

## **Effect of mash and crumbled feed forms on the performance of broiler chickens**

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**Abstract:** *The study was carried out to observe the influence of mash and crumbles on the performance of broilers at Poultry Production and Research Hyderabad, Department of Livestock and Fisheries, Government of Sindh. A total of 90 day-old broiler chicks were purchased from Hyderabad market and randomly divided into group A and B, each group was further subdivided three times and 15 chicks/replicate were reared. The chicks under group A and B given mash and crumbles feed respectively up to 42 days. The broilers provided crumble feeding consumed more ( $P<0.05$ ) feed than that of mash provided. The overall feed intake of broilers fed crumble was higher ( $3964.3\pm 0.72\text{g/bird}$ ) than the broilers with mash feeding ( $3800.00\pm 1.77\text{g/bird}$ ). The body weight of broilers with crumble feeding was observed higher from 2<sup>nd</sup> to 6<sup>th</sup> week than that of broilers with mash feeding. The overall live body weight was recorded significantly more ( $2080.7\pm 1.96\text{g/bird}$ ) in broilers with crumble feeding than the broilers with mash ( $1884.80\pm 0.57\text{g/bird}$ ). The trend of weight gain (%) was also remained risen from 2<sup>nd</sup> to 6<sup>th</sup> week for the group of broilers fed crumbles in comparison of broilers with mash feeding. The overall FCR was recorded to be comparatively better ( $P<0.05$ ) in broilers with crumble feeding ( $1.84\pm 3.33$ ) than broilers with mash ( $1.88\pm 6.67$ ). It could be concluded that the broilers provided crumble feed may give better body weight and efficient feed conversion.*

**Keywords:** *broiler chickens, crumbles, feed forms, mash, performance*

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### **I. Introduction**

The poultry industry is the second largest industry of Pakistan next to textiles with a turnover of approximately Rs. 564 billion and poultry meat contributes 28.5% of the total meat production in country. In Pakistan, about forty percent of total meat consumption is being procured from poultry products and 834,000 tons of poultry meat consumption puts it among world's top 20 [1]. The broiler farming is growing day by day in the country. However, fruitful growth of broiler depends on ideal feed intake throughout the growing period. An ideal feed intake rely on factors like environmental temperature and diet nutrient density, and physical feed quality is considered to have a very significant impact on broiler growth [2]. Out of the total recurrent cost of poultry industry approximately 70% accounts for the feeding, thus profitability of the operation is very much dependent on the feeding management [3]. However, the cost of feed processing represents a significant portion of feed costs and gives the greatest opportunity for influencing broiler performance beyond nutritional adequacy [4]. In meat yield of broiler, a fundamental issue is the physical form of feed. Various feed forms pellet, mash or crumble that to be provide to broiler are the most main factor which directly affect the cost of mixed feed and production performance of chicken. Mash is a form of a whole feed that is finely ground and mixed therefore that birds cannot easily separate out ingredients; every mouthful offers a well-proportioned diet. Though, crushed feed is not so pleasant and does not keep their nutritive value as well as ungrounded feed [5]. Crumble also is a type of feed prepared at the mill by pelleting of the mixed ingredients and then crushing the pellet to a consistency thicker than mash. Recently this form of feed is becoming popular in broiler production due to its convenience of feeding. Feeding of each form of feed has its advantages and disadvantages. The effectiveness, digestibility and conversion efficiency of different forms of feed are also different. Limited research has been done to investigate the effect different forms of feed (mash and crumble) on the productive

performance of broiler in Sindh province of Pakistan. Thus the present study has been carried out to observe the effect of mash, and crumbled forms of feed on performance of broiler.

## II. Materials And Methods

The present study was conducted at Poultry Production and Research Hyderabad, Department of Livestock and Fisheries, Government of Sindh to evaluate effect of mash and crumbles on the performance of broiler. Before start of the experiment the experimental farm of the broiler house was properly washed, cleaned and disinfected. A total of 90 day-old broiler chicks were purchased from Hyderabad market and randomly divided into two groups A and B. The group A and B were further subdivided three times (i.e. A1, A2 and A3; B1, B2 and B3) for the replications and each replication consisted 15 chicks. The chicks under group A offered mash and B with crumbles up to 42 days of the experiment and both forms of the feed were of same composition. Uniformity in the management practices was maintained as much as possible. Fresh drinking water was supplied ad libitum to the birds throughout the experimental period. Feed was offered to the broilers three times a day. Drinkers were washed and cleaned daily in the morning and feeders were cleaned weekly before being used. Strict sanitary measures were followed during the experimental period. The parameters: Feed consumption (Feed intake (g/bird) = feed offered - total fed / Total No. of broilers), Weight gain (g/bird) and Feed conversion ratio [FCR= feed intake (g) / live weight (g)] were recorded during the experiment.

