



## Evaluation of Different Litter Materials on Performance of Commercial Broilers

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### ABSTRACT

A 6 week study was conducted on 240 Commercial day old broiler chicks. The birds were randomly assigned to four treatments (4 replicates of 20 birds each) consisting different litter material like paddy husk, ragi husk, shredded areca nut sheath waste and smashed maize cobs. The birds were reared on deep litter system of housing. All the groups were provided with similar environmental and managerial conditions throughout the experimental period. T1; paddy husk, T2; ragi husk, T3; shredded areca nut sheath waste and T4; smashed maize cobs on the performance and cost of production of commercial broilers reared in deep litter system of rearing. Among different litter materials like paddy husk, maize cob, ragi husk and shredded areca nut sheath waste, there was an improvement in body weight gain, feed consumption, FCR and mortality rate in paddy husk group when compared to other litter materials. BCR ratio was comparable among different treatment groups. Therefore, In addition to paddy husk, other litter materials can be used as an alternative in broilers if available at cheaper cost.

**Key Words:** Broilers, Performance, Litter materials, paddy husk.

### INTRODUCTION

Poultry is the most organised sector in animal production system. It has witnessed fastest growth amongst agriculture and allied sectors in India. While the production of agricultural crops has been rising at a rate of 1.5 to 2 %t per annum that of eggs and broilers has been rising at a rate of 8 to 10 % per annum. Poultry meat is the fastest growing component of global meat demand, and India, the world's second largest developing country, is experiencing rapid growth in its poultry sector. To obtain maximum meat production, management in the poultry house is the key point in success. One of the management practices is the proper maintenance of poultry litter commonly named as deep litter system of management. The litter material is used in a poultry farm to give more comfort to the birds. The aim of this study was to determine the selection of litter/bedding material used in broiler farm during the rearing period. The quality of litter material mainly influences the overall performances of the broiler birds as well as the chickens. It receives droppings and absorbs moisture from faeces and respiratory

processes. It also provides a warm, soft and spongy surface for optimum comfort of the birds.

A variety of litter material including paper products, gypsum (Grimes *et al*, 2007), hardwood bark, sand (Shields *et al*, 2005), rice and wheat straw (Sreehari and Sharma 2010), ground corn cob and soybean straw (De Avila *et al*, 2008), paddy straw and pine leaves (Navneet *et al* 2012, Sharma *et al* (2015). Comparative studies on various crop residues namely ground nut shell, sorghum husk, red gram husk and bajra (pearl millet) husk as litter materials have been used as substitute bedding materials with various level of success (Thirumalesh *et al*, 2013). Particle size, absence of dust, bulk density, thermal conductivity, drying rate and compressibility make pine shavings an ideal bedding material for broilers and layer birds. Therefore, the first objective of the present research was to evaluate the effect of different types of litter materials on feed intake, FCR, body weight gain and mortality rate in commercial broilers reared on different types of materials widely used as litter in the poultry industry (paddy husk, ragi husk, shredded areca

nut sheath waste and smashed maize cobs) The other objective was to study the Benefit cost ratio (BCR) on broiler production Moreover, the characteristics of the materials used as broiler substrate must be taken into account, because some substrates may enrich the environment and support important behaviors of the birds (Gunnarson *et al*, 2000), as well as determine chickens.

## **MATERIALS AND METHODS**

A 6 week study was conducted on 240 Commercial broiler chicks (day old). The birds were randomly assigned to four treatments (4 replicates of 20 birds each) consisting different litter material like paddy husk (PH), shredded areca nut sheath waste (AS), ragi husk (RH), and smashed maize cobs (MC). The birds were reared on deep litter system of housing. All the groups were provided with similar environmental and managerial conditions throughout the experimental period. The commercial starter and finisher feed was formulated as per BIS 2007 specification. An identical and adequate feeding and watering space was provided to all the birds throughout the experimental period. Brooding was carried out for two weeks by using electric bulbs. In the study weekly feed intake, FCR, Body weight and mortality percent Litter moisture content at every week was recorded among different treatments during 0-6 weeks of rearing period. The data collected on various parameters were subjected to statistical analysis as per the methods suggested by Snedecor and Cochran (1989).

## **RESULTS AND DISCUSSION**

The statistical analysis of data on effect of different litter material on feed intake live body weight, body weight gain and feed conversion ratio is depicted in table 1, 2, 3 and 4 respectively. The results on cumulative live body weights of broilers from group PH differed significantly ( $P<0.05$ ) from 0-3 weeks of age. However, the overall live body weights of broilers in group PH for 0-6 weeks period found to be

significantly ( $P<0.01$ ) higher than live body weights of broilers from other groups. This indicated that, rearing of broiler birds on paddy husk litter material found to be beneficial for significant improvement in live body weight. Similar results were found with body weight gain of broilers. When the data on body weight gain from 0-6 weeks was analyzed, significant ( $P<0.05$ ) increase in gain in weights of broiler birds were observed from PH than groups. The results of the present findings indicated that paddy husk improved the weight gain in broiler birds. The efficiency of utilization of feed was significantly better in the paddy husk material than the other material. This was in agreement with the findings of Davasgaium and Boodoo (2000) and Dhaliwal *et al* (2018).

The feed conversion ratio of broilers was statistically analyzed for 0-3 weeks and 0-6 week period. The feed conversion ratio of broiler birds from 0-3 weeks of age was significantly improved in group PH than groups. The feed conversion ratio of broiler birds from 0-6 weeks of age was found to be significantly ( $P<0.05$ ) improved in group PH than other groups.

Economics of the four different litter materials was calculated on the basis of market prices at the time of trial. Keeping the standard floor space of one square foot per broiler, prices of different litter materials were calculated. The cost of paddy husk (PH), shredded areca nut sheath waste (AS), ragi husk (RH), and smashed maize cobs (MC) was Rs. 3.67, 3.17, 3.15 and 3.12, respectively for kilogram (Table 5). The rice husk had an edge on shredded areca nut sheath waste (AS), ragi husk (RH), and smashed maize cobs (MC) due to its very high moisture absorbing ability, paddy husk is also better than other litter materials in respect of availability and economics

The overall results of the study indicated that the body weight, weight gain, feed intake and feed conversion ratio of broiler birds reared on paddy husk litter material were significantly improved than the birds reared on other materials.

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**Table 1. Weekly mean feed intake (g/bird) of commercial broilers reared on different litter materials.**

Treatment		Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Cumulative		
								Wk 0-3	Wk 4 to 6	wk 0-6
T1	PH	94.41 <sup>a</sup>	291.13 <sup>a</sup>	503.83 <sup>a</sup>	619.20 <sup>a</sup>	777.03 <sup>a</sup>	752.54 <sup>a</sup>	889.42	2148.37 <sup>a</sup>	3037.68 <sup>a</sup>
T2	AS	90.15 <sup>b</sup>	272.39 <sup>c</sup>	486.64 <sup>c</sup>	604.83 <sup>b</sup>	771.15 <sup>b</sup>	730.18 <sup>c</sup>	850.46 <sup>c</sup>	2105.54 <sup>c</sup>	2955.73 <sup>d</sup>
T3	RH	91.65 <sup>ab</sup>	271.52 <sup>c</sup>	496.49 <sup>b</sup>	602.86 <sup>b</sup>	765.33 <sup>c</sup>	739.55 <sup>b</sup>	861.81 <sup>b</sup>	2105.49 <sup>c</sup>	2965.84 <sup>c</sup>
T4	MC	91.18 <sup>b</sup>	283.07 <sup>b</sup>	496.72 <sup>b</sup>	604.44 <sup>b</sup>	776.35 <sup>a</sup>	730.05 <sup>c</sup>	870.81 <sup>c</sup>	2109.32 <sup>b</sup>	2979.79 <sup>b</sup>
Mean		0.57	2.14	1.73	1.74	1.25	2.41	3.70	4.70	8.29
P value		0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

**Table 2. Weekly mean body weight (g) of commercial broilers reared on different litter materials.**

Treatment		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
T1	PH	141.25	345.23a	701.75a	1,051.00a	1,427.50a	1,830.75a
T2	AS	138.75	339.83b	646.50c	992.00b	1,355.00c	1,720.25b
T3	RH	140.34	336.53c	668.25b	1,014.00ab	1,374.50b	1,741.75b
T4	MC	139.75	343.47a	674.75b	1,016.00ab	1,382.25b	1,754.00b
SEM		0.93	0.92	5.73	7.72	7.09	11.93
P value		0.844	0.001	0.001	0.035	0.001	0.001

**Table 3. Weekly mean body weight gain (g) of commercial broilers reared on different litter materials.**

Treatment		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
T1	PH	89.12b	203.66a	356.27a	361.47a	366.44	403.35a
T2	AS	88.50b	198.76b	305.08c	352.05ab	359.10	365.70c
T3	RH	92.32a	192.35c	330.01b	347.28b	362.10	367.55c
T4	MC	89.51b	203.67a	332.86b	343.08b	363.60	371.69b
SEM		0.55	1.32	4.79	2.24	1.28	3.99
P value		0.04	0.001	0.001	0.001	0.244	0.001

**Table 4. Weekly mean FCR of commercial broilers reared on different litter materials**

Treatment		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
T1	PH	1.07a	1.43	1.42c	1.71	2.13	1.86c
T2	AS	1.03b	1.38	1.60a	1.71	2.15	2.00a
T3	RH	0.99c	1.41	1.51b	1.74	2.11	2.01a
T4	MC	1.03b	1.40	1.50b	1.75	2.16	1.97b
SEM		0.01	0.01	0.02	0.01	0.02	0.02
P value		0.001	0.610	0.001	0.09	0.799	0.001

**Table 5. Economics of production for the birds from different groups**

Treatment	PH	AS	RH	MC
Chick cost	35	35	35	35
Feed Intake	3,037.68	2,955.73	2,965.84	2,979.79
Cost of feed (Rs. 28 /Kg )	85.06	82.76	83.04	83.43
Miscellaneous cost (Rs.4/ Bird)*	4	4	4	4
Cost of litter	3.67	3.17	3.15	3.12
Total cost per bird	128	125	125	126
Body Weight	1,830.75	1,720.25	1,741.75	1,754.00
Return on sale @ Rs. 80/ kg	146.46	137.62	139.34	140.32
Net profit/bird	18.73	12.69	14.15	14.47
Net profit /kg	10.23	7.38	8.12	8.25
Benefit cost ratio (BCR)	1.15	1.10	1.11	1.12

\*Includes labour, electricity, etc

**CONCLUSION**

Among different litter materials like paddy husk, maize cob, ragi husk and shredded areca nut sheath waste, there was an improvement in body weight gain, feed consumption, FCR and mortality rate in paddy husk group when compared to other litter materials. BCR ratio is comparable among different treatment groups. Therefore, In addition to paddy husk, other litter materials can be used as an alternative in broilers if available at cheaper cost.

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