ASSESSMENT OF MICROCLIMATE, FLOOR TYPE AND COLIFORM CONTAMINATION OF THE AIR IN INTENSIVE SHEEP UNIT

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ABSTRACT

An experiment was conducted to assess and compare the coliform air pollution levels in slatted floor and mud floor of sheep pens. Weekly recordings were taken at 8 a.m. and 2 p.m for the estimation of coliform count in air and climatic variables viz. air temperature, relative humidity and air velocity. Coliform count was not statistically significant different between the floors even though the count was higher in mud floor (9.18 ± 3.20cfu per 30 l of air) than in slatted floor (5.25 ± 2.35 cfu per 30 l of air). The floor of sheep pens did not have any significant influence on the climatic variables but the period had a highly significant ($P<0.01$) influence on climatic variables.

KEY WORDS: Coliform - air borne organism - sheep house - floor type - micro climate

INTRODUCTION

At present, the husbandry system of sheep rearing has been changed into intensive system from traditional extensive system of management. In this system the incidence of respiratory diseases are high which is supposed to be correlated to the quality of air and its contents including microbes causing mortality in lambs (Prasad et al., 1992; Wadhwani et al., 1992 and Kulkarni et al., 1997). So the concentration of airborne micro-organism was important in determining the severity of clinical respiratory diseases (Pritchard et al., 1981). The micobial air contamination in sheep pens mainly depends upon the husbandry system followed especially by the method of feeding and the type of floor. The possible levels of coliform air contamination have not yet been investigated in sheep pens. Keeping these in view, the present study was undertaken.

MATERIALS AND METHODS

The study was carried out in sheep pens at Livestock Research Station, Kattupakkam for a period of five months. Twelve apparently healthy weaned Madras red, male lambs were selected and divided into two groups of six each.They were homogeneous in terms of age (3 months) and body weight (12.63 ± 1.39 kgs). The two groups were assigned at random to the two experimental housing systems viz., mud and slatted floor were maintained under similar intensive system of management and feeding. Air samples and climatic values were taken from the slatted and mud floor of sheep pens once in a week at 8.00 am and 2.00 pm. and body weight of lambs were also taken at fortnightly intervals.

Collection of air sample for coliform contamination

Fifty one and half grams of MacConkey agar was suspended in 1 l of distilled water and boiled to completely dissolve the medium. Finally, the pH of the medium was adjusted to 7.1 ± 0.2 and autoclaved at 15 lb pressure per square inch for 15 minutes. The sterile molten and cooled media of 15 to 20 ml was poured into each petridishes and mixed uniformly. Then it was used for the collection of air samples. An airborne bacterial sampler was used to collect air sample for microbial count. The sampler was operated at the prescribed flow rate of 30 l/min over the concerned medium. All samples were taken from the centre of the pen at 0.75 m height above the floor level. Petridishes were filled with 20 ml of MacConkey agar for estimating coliform count. After the collection of samples, the petridishes were incubated at 37 C for 24 hours. At the end of 24 hours the number of colonies were counted by using Quebec colony counter. The number of colonies was expressed as cfu/30 l of air.

Recording of micro climate

Inside ambient temperature (C), relative humidity (per cent) and air velocity (m/sec) were measured with a battery operated Testo-452 precision instrument. Air probe for temperature and humidity measurement and

pressure probe for velocity meas pitot tube were used. Climatic values were recorded at the initial and final stage of the collection period and the mean of the two readings were used for statistical analysis.

The data were analysed statistically as per the Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The mean coliform count (cfu/30 l of air) recorded in the air of the sheep pen with two different flooring pattern at different periods and the analysis of variance are given in table 1 and overall mean in table 2. The overall mean coliform count did not differ significantly between the floors even though the count was higher in mud floor (9.18 ± 3.20cfu per 30 l of air) than in slatted floor (5.25 ± 2.35 cfu per 30 l of air) (Table 2). This might be due to low viability of coliform organisms in the air but it is present relatively in high concentration in the litter. This is in agreement with the earlier findings of Muller and Wieser (1987).The period did not influence significantly the coliform count (Table1)

Table - 1 