC) instead of soybean meal did not influence the egg quality traits significantly. Use of higher amount of niger and sesame seed cake showed higher

retention of CF, NFE, Ca and P. It may be due to higher amount of these nutrients supplied through these diets.

Conclusion

Use of oilseed meals (niger and sesame cake) in equal proportion replacing soybean meal at 50% level showed significantly higher hen day production percent and feed intake, whereas, FCR and cost of feeding was significantly lower. When oilseed meals were used instead of soybean meal at 60% and 70% level (group 4 and 5) hen day production percent and feed intake had reduced significantly in comparison to those receiving 50% oilseed meals instead of soybean meal. Whereas, FCR and cost of feeding was significantly higher. Thus performance of birds receiving 100% soybean meal with or without fishmeal or 50% oilseed meals instead of soybean meal was nearly similar. Similar type of effect of these diets was recorded as regards egg quality traits i.e. egg quality traits of birds receiving diet containing soybean meal with or without fishmeal and those receiving 50% oilseed meals instead of soybean meal was superior to those receiving diet containing 60% or 70% oilseed meals instead of soybean meals. Group1, 2, 3 were superior and group 4 and 5 were inferior. Hence, considering all the aspect it was concluded that group 3 with 50% replacement of soybean meal using RTC and SSC was most beneficial.

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References

1. Baghel, R.P.S. and Netke, S.P. (1987). Economic broiler ration based on vegetable proteins. *Indian Journal of Animal Science*, **59**: 145-148.
2. Bird, J.M. (1955). Performance of growing chickens. *Poultry Science*, **34**: 1163.
3. Duncan, D.B. (1955). Multiple range and F- test. Biometrics, **11**: 1.
4. Mohan, C.; Reddy, C.V.; Rao, P.V. and Siddqui, S.M. (1982). Comparative evaluation of the nutritive value of cake of groundnut, niger and safflower for poultry. *Indian Journal of Animal Science,* **53(7)**: 746-749.