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Performance of Commercial Broilers Raised on Reused and Mixed Type of Litters

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ABSTRACT

An attempt was made to investigate the broiler performance raised on once-used, twice-used and thrice-used litter of paddy husk, either as such or mixed with equal parts of fresh litter in 3 experiments. Broilers raised on fresh litter served as control. Broilers raised on reused and mixed litter had numerically higher body weight at 6 weeks, than the broilers raised on fresh litter in all the 3 experiments, except in Ex-III, where the higher body weight in favour of mixed litter group over the fresh litter group were found to be significant statistically. There were no significant differences among the broilers raised on 3 litter types in the FCR, survivability and dressed weight at 6 weeks of age in all the 3 experiments. The results indicated that broilers could be raised successfully on reused type of litter up to 4 times consecutively either as such or mixed with equal parts of fresh litter.

Keywords: Reused litter, Used-litter, Fresh litter, Broiler performance, Organoleptic character of meat

INTRODUCTION

One of the prerequisite for profitable broiler farming is rearing of broilers on a good quality bedding material i.e. litter. Paddy husk is the most commonly used litter material for broiler production in India and more particularly in the North Eastern region. Of late, the demand for paddy husk has increased due to rapid progress of the poultry industry and its use as a fuel in many other industries. The scarcity is accompanied by higher cost for the available material. This has often resulted in the continued use of the same litter material by farmers to raise successive crops of broilers using the same litter, though the usual practice is to use fresh litter for a new flock.

Raising broilers on reused litter could be economical as there is no extra cost for removal and disposal of old litter. Scientific investigation on the use of reused litter for growing broilers reveals that instead of jeopardizing the flock it has been shown by many investigators that broilers put up a better (Lokanath et al. 1984) or nearly equal (Jones and Hagler 1983) performance compared to broilers raised similarly on fresh litter. Not much work has been reported in this aspect in India and particularly on paddy husk as litter material. The objective of this investigation was therefore, to study the feasibility of raising broilers on reused litter (once-used, twice-used and thrice-used) used either as such or mixed with 50 parts of fresh litter.

MATERIALS AND METHODS

The investigation comprised of 3 consecutive experiments (Ex-I, Ex-II and Ex-III) involving a total of 810 commercial hybrid broiler chicks. Each experiment was conducted with 270 numbers of day old broiler chicks divided equally in 3 groups (90 chicks/litter type) with 3 replicates of 30 chicks each. The litter material used was paddy husk, which were of 3 types i.e. fresh litter which served as control (FL-I, FL-II and FL-III), reused litter (once-used- UL-I, twice-used- UL-II and thrice-used- UL-III) and mixed (50 parts of fresh litter with 50 parts of once-used - ML-I, twice-used - ML-II and thrice-used - ML-III).

Clean dried paddy husk was collected locally. All the sanitary precautions such as cleaning, lime water washing and spraying of insecticide etc were undertaken in each of the pens used for fresh litter, before spreading the litter material. Once-used type of litter materials were collected from the broiler

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unit of the Instructional Poultry Farm of College of Veterinary Science, Khanapara, Guwahati. In Ex-I, the reused litter material was used previously once (once-used UL-I) and the same litter was reused in Ex-II (twice-used UL-II) and Ex-III (thrice-used UL-III) consecutively. Mixed litter was prepared by mixing 50 parts of fresh litter with 50 parts of once-used (ML-I), twice-used (ML-II) and thrice- used (ML-III) litter for the 3 consecutive experiments (Ex-I, Ex-II and Ex-III). The caked up litter material and fallen out feathers were removed from the reused litter at the beginning of each experiment. In case of reused litter, the litter material was heaped up at the centre of the pen and water sprinkled for facilitating microbial multiplication. Subsequently after 7 days the litter was evenly spread on the floor before allotment of chicks. Care was taken so that in each of the pen the thickness of the litter did not exceed 9-10 cm irrespective of litter types. Each type of litter in use was stirred once daily for the entire durationof the experiment.

