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EFFECT OF VARIOUS FEED FORMS ON THE PERFORMANCE OF BROILER CHICKS

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An experiment on 144 day-old broiler chicks was conducted to study the effect of the physical form of feed on their performance. Chicks in group A (control) were placed on mash feeding, those in group B were offered crumbles throughout, while birds in group C were fed crumbles from 0-4 weeks and pellets from 4-8 weeks of age and group D was offered mash from 0-2, crumbles from 2-4 and pellets from 4-8 weeks of age. The overall weight gain and feed efficiency ratios were apparently best in chicks of group B, followed by those of chicks in groups C, D and A. The feed consumption for the same period was apparently highest in chicks of group A followed by the chicks in groups B, C and D. The differences were, however, non-significant. The birds in group D exhibited higher mortality. The net profit per broiler was more in group B followed by that in groups C, D and A.

INTRODUCTION

Feeding of broilers accounts for approximately two-thirds of the total running expenditures, therefore, any improvement in feeding practices leading to saving in feed expenses could cut down the total cost of production. Many research workers have attempted to reduce the feeding cost effectively by developing the least cost feed formulations and feeding systems for poultry. Changed texture of feeds particularly when mash feeds

were transformed into pellets and crumbles improved feed consumption, weight gain and feed efficiency (Chang et al., 1983; and Choi et al., 1986) with minimum feed wastage. Some efforts have recently been made by a few commercial feed producers to introduce and popularize crumbles and pellets in addition to the mash feed already being used in Pakistan. Very little work on this aspect of poultry feeding has been reported in this country. It was, therefore, planned to initiate a study to observe the effect of various forms of feed on broiler performance in terms of feed consumption, weight gain, feed efficiency, mortality and overall economics.

MATERIALS AND METHODS

One hundred and forty-four day-old broiler chicks were randomly divided into 12 experimental units of 12 chicks each. Three experimental units were further allotted randomly to each of the four feeding groups according to completely randomized design. Chicks in group A (control) were placed on mash feeding, those in group B were offered crumbles throughout, while those in group C were fed crumbles from 0-4 weeks and pellets from 4-8 weeks of age. The birds in group D were offered mash from 0-2, crumbles from 2-4 and pellets from 4-8 weeks of age.

Commercial feeds prepared in the form of mash, crumbles and pellets, claimed to have the same formulation in starter or finisher ration were used from 0-4 weeks and from 4-8 weeks of age, respectively. The chicks were maintained in individual pens on saw dust litter under uniform conditions providing feed and water ad libitum. The chicks were weighed individually at day-old and also at weekly intervals upto the end of the experiment. Weekly feed consumption was recorded for each experimental unit.

The data thus collected were analysed using analysis of variance technique and significant differences among treatments were compared by Duncan's Multiple Range test (Steel and Torrie, 1981).

RESULTS AND DISCUSSION

Weight gain: The chicks in group B (fed crumbles throughout) apparently gained maximum weight during the starter period followed by those in groups D (fed mash during first two weeks followed by crumbles), A (fed mash throughout) and C (fed crumbles throughout), respectively (Table 1). The differences among various groups were, however, statistically non-significant (Table 2).

The results indicate that of the two groups of chicks fed crumbles, group B apparently gained more weight, whereas birds in group C were almost similar to those in group A fed mash during the starter period. The numerical difference in the performance of the two groups under the same treatment may be due to an experimental error of unknown origin or mere a chance factor. The average weight gain of the chicks in groups B and C (fed crumbles) as a whole and that of chicks in group D (fed crumbles after two weeks) was higher by 6.5 and 3.2%, respectively, as compared to that of chicks in group A (fed mash).

The chicks in group C exhibited maximum weight gain (1092.5 g) during the finisher period followed by those of chicks in groups B (1027.6 g), D (1005. 1 g) and A (954.2 g), respectively. The influence of treatments on the average weight gain during finisher period was also found to be non-significant. The chicks in groups B, C and D apparently gained 7.7, 14.5 and 5.3 % more weight, respectively, during the finisher period than that of the chicks in group A. Brue and Latshaw (1981) reported a similar trend where four weeks old broilers fed pellets grew faster and reached the average weight of 1750 g about three days earlier than those fed all mash.

The overall weight gain during the study period of eight weeks was apparently the highest (1582.7 g) in chicks of group B, followed by those of chicks in groups C (1575.5 g), D (1508.0 g) and A (1441.8 g). The average weight gain of cicks in groups B, C and D was 9.8, 9.3 and 4.6 % higher as compared to that of chicks in group A. These differences were, however, non-significant (Table 2).

The results are supported by the findings of Malik (1973)

Table 1. *Average values of weight gain, feed consumption and feed efficiency of chicks during starter and finisher periods*

Periods (Weeks)	Parameters	Groups / Treatments			
		A	B	C	D
Starter (0 - 4)	Weight gain (g)	487.6	555.1	483.0	503.0
	Feed consumption (g)	1249.2	1275.1	1317.6	1293.0
	Feed efficiency	2.57^{ab}	2.30^{b}	2.73^{b}	2.58^{ab} *
Finisher (4 - 8)	Weight gain (g)	954.2	1027.6	1092.5	1005.1
	Feed consumption (g)	3160.4	3036.5	2958.8	2896.4
	Feed efficiency	3.33	2.96	2.77	2.88
Overall (0 - 8)	Weight gain (g)	1441.8	1582.7	1575.5	1508.0
	Feed consumption (g)	4409.6	4311.6	4276.4	4189.4
	Feed efficiency	3.07	2.73	2.75	2.78

* The same superscript for means in a row shows non-significant difference.

