J. Sci. Technol. (Dinajpur) Vol. 8: 115-119 (2010)
ISSN 1994-0386

EFFECT OF DIFFERENT TYPES OF LITTER ON PRODUCTION PERFORMANCE OF BROILER

F. Kabir and M. Uddin

ABSTRACT

Eighteen (18) farms rearing 1000-3000 broilers were used to assess the impact of different litter depths on the performance of broiler raised on saw dust and rice husk litter. Chicks were randomly assigned into two groups of three litter depths of 2, 4 and 6 inches each for both saw dust and rice husk litter. Different parameters like weight gain, feed conversion ratio (FCR), feed intake and relative organ weight were studied in estimating broiler response. At the end of five weeks of rearing broiler, it was observed that the weight gain was significantly ($p<0.05$) differed by the variation in use of litter materials while feed intake and feed conversion ratio were not significant. Birds performed similar to sawdust and rice husk litter at 4 inches & 6 inches of depth. Significant ($p<0.05$) difference was observed in weight gain of birds at 3rd week of rearing on sawdust and rice husk litter at 2 inches of depth. The weight gain was observed higher in those farms that were rearing broilers on rice husk litter. The highest FCR (1.44) was found in the farm at 4th week of rearing broiler with 6 inches depth on rice husk litter. Except the kidney other organs did not influence most at different depths of litter was observed in this experiment. It is observed that the production performance of broiler is better on rice husk litter than that of saw dust litter.

Key Words: *Litter, production, performance, broiler*

INTRODUCTION

The importance of good quality bedding material for the rearing of broilers on conventional floor systems has been recognized and emphasized (Anisuzzaman and Chowdhury, 1996). Broilers do not perform to their genetic potential in a poor environment. The quality of the environment is highly dependent upon bedding material. The poultry industry consumes large quantities of processed solid wood residues and other materials for litter. Although a variety of products, such as wood shavings, wheat straw and peanut and sunflower hulls, are used as bedding for poultry, alternative litter sources are always of interest to the poultry producer (Hester *et al.*, 1997). The rapid development of the poultry industry in Mauritius has resulted in an increase in the demand for poultry litter material. It is becoming increasingly difficult to secure enough good quality litter that can help to control economic losses related to poor litter management. Such losses can be due indirectly to poor performance and mortality or as a result of condemnation due to down grading at the slaughterhouse. Cost of litter is therefore becoming an increasingly important item in the cost of chicken production. When planning a total management programme for the production and marketing of chicken, all aspects of management such as ventilation, house temperature and bird density interrelate with litter management. However, farmers tend to pay little attention to litter management, and concentrate on nutrition and disease control. The adoption of an appropriate strategy for litter management aiming at optimising both bird performance and cost of production largely depends on the availability and cost of good quality bedding material.

The factor that influences bedding material conditions the most is moisture. Excess moisture in the bedding material increases the incidence of breast blisters, skin burns, scabby areas, bruising,

Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Khanpura, Babugonj, Barisal-8210, Bangladesh

condemnations and down grades. Wet bedding material is also the primary cause of one of the most serious environmental factors affecting broiler production today and resulted in excessive ammonia (NH_3) production (Lacy, 2002). Ammonia in poultry houses is formed by the breakdown of uric acid by bacteria in the poultry litter. Many producers underestimate the detrimental effects of ammonia. High ammonia levels have been proven to cause increased susceptibility to Newcastle disease, as well as depressing growth rates while allowing *E. coli* organisms to proliferate. Prolonged exposure to high levels (50 to 100 ppm) is the cause of kerato-conjunctivitis (blindness) observed in some broiler flocks reared during the cooler months of the year (Lacy, 2002). When levels are as high as this, production is seriously affected. Ammonia levels of just 25 ppm have been found to depress growth and increase feed conversion in broilers. Poultry litter moisture is the key to controlling ammonia levels since litters at 21-25 percent moisture levels produce little ammonia (Lacy, 2002). When poultry litter moisture exceeds 30 percent, ammonia production starts and increases as temperature goes up. Bagley & Evans (1998) stated that ideally poultry litter moisture should be maintained at 12 to 25 percent. It is important that litter is kept in a dry and friable condition throughout the life of the flock. If the litter becomes caked or too wet (> 50 percent moisture) the incidence of hock burn and breast necrosis will increase substantially. Many factors affect litter moisture. For instance, if new bedding material is not stored properly and becomes damp before it is spread in the broiler house, it may be difficult to avoid wet litter problems. Van Middelkoop (2004) emphasizes the fact that ventilation at chicken level is very important to lower litter temperature. Good ventilation at the chicken level reduces bacterial activity in the litter contributing to a lower litter temperature of about 4°C. This resulted in better broiler performance and a better persistency in growth rate. The aim of this study was to look at the effect of different types of litter at different depth as a bedding material on the production performance of commercial broiler over conventional floor system.