Standard managemental practices were followed to raise the broilers up to 6 weeks of age. The performance of the broilers in terms of weekly body weight gain, feed conversion ratio (FCR), survivability and dressed weight percentages at 6 weeks were recorded for each group. Organoleptic characters of meat of broilers slaughtered at 6 weeks of age were also studied.

To evaluate the organoleptic characters of meat, a taste panel was constituted with 9 habitual meat eaters as constituent members. Part of breast meat boiled in pressure cooker without adding any salt or spices were served for evaluation of tenderness, juiciness, flavour and overall acceptability by using the 9 point Hedonic scale (Doty 1959), 1 being poorest and 9 being highest. The average scores awarded by members were used for interpretation.

Standard methodology was adopted in carrying out the statistical analysis (Snedecor and Cochran 1967).

RESULTS AND DISCUSSION

The mean weight, feed conversion ratio, survivability and dressed weight of broilers at 6 weeks of age in 3 experiments have been presented in Table-1.

Body weight

There were no significant (P>0.05) difference in the average body weight of the broilers raised on fresh and reused type of litter in all the 3 experiments, though numerically heavier body weights were recorded in the broilers raised on reused litter. But significantly (P<0.01) higher body weight in favour of mixed litter group (ML- III) over the fresh litter group (FL-III) were recorded in Ex-III. The results from the 3 experiments (Table-1), clearly indicates that chicks raised either on reused litter (UL-I, UL-II and UL-III) or mixed litter (ML-I, ML-II and ML-III) derive additional advantage in terms of better rate of growth, than the broilers raised on fresh litter (FL-I, FL-II or FL-III). The results were suggestive of an advantage from the use of recycled litter either as a whole or mixed with fresh litter, when compared to fresh litter. The reasons for the

Table 1: Means and standard errors of body weight, feed conversion ratio (FCR), survivability (%) and dressed weight (%) of broilers at 6 weeks of age

Experiment	Litter type	Body weight (g)	FCR	Survivability(%)	Dressed weight (%)
Ex-I	FL-I	1950.06^{a} +25.64	2.003^{a} + 0.02	95.56^{a} + 1.11	74.09^{a} + 0.23
	UL-I	1961.57^{a} +27.11	2.025^{a} + 0.02	96.67^{a} + 0.02	73.76^{a} + 0.21
	ML-1	2015.47^{a} ± 23.16	1.967^{a} ± 0.02	95.56^{a} ± 1.11	73.70^{a} ±0.23
Ex-II	FL-II	1963.03^{a} + 21.51	2.049^{a} + 0.02	98.89^{a} + 1.11	73.60^{a} + 0.24
	UL-II	1988.56^{a} + 17.91	2.013^{a} + 0.02	100.0^{a} + 0.00	74.08^{a} + 0.23
	ML-1I	1970.90^{a} ± 17.53	1.994^{a} ± 0.02	98.89^{a} ± 1.11	73.91^{a} ± 0.31
Ex-III	FL-III	1913.64^{a} + 19.74	2.069^{a} + 0.03	97.78^{a} + 1.11	72.94^{a} + 0.34
	UL-III	1965.46_{b}^{ab} + 19.62	2.051^{a} + 0.03	94.45^{a} + 1.11	73.03^{a} + 0.57
	ML-1II	2010.48^{b} ± 20.46	2.094^{a} ± 0.08	92.23^{a} ± 2.94	73.96^{a} ± 0.18

Figures in a column within an experiment with at least one superscript in common do not differ significantly (P<0.05)

beneficial effects might be due to synthesis of certain vitamins of the B-complex group in used litters due to microbiological activity and breakdown (Halbrook et al. 1950a, Kennard and Chamberlin, 1951). Used litter poses less hazard to health because its chemical composition has a stabilizing affect on the microbiological population (Phelps, 1971). Lokanath et al. (1984) and Poyraz et al. (1990, III) have advocated raising chicks on used litter to promote growth, similar to the findings of the present investigation.

The results suggested that used litter can be reused for raising broiler batches successfully for at least 3 times consecutively without having any detrimental effect on body weight up to 6 weeks of age. Similar observations on broilers using the same litter consecutively were also reported by Dick et al. (1976) with 5 batches and Azahan et al. (1982) with 6 batches. In contrary Johnson et al. (1985) reported significantly increased broiler weight gain in trial-3 and 4 compared to first two trials in an investigation lasting for 1 year without a change of litter.