Table 2. *Analysis of variance of data on weight gain, feed consumption and feed efficiency of chicks during starter and finisher periods*

Periods (Weeks) (Weeks)	Source of variation variation	Degree of freedom freedom	Mean squares		
			Weight gain	Feed consumption	Feed efficiency
Starter (0 - 4)	Between treatments	3	3286.94^{NS}	2495.97^{NS}	0.0961*
	Error	8	861.08	1479.06	0.0217
Finisher (4 - 8)	Between treatments	3	9867.02^{NS}	38821.55^{NS}	0.1755^{NS}
	Error	8	7689.62	10107.84	0.0661
Overall (0 - 8)	Between treatments	3	13071.55^{NS}	29903.66^{NS}	0.0753^{NS}
	Error	8	12258.12	13040.86	0.0399

* = Significant ($P < 0.05$); NS = Non-significant.

who reported that the difference in weight gain of the chicks upto the age of ten weeks fed on pellets, crumbles and mash was non-significant. Piech-Schleicher (1979) also reported that the form of feed had no effect on liveweight gain in broiler chickens from day-old to eight weeks of age. Reece et al. (1985), however, reported significantly higher body weight of broilers on crumbles as compared to mash feed at 47 days of age.

Feed consumption: The chicks in group C apparently consumed maximum feed during the starter period followed by those in groups D, B and A, respectively (Table 1). The differences among various groups were, however, non-significant (Table 2). Results of the present study differ from those of Choi et al. (1986) who reported that broiler chicks fed the crumble starter diet consumed significantly more feed as compared to those fed starter feed in the form of mash.

The chicks in group A exhibited maximum feed consumption (3160.4 g) during the finisher period followed by those of chicks in groups B (3036.5 g), C (2958.8 g), and D (2896.4 g), respectively (Table 1). The influence of treatments on the average feed consumption during finisher period was also found to be non-significant. The results do not agree with the findings of Choi et al. (1986) who observed that pelleting the finisher diet significantly improved feed intake in comparison to mash feeding.

The overall feed consumption during the study period of eight weeks was apparently the highest (4409.6 g) in chicks of group A, followed by those of chicks in groups B (4311.6 g), C (4276.4 g) and D (4189.4 g), respectively. These differences were, however, non-significant. It was noted that chicks in group A on an average consumed less feed during the starter period but comparatively more feed during the finisher period. As a result the overall feed consumption was found to be the highest in the same group followed by that in the group fed crumbles throughout. The overall average feed consumption of the chicks fed pelleted diet during the finisher period (groups C and D) was observed to be minimum. Malik (1973) also recorded a comparatively higher consumption of mash feed, however, the chicks fed mash consumed significantly more feed than those fed either crumbles or pellets.

Feed efficiency: The average feed efficiency of chicks in groups A, B, C and D during the starter period was 2.57, 2.30, 2.73 and 2.58, respectively (Table 1). The chicks in group B showed significantly better feed efficiency than group C (Tables 1 and 2). Unexpected significant difference in feed efficiency between the chicks in groups B and C (fed crumbles) can be attributed to some experimental error or mere a chance factor. The average feed efficiency ratio (2.52) worked out from the original values of the groups B and C fed crumbles is apparently somewhat better than those for groups A and D. The results are in agreement with those of Takemasa and Hijikuro (1977) who observed the same feed efficiency of the chickens fed mash, pellets, steamed pellets or reground pellets during the first four weeks of age. The chicks in group C apparently exhibited the best feed efficiency (2.77) during the finisher period followed by those of chicks in groups D (2.88), B (2.96), and A (3.33). These differences were, however, non-significant.

The overall feed efficiency ratio during the study period of eight weeks was apparently the best (2.73) in chicks of group B followed by those of chicks in group C (2.75), D (2.78) and A (3.07). The feed efficiency values in case of chicks in groups B, C and D had little variation and these groups apparently showed better feed efficiency in comparison to the chicks in group A. These differences were, however, non-significant. The results of the study are supported by the findings of Choi et al. (1986) who found no significant differences in feed efficiency during eight weeks period between types of either starter or finisher ration.

Table 3. *Mortality percentage and economics of various treatments*

Factors	Groups / Treatments			
	A	B	C	D
Mortality percentage	5.6	2.8	8.3	22.2
Net profit (Rs.)	5.57	8.61	8.56	7.54

Mortality and economic aspect: The mortality percentage of chicks in groups A, B, C and D was 5.6, 2.8, 8.3 and 22.2, respectively (Table 3). Apparently the chicks in group D showed maximum mortality. No incidence of pasting up and feather picking was, however, observed in chicks under any of the treatments throughout the experimental period. Apparently net profit as shown in Table 3 was lower in group A as compared to that of the other groups.

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