

EVALUATION OF PADDY STRAW BEDDING FOR CROSSBRED COWS IN WINTER

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ABSTRACT

A study on twenty healthy lactating equal producing crossbred cows for a period of 60 days was conducted to observe the effect of paddy straw as bedding with different thickness during winter season at the dairy farm of Guru Angad Dev Veterinary and Animal Sciences University, Punjab. Twenty lactating crossbred cows of similar health and production status were randomly divided into four groups of five animals each. Paddy straw was spread over the floor to a depth of 10 (T₁₀), 20 (T₂₀) and 30 cm (T₃₀) in three treatment groups against control group (T₀) where no bedding was provided. The variations in mean body weight were non significant among groups. The milk production was increased by 3.6-17.1% over control group. Total expenditure on bedding ranged only between Rs 53-185/month/animal. So use of paddy straw as bedding material is an economically viable and eco-friendly option.

Key words : bedding, crossbred cows, economic, paddy, straw, winter

Paddy straw is considered as an agricultural waste product, which is usually not fully utilized or disposed by the farmers. The rice wheat system is one of the widely practiced cropping systems in India and covers about 9.5 million hectares, about 90% of this area is located in the Indo Gangetic plains². Almost 90-95% of the rice area in Punjab, Haryana and western UP is used under intensive rice wheat system⁴. Widespread adoption of green revolution technologies has resulted in inception of high yielding varieties, increasing both crop as well as residues. Mechanized harvesting techniques such as combine harvester leaves behind a large amount of loose straw in the field, whose disposal or utilization within a short time compels farmers to burn the useful organic matter¹. It is estimated that 116 million metric tonnes of crop residues were burnt in India in 2001¹⁰. In major rice producing state of Punjab almost 3/4th of straw of

paddy straw usually burnt to vacate the fields annually. Burning of paddy straw produces CO, CO₂, CH₄, N₂O and other gasses, which cause a lot of air pollution⁶ and various health problems⁹. These health hazards can, however, be prevented by reducing one of the root cause of air pollution i.e. encouraging the farmers to use paddy straw for some beneficial purposes like excellent bedding for livestock especially in winter. Therefore, an experiment was conducted with the objective to evaluate the viability of paddy straw as bedding for crossbred cows in winter.

MATERIALS AND METHODS

Experimental design

The work was conducted on crossbred cows at dairy farm of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana for a period of 60 days during December 2002 to January 2003, under the semi-arid climatic conditions of India. Twenty lactating crossbred cows of similar health and production status were randomly divided into four groups of five animals

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each. Paddy straw was spread over the floor to a depth of 10 (T_{10}), 20 (T_{20}) and 30 cm (T_{30}) in three treatment groups which were compared with control group (T_0) without any kind of bedding. Dung and soiled paddy straw was removed on daily basis in the morning as well as in the evening. Rest of management practices followed at the farm were identical among all the groups. The body weight of each animal was recorded every fortnight using platform balance in the morning before offering any feed and water. The animals were machine milked twice in a day and milk yield was recorded by digital recorder of milking machine.

Statistical Analysis

The statistical significance of the mean differences within control and treated groups was analyzed by ANOVA, with Duncan's multiple range test (Snedecor and Cochran, 1994). The software used was Statistical Package for Social Sciences (SPSS) for windows version 16.0 (SPSS Inc, Chicago, IL, USA). A p-value of < 0.05 was used to establish statistical significance.

RESULTS AND DISCUSSION

The Mean Air Temperature ($^{\circ}\text{C}$), Relative Humidity (%), Total rainfall/week, Number of rainy days/week, Sunshine (hours /day) and Wind velocity (km/hour) were 12.4 ± 1.1 , 79.3 ± 3.5 , 5.0 ± 4.2 , 0.5 ± 0.3 , 4.7 ± 0.7 and 3.1 ± 0.3 , respectively. The animals reared with either no bedding (T_0) or having 10 cm (T_{10}) deep bedding shown a loss of 1.27% and 2.70% mean body weight, respectively. However, the animals in T_{20} and T_{30} groups gained 1.08% and 0.75% mean body weight, respectively (table 1). Numerical difference in the initial and the final mean body weight of cows under all the groups was non-significant. The weight gain of animals on 20 and

30 cm deep bedding may be due to conservation of body heat and less exposure to stress.

Animals under T_{10} , T_{20} and T_{30} had produced 3.6, 5.3 and 17.1 %, respectively, more milk over the control group. This confirms the comfortable condition in these groups where bedding was provided and comfort increased by adding more thickness to bedding. These observations were in close conformity with the findings of Kliment and Psenica (1979) and Shinde (1997), who also reported the increase in milk yield due to use of paddy straw as bedding during winter compared to control without any bedding. The cows reared on bedding were observed cleaner compared to those without any bedding. This cleanliness improved further with the increase in depth of bedding. The paddy straw bedding improved the comfort of the animals during winter⁵.

Economic viability of paddy straw as bedding is depicted in Table 1, which clearly indicated escalation in net income under these groups with bedding. The application of paddy straw as bedding had charged Rs. 53.40, 106.90 and 185.20 per animal per month in T_{10} , T_{20} and T_{30} groups, respectively. Paddy straw bedding of depth 10, 20 and 30 cm had resulted in increase in net profit of Rs 188.40, 253.90 and 971.70 per animal per month over control group. The profit was increased with the increase in thickness of bedding.

Since paddy is considered to be waste agricultural by-product and usually burnt. So paddy straw may be available free of cost to the dairy farmers and can improve the profitability of dairy farmers. On the basis of above study it can be concluded that use of paddy straw during winter season is not only economically viable but also eco-friendly due to prevention of environmental pollution from burning of paddy straw.

Paddy straw bedding for crossbred cows

Table 1 : Economic impact of different treatments in crossbred cows

Sl. No.	Particulars	T ₀	T ₁₀	T ₂₀	T ₃₀
1.	Usage of paddy straw (Kg/animal/day)	0.00	3.08	6.04	9.31
2.	Total paddy straw used (Kg)	-	924.00	1812.00	2793.00
3.	Transportation cost for procuring paddy straw(Rs.)	-	292.00	574.00	884.00
4.	Daily time taken by one person for spreading and cleaning of paddy straw (Minutes/day)	-	22.00	45.00	88.00
5.	Total time spent (hours)	-	22.00	45.00	88.00
6.	Labour charges @Rs 11.00 per hour	-	242.00	495.00	968.00
7.	Total expenditure(S. No. 3. and 6.), Rs.	0.00	534.00	1069.00	1852.00
8.	Initial Body weight in Kg	441.2 ± 33.1 ^a	444.0 ± 18.7 ^a	427.0 ± 23.5 ^a	437.0 ± 17.5 ^a
9.	Final body weight in Kg	435.6 ± 29.4 ^a	432.0 ± 19.0 ^a	431.6 ± 23.4 ^a	440.2 ± 16.9 ^a
10.	Total milk yield during the study period (litres)	5629.6	5831.1	5930.3	6593.7
11.	Increase in milk yield over control group (liters)	-	201.50	300.70	964.10
12.	Sale of increased milk @ Rs 12.00 per liter(Rs.)		2418.00	3608.00	11569.00
13.	Margin of receipt by sale of milk over expenditure(Rs.)		1884.00	2539.00	9717.00

(Means with different superscript in a row differ significantly)

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