### 2.1 Statistical analysis

The data so obtained was tabulated and analyzed according to statistical procedure of Analysis of Variance (ANOVA) and the treatment means were computed using Least Significant Difference (LSD) at 5% level of probability through computerized statistical package i.e. Student Edition of Statistics (SXW), Version 8.1 (Copyright 2005, Analytical Software, USA).

## III. Results

In current study, it was observed that the feed intake of broilers offered both types of feeding (i.e. mash and crumble) was varied significantly ( $P < 0.05$ ). The results presented in Table-1 show that the broiler group offered mash feeding consumed more feed at 1<sup>st</sup> week of experiment ( $112.29 \pm 2.078$ g/bird) than the group on crumble feeding ( $108.14 \pm 0.85$ g/bird). Whereas at 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> week the feed intake was found to be higher as  $260.50 \pm 0.31$ ,  $555.36 \pm 0.43$ ,  $780.10 \pm 0.29$ ,  $1065.40 \pm 0.48$  and  $1194.80 \pm 0.91$ g/bird respectively of broilers fed crumble than the broilers fed mash ( $245.46 \pm 1.51$ ,  $510.43 \pm 0.85$ ,  $700.32 \pm 1.44$ ,  $1045.10 \pm 1.58$  and  $1186.50 \pm 0.68$ g/bird at 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> week, respectively). Table-1 further reveals that the broilers provided crumble feed were found to be with remarkable ( $P < 0.05$ ) live body weight than the broilers with mash feeding. However at the initial period (1<sup>st</sup> week) the group of broilers fed mash achieved  $69.47 \pm 0.84$ g/bird body weight and of broilers with crumble feeding it was  $65.70 \pm 0.76$ g/bird. While the body weight of broilers with crumble feeding was noted higher at 2<sup>nd</sup> ( $139.00 \pm 0.58$ g/bird), 3<sup>rd</sup> ( $275.20 \pm 0.42$ g/bird), 4<sup>th</sup> ( $375.30 \pm 0.40$ g/bird), 5<sup>th</sup> ( $485.20 \pm 0.76$ g/bird) and 6<sup>th</sup> ( $540.60 \pm 0.53$ g/bird) week than that of broilers with mash feeding at 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> ( $143.33 \pm 0.35$ ,  $320.37 \pm 1.03$ ,  $415.30 \pm 0.21$ ,  $550.50 \pm 0.84$  and  $585.57 \pm 0.58$ g/bird, respectively) week.

**Table-1 Effect of mash and crumble feeding on the weekly performance of broilers**

Week	Feed form	Performance of broiler		
		Feed intake (g/bird)	Weight gain (g/bird)	FCR
1 <sup>st</sup>	Mash	112.29±2.078 <sup>k</sup>	69.47±0.84 <sup>k</sup>	1.61±0.01 <sup>i</sup>
	Crumble	108.14±0.85 <sup>l</sup>	65.70±0.76 <sup>l</sup>	1.64±0.01 <sup>i</sup>
2 <sup>nd</sup>	Mash	245.46±1.51 <sup>j</sup>	139.00±0.58 <sup>j</sup>	1.76±0.01 <sup>g</sup>
	Crumble	260.50±0.31 <sup>i</sup>	143.33±0.35 <sup>i</sup>	1.81±0.01 <sup>f</sup>
3 <sup>rd</sup>	Mash	510.43±0.85 <sup>h</sup>	275.20±0.42 <sup>h</sup>	1.69±0.02 <sup>h</sup>
	Crumble	555.36±0.43 <sup>e</sup>	320.37±1.03 <sup>e</sup>	1.73±0.00 <sup>e</sup>
4 <sup>th</sup>	Mash	700.32±1.44 <sup>f</sup>	375.30±0.40 <sup>f</sup>	1.86±1.00 <sup>e</sup>
	Crumble	780.10±0.29 <sup>c</sup>	415.30±0.21 <sup>c</sup>	1.87±1.00 <sup>e</sup>
5 <sup>th</sup>	Mash	1045.10±1.58 <sup>d</sup>	485.20±0.76 <sup>d</sup>	2.15±0.02 <sup>b</sup>
	Crumble	1065.40±0.48 <sup>c</sup>	550.50±0.84 <sup>b</sup>	1.93±8.81 <sup>d</sup>
6 <sup>th</sup>	Mash	1186.50±0.68 <sup>b</sup>	540.60±0.53 <sup>c</sup>	2.19±5.78 <sup>a</sup>
	Crumble	1194.80±0.91 <sup>a</sup>	585.57±0.58 <sup>a</sup>	2.03±0.02 <sup>c</sup>
LSD (0.05)		3.3267	1.8854	0.0325
SE ±		±1.6000	±0.9091	±0.0157