Feed conversion ratio

From the results (Table-1) it is clear that there were no significant difference in the average feed conversion ratio of broilers raised on fresh or reused type of litter in all the 3 experiments. These results suggested that type of litter either fresh or reused had no significant effect on the feed conversion ability of broilers raised on them. Non significant differences in the feed conversion ratio of broilers raised on fresh and reused litter were also reported by Malone et al. (1990) and Lien et al. (1992).

Survivability

There was no significant (P>0.05) difference in the percent survivability of broilers among the 3 litter types in all the 3 experiments though numerical differences among the 3litter types existed. In Ex-III, the numerically lower survivability observed in reused litter raised group of broilers over fresh litter might be due to disintegration of litter particles. Decrease in particle size of litter with the age of litter was also reported by Howes et al. (1967), Lien et al. (1992). Non-significant difference in the survivability of broilers raised on fresh and reused litter was also reported by Jones and Hagler (1983) and Lien et al (1992).

Dressed weight

There was no significant (P>0.05) difference in percent dressed weight of broilers among the 2 litter types in all the 3 experiments indicating that type of litter either fresh or reused exerted similar effects on the carcass yields. Similar trends of results were also reported by Lien et al. (1992) and Brake et al. (1993).

Organoleptic evaluation of meat

The results of the organoleptic evaluation of meat (Table-2) indicated that the type of litter either fresh or reused in Ex-I and Ex-II has similar influence on tenderness, juiciness, flavour and

Table 2: Means and standard errors of organoleptic characters of meat of the broilers at 6 weeks of age raised on different litter types

Experiments	Litter types	Criteria			
		Tenderness	Juiciness	Flavour	Overall acceptability
Ex-I	FL-I	6.77^{a}_{a} + 0.18	6.42^{a}_{a} + 0.18	6.20^{a}_{a} + 0.20	6.41^{a}_{a} + 0.19
	UL-I	6.52^{a}_{a} + 0.19	6.20^{a}_{a} + 0.20	6.05^{a}_{a} + 0.21	6.24^{a}_{a} + 0.20
	ML-I	6.51^{a}_{a} ± 0.21	6.28^{a}_{a} ± 0.20	6.03^{a}_{a} ± 0.22	6.22^{a}_{a} ± 0.19
Ex-II	FL-II	6.74^{a}_{a} + 0.15	6.76^{a}_{a} + 0.20	6.85^{a}_{a} + 0.11	6.88^{a}_{a} + 0.12
	UL-II	6.90^{a}_{a} + 0.16	6.88^{a}_{a} + 0.14	6.97^{a}_{a} + 0.10	7.00^{a}_{a} + 0.12
	ML-II	6.88^{a}_{a} ± 0.18	6.85^{a}_{a} ± 0.15	6.88^{a}_{a} ± 0.14	6.93^{a}_{a} ± 0.14
Ex-III	FL-III	6.28^{a}_{b} + 0.14	6.35^{a}_{b} + 0.11	6.29^{a}_{a} + 0.10	6.46^{a}_{a} + 0.09
	UL-III	6.88_{b} + 0.16	6.83_{b} + 0.16	6.57^{a}_{a} + 0.12	6.75^{a}_{a} + 0.14
	ML-III	6.92_{b} ± 0.16	6.88_{b} ± 0.15	6.57^{a}_{a} ± 0.15	6.81^{a}_{a} ± 0.15

NB: Figures in a column within an experiment with at least one superscript in common do not differ significantly (P<0.05)

overall acceptability. However, in Ex-III, tenderness and juiciness of the meat of reused type of litter (UL- III) were significantly ($P<0.05$ to 0.01) higher compared to broilers raised on fresh litter while there was no significant difference in the flavour and overall acceptability of meat between the 2 litter types though numerical differences in favour of reused type of litter existed. There could be suggestive of a possible relationship between the age of the litter and organoleptic characters of meat of broilers raised.

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