MATERIALS AND METHODS

Parameters studied

This study was conducted in some selected broiler farms of Tangail district. The performance of broiler was studied for 5 weeks of their rearing period from November 2008 to December 2008 in the selected broiler farms. A number of 18 broiler farms were selected. Each farm reared 1000-3000 broilers on an average. The farms were selected on the basis of 6 categories, such as using of litter as bedding materials of sawdust 2, 4, 6, inches and rice husk 2, 4, 6 inches. For each categories, 3 farms were selected whose management system other than litter management were more or less similar. Performance of the birds was recorded weekly. Feed conversion ratio (FCR), carcass weight (%) and relative organ weight (g) were studied as a parameter to justify the performance of the broiler.

Feed consumption and weight gain

Feed consumption depends on age of broiler. The data were collected weekly from the farms. From each farm feed consumption data were collected by using the following formula:

$$\frac{\text{Total amount of feed consumed in a week (g)}}{7\ (d)}$$

The same data were collected from the other three farms of same categories such as 2, 4, 6 inches depth. Average feed consumption of broiler of three different farms was used for this study. The weekly weight gain was recorded same as weekly feed consumption of broiler and only average values were used for this study.

Feed Conversion Ratio

After collection of data related to feed consumption and weight gain, the FCR was calculated by using the following formula:

$$\textbf{FCR} = \frac{\text{Feed consumption (g)}}{\text{Weight gain (g)}}$$

Dressing and eviscerated (%)

After slaughtering, the broilers were dressed and dressing (%) was calculated. The dressed chickens were later eviscerated and eviscerated (%) were calculated. The dressing and eviscerated percentage were calculated after 5 weeks of study period. The organ weights were measured and expressed in g. All data recorded in this study were collected in close supervision of the farms. Body weight gain and feed consumption were measured and expressed in g/bird/day.

Statistical analysis

The difference between the comparative performances of broiler bird was analyzed by $\chi 2$ test.

RESULTS AND DISCUSSION

Table 1 shows the average weight gains of broiler reared on different depth of sawdust and rice husk litter. The weight gains were significantly ($p<0.05$) differed at 2 inches of depth between sawdust and rice husk litter at 3rd week (15 - 21 d) of rearing. Birds perform similar on sawdust and rice husk litter at 4 inches & 6 inches of depth. Significant ($p<0.05$) difference was observed between weight gain of birds at 3rd week (15 - 21 d) of rearing on sawdust (31 g/b/d) and rice husk (39 g/b/d) litter at 2 inches of depth. On an average, the weight gain was higher in those farms that were rearing broiler on rice husk litter. The above findings is similar to Anisuzzaman and Chowdhury (1996), they compared four types of litter, viz. rice husk, sawdust, paddy straw and sand, and found that rice husk was the best litter material for rearing broilers with better growth, feed consumption and feed conversion.

Table 1. Average weight gain (g/bird/day) of broiler reared on different depth of sawdust and rice husk litter

Parameter	2 inches			4 inches			6 inches		
	Sawdust	Rice husk	$\chi 2$	Sawdust	Rice husk	$\chi 2$	Sawdust	Rice husk	$\chi 2$
Weight gain (g/b/d):									
0 – 7 d	9	8		8	8		8	9	
8 – 14 d	18	18		20	26		17	19	
15 – 21 d	31	39	*22.31	43	40	^{NS}1.54	33	38	^{NS}0.02
22 – 28 d	55	52		56	57		51	57	
29 – 35 d	62	67		58	61		57	59	

*$p<0.05$, ^{NS}Not significant.

Table 2 represents the average feed consumption of broiler raised on different depth of sawdust and rice husk litter. No significant ($p>0.05$) difference was found on feed consumption of broiler on various litter depth of sawdust & rice husk litter. Although feed consumption depends upon age, on an average, broiler consumed more feed in those farms that were rearing birds on rice husk litter. The highest performance of feed consumption was observed in sawdust litter (74 g) at 3rd week (15 - 21 d) of rearing on 4 inches of depth and the lowest performance was found in rice husk litter (65 g) at 3rd week (15 - 21 d) of rearing on 4 inches of depth.

Table 2. Average feed consumption (g/bird/day) of broiler reared on different depth of sawdust and rice husk litter

Parameter	2 inches			4 inches			6 inches		
	Saw dust	Rice husk	χ^2	Saw dust	Rice husk	χ^2	Saw dust	Rice husk	χ^2
Feed consumption (g/b/d):									
0 – 7 d	19	16		16	15		16	14	
8 – 14 d	35	33		38	36		33	36	
15 – 21 d	56	64	$^{NS}1.11$	74	65	$^{NS}0.25$	60	62	$^{NS}0.45$
22 – 28 d	86	81		87	83		85	82	
29 – 35 d	99	103		91	88		96	93	

Table 3 shows the average feed conversion ratio (FCR) of broiler raised on different depth of sawdust and rice husk litter. During the 5 weeks of study period, the highest FCR were observed at the 4th week (22 – 28 d) of rearing of broiler. The highest performance of FCR was found on the rice husk (1.44) litter at 6 inches of depth. Sawdust performed comparatively lower FCR (1.67) at the same age.

Table 3. Average feed conversion ratio (FCR) of broiler reared on different depth of sawdust and rice husk litter

Parameter	2 inches			4 inches			6 inches		
	Sawdust	Rice husk	χ^2	Sawdust	Rice husk	χ^2	Sawdust	Rice husk	χ^2
Feed conversion ratio:									
0 – 7 d	2.11	2.00		2.00	1.87		2.00	1.55	
8 – 14 d	1.94	1.83		1.9	2.00		1.94	1.89	
15 – 21 d	1.8	1.64	$^{NS}0.53$	1.72	1.62	$^{NS}0.018$	1.82	1.63	$^{NS}0.55$
22 – 28 d	1.56	1.56		1.55	1.45		1.67	1.44	
29 – 35 d	1.6	1.54		1.56	1.44		1.68	1.57	

Table 4 represents the dressing percentage of broiler raised on different depth of sawdust & rice husk litter. Dressing percentage was the highest in the farm that was rearing broiler on rice husk litter (88.82%) at 2 inches depth and the lowest performance was on sawdust litter (84.57%) at 4 inches depth. The eviscerated weight was the highest on rice husk litter (80.87%) at 4 inches depth and lowest on sawdust litter (76.82%) at 4 inches of depth.

Table 4. Carcass traits of broiler reared on different depth of sawdust and rice husk litter

Trait	Sawdust (inches)			Rice husk (inches)		
	2	4	6	2	4	6
Dressed wt. (%)	85.98	84.57	86.2	88.82	88.29	85.05
Eviscerated wt. (%)	78.77	76.82	77.74	80.82	80.87	76.56

Table 5 shows the average relative organ weight of broiler raised on different depth of sawdust and rice husk litter. No significant difference was found between the relative organ weights of broiler except kidney on different depth of litter. The highest kidney weight (7.52 g) was observed at rice husk litter on 4 inches depth and it may be due to better management condition of rice husk litter.

Table 5. Average relative organ weight (g) of broiler reared on different depth of sawdust and rice husk litter

Organs	Sawdust (inches)			Rice husk (inches)		
	2	4	6	2	4	6
Heart	4.5	4.76	4.61	4.86	4.80	4.22
Lung	6.76	7.31	7.01	7.35	7.35	7.10
Liver	22.41	19.12	17.70	19.50	19.22	18.29
Spleen	1.41	1.12	1.19	1.36	1.72	1.13
Kidney	5.72	5.62	6.61	4.95	7.52	5.35
Gizzard	20.95	23.34	19.69	23.65	23.65	19.60

CONCLUSION

Most of the broiler farm owners of our country are rearing broiler bird with or little knowledge. They use different types and different thickness of bedding materials in their farms. After completing the study, we observed that there are some effects on types and thickness of litter on production performance of broiler. There are many categories of litter in the world, which are using as in the broiler farm such as sawdust, rice husk, sand, wood savings etc. In Bangladesh perspective sawdust and rice husk are commonly used because of cost and availability. Production performances of broiler are comparatively higher on rice husk litter than sawdust, and broiler perform better at litter on 6 inches depth. So, our farm owner should consider litter types and depth before starting any broiler farms and then broiler farms will be more profitable. The production performance was observed better in rice husk litter and it may be due to higher absorbing capacity of rice husk litter and this type of litter can be manage and dry easily and litter depth is also an important factor for damp free environment of broiler house.

REFERENCES

Anisuzzaman M and Chowdhury, SD. 1996. Use of four types of litter for rearing broilers. Brit. Poultry Sci. 37: 541-545.

Bagley CP and Evans. RR. 1998. Broiler litter as a feed or fertilizer in livestock operations. Extension specialist and head of North Mississippi research and extension center. pp. 71-74.

Hester PY. Cassens DL and Bryan. TA. 1997. The applicability of particleboard residue as a litter material for male turkeys. Brit. Poultry Sci. 76: 248-255.

Lacy MP. 2002. Litter quality and broiler performance. The University of Georgia College of Agricultural & Environmental Sciences. Cooperative Extension Service. pp. 83-87.

Van Middelkoop JH. 2004. Light program and ventilation in controlling broiler performance. Proceedings of the 23rd Scientific Day WPSA. University of Pretoria. pp. 1-9.