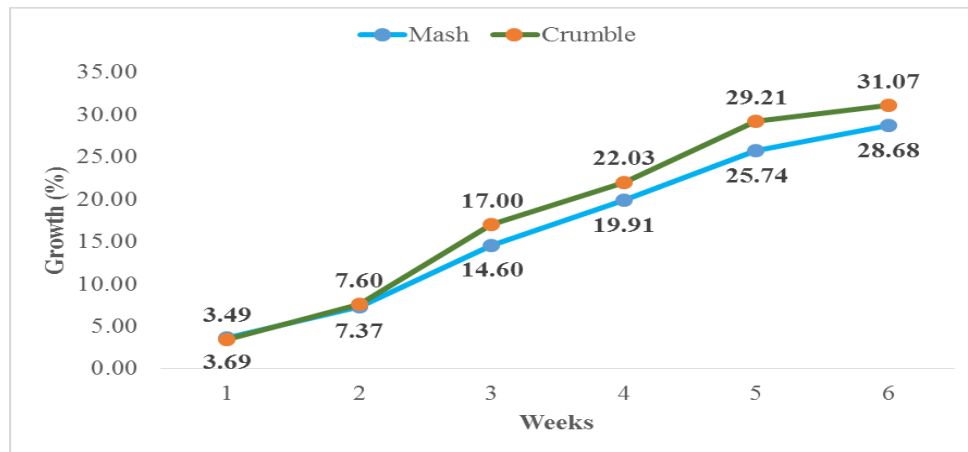
Values are the averages of 3 replicates per group, and values with different letters within similar column are significantly differ from each other.

However, result in Table-2 demonstrates that overall feed consumption in broilers provided mash feeding was lower ( $3800.00 \pm 1.77$ g/bird) than that of broilers with crumble feeding ( $3964.3 \pm 0.72$ g/bird). The overall live body weight was recorded significantly more ( $2080.7 \pm 1.96$ g/bird) in broilers with crumble feeding than the broilers with mash ( $1884.80 \pm 0.57$ g/bird). Moreover the trend of body weight gain shown in figure-1 indicates that the increase in body weight gain at 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> (7.60, 17.00, 22.03, 29.21 and 31.07%, respectively) week was markedly high in group of broilers fed crumbles compared to broilers with mash feeding (i.e. 7.37, 14.60, 19.91, 25.74 and 28.68%, respectively). In the present study feed conversion ratio (FCR) was observed as  $1.61 \pm 0.01$  (at 1<sup>st</sup> week),  $1.76 \pm 0.01$  (at 2<sup>nd</sup> week),  $1.69 \pm 0.02$  (at 3<sup>rd</sup> week) and  $1.86 \pm 1.00$  (at 4<sup>th</sup> week) in broilers fed mash, while in broilers fed crumbles it was  $1.64 \pm 0.01$ ,  $1.81 \pm 0.01$ ,  $1.73 \pm 0.00$  and  $1.87 \pm 1.00$  at corresponding weeks. However FCR was improved in group of broilers fed crumbles at 5<sup>th</sup> week ( $1.93 \pm 8.81$ ) and 6<sup>th</sup> ( $2.03 \pm 0.02$ ) week as compared to broilers with mash at 5<sup>th</sup> and 6<sup>th</sup> week ( $2.15 \pm 0.02$  and  $2.19 \pm 5.78$ , respectively). Further Table-2 reveals that the overall FCR was recoded to be comparatively better ( $P < 0.05$ ) in broilers with crumble feeding ( $1.84 \pm 3.33$ ) than broilers with mash ( $1.88 \pm 6.67$ ).

**Table-2 Influence of mash and crumble feeding on overall performance of broilers**

Parameters	Feeding		LSD (0.05) ± SE
	Mash	Crumble	
Feed consumption (g/bird)	$3800.00 \pm 1.77^b$	$3964.3 \pm 0.72^a$	5.2914 ±1.9058
Weight gain (g/bird)	$1884.80 \pm 0.57^b$	$2080.7 \pm 1.96^a$	5.6644 ±2.0402
FCR	$1.88 \pm 6.67^a$	$1.84 \pm 3.33^b$	0.0207 ±7.454

Values are the averages of 3 replicates per group, and values with different letters within similar row are significantly differ from each other.



**Figure-1 Growth trend /weight gain (%) of broilers offered mash and crumble feeding**

#### IV. Discussion

In present study the broilers provided crumble feeding consumed more ( $P < 0.05$ ) feed than that of mash form of feed provided. However weekly feed intake was found to be increase in the group of broilers fed crumbles than those fed mash throughout the experimental period. Relatively similar findings have been reported in another study [6], Authors stated that significantly ( $P < 0.01$ ) highest feed consumption was occurred in broilers of crumble group in all the weeks of age than the broilers of mash group. The overall feed intake of broilers fed crumble was also observed higher ( $3964.3 \pm 0.72$ g/bird) than the broilers with mash feeding ( $3800.00 \pm 1.77$ g/bird). Likewise Jahan et al. [6] reported that here it was evident that significantly higher feed consumption occurred in crumble ( $3302.65$ g) group than that of mash ( $3191.3$ g) group during the whole period of trial. However, other Researchers are also agreed with the results of present study who reported that crumbled feed forms gave greater feed intake than did mash forms in the broiler chickens [7, 8, 9 and 10]. In current study the body weight of broilers with crumble feeding was observed higher from 2<sup>nd</sup> to 6<sup>th</sup> week than that of broilers with mash feeding. These findings are in the line of results reported by Jahan et al. [6] who indicated that the highest body weight throughout all of the weeks was observed in crumble group, whereas the lowest body weight in different weeks were observed mash group of broiler. In present study the overall live body weight was recorded significantly more ( $2080.7 \pm 1.96$ g/bird) in broilers with crumble feeding than the broilers with

mash ( $1884.80 \pm 0.57$ g/bird). These results are supported by Kim and Chung [11] they stated that that mash-fed broilers had lower body weight at 41 days than broilers fed on crumble. Further Preston et al. [12] and Munt et al. [13] also reported that the results shown significantly poorer performance of mash-fed birds. Moreover in present study the trend of body weight gain (%) was also remained risen from 2<sup>nd</sup> to 6<sup>th</sup> week for the group of broilers fed crumbles in comparison of broilers with mash feeding. In the present study values of feed conversion ratio (FCR) were observed as high in broilers fed crumbles at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> week than that of broilers fed mash. While the values were found to be significantly lower ( $P < 0.05$ ) in broilers fed crumble feeding ( $1.84 \pm 3.33$ ) than broilers with mash ( $1.88 \pm 6.67$ ) at 5<sup>th</sup> and 6<sup>th</sup> week of experiment, that indicates higher feed conversion efficiency. Similarly other study conducted by Jahan et al. (2006) reported that the FCR during the whole experimental period differed significantly ( $P < 0.01$ ), the highest (2.58) FCR value was recorded in mash group, which indicated low feed conversion efficiency and comparatively lower value was noted in crumble (2.24) group, that indicated high feed conversion efficiency. While, Chehraghi et al. [5] studied that in FCR values no significant differences were noted in 1<sup>st</sup> and 2<sup>nd</sup> week feed intake among the different dietary groups, but in 3<sup>rd</sup> to 6<sup>th</sup> weeks the highest FCR were observed in mash and the lowest FCR were observed in crumble ( $P < 0.05$ ). However relatively similar results were obtained by different researchers [14 and 15] who reported that crumble feed forms had a better feed efficiency over mash.

## V. Conclusions

It was concluded from present results that the broiler chickens fed crumble feed form gave significantly higher body weight and consumed more feed than the broilers fed mash. Further it could also be concluded that broilers fed crumble form of feed appeared to be with efficient feed conversion.

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