

Effect of rubber flooring on behaviour of tied dairy cows

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Introduction There has been an increased interest in developing new floors for housed cows. Reports in the literature have suggested that rubber floorings provide a more comfortable surface than concrete for tied dairy cows (Hultgren, 2001). A cotton bag filled with chopped rubber from car tyres has been used as a bedding surface for dairy cows in Londrina, South of Brazil. This rubber bedding seems to provide a soft surface for the animals as well as economising on bedding material. However, there is no information related to behavioural responses of dairy cows to this flooring surface. Therefore, an experiment was carried out with the aim of studying the effect of this rubber flooring on behaviour of dairy cows kept in a tie-stall system.

Material and methods A total of sixteen Holstein-Friesian dairy cows from a commercial dairy farm were randomly allocated to two flooring treatments: T1 = rubber flooring bag (0.15 m thick) with approximately 0.10 m layer of sawdust; and T2 = concrete flooring with approximately 0.25 m layer of sawdust. The cows had a mean lactation stage of 141.1 days (sd, 24.6.), mean parity of 2.25 (sd, 0.281), body condition score of 2.73 (sd, 0.095) and mean milk yield of 33.8 kg/d (sd, 1.25). The cows were fed a total mixed ration, *ad libitum*, consisting (per day/cow, fresh basis) of 28 kg of maize silage, 1.0 kg of grass hay and 16 kg of concentrate, containing maize meal, soybean meal, citrus pulp and cottonseed meal. All animals were milked three times per day (5:30, 13:30 and 21:30 h) in a herringbone-milking parlour. The stalls measured 1.30 m wide and 1.68 m length. The stall division consisted of a top metal tube, two vertical posts and a neck rail tube, 1.14 m high. There was one automatic water bowl (0.47 m height) for each pair of cows. Stall beds were raised 0.15m above the dung channel. Stalls were bedded with sawdust three times a week and cleaned up twice per month. Maintenance behavioural activities were observed manually by a team of observers and recorded for 24 h (10 minutes intervals) once a week, for four consecutive weeks. The data were analysed using GLM procedure of Minitab Software (Minitab, 1995). Treatment means which showed significant differences at the probability level of $P < 0.05$ were compared using Tukey's pairwise comparison procedures.

Results The cows spent an average of 234 minutes/24h (sem = 7.18) in the milking parlour. There were no significant differences between treatments for time spent lying and ruminating and total time lying down. The animals spent significantly ($P < 0.05$) more time eating and total time ruminating on rubber than concrete stall. However, cows spent significantly ($P < 0.05$) more time lying and sleeping on concrete than rubber stalls (Table 1).

Table 1 Maintenance behaviour of tied dairy cows kept in rubber and concrete flooring system

Behaviour (minutes/24h)	Rubber	s.e.m.	Concrete	s.e.m.
Lying (total)	618	18.84	645	18.75
Lying	194b ¹	8.51	215a	10.23
Lying and ruminating	358	13.00	339	15.33
Eating (total)	334a	12.01	301b	10.44
Eating, standing on four legs	307a	13.51	264b	13.92
Ruminating (total)	493a	8.50	457b	9.66
Standing on two legs and ruminating ³	34a	11.01	15b	6.78
Sleeping ²	46b	4.57	61a	5.21

¹ = Analysed after square root transformation. Different letters = statistically significant difference ($P < 0.05$).

²Sleeping = sternally recumbent position with head either resting on the ground or tucked round and held against the thorax.

³Standing on two legs = standing with the front legs on the bed floor and the rear legs on the passageway.

Conclusions The results of the present study demonstrate that there was no advantage in terms of cow's comfort using the rubber bag flooring as there were no significant differences between treatments for total time spent lying down. Animals on concrete spent more time lying and sleeping than those on the rubber-filled bags (Table 1). However, the animals lying on the rubber-filled bags spent significantly more time eating and ruminating. Possibly the less regular and solid surface provided by the rubber bags decreased the cows lying time and increased their eating and standing on two legs and ruminating times (Hultgren, 2001).

References

Hultgren, J. 2001. Effects of two stall flooring systems on the behaviour of tied dairy cows. *Applied Animal Behaviour Science*, 73: 167-177

Minitab (1995). User's Guide, Released 10.5 Xtra for windows, Windows 95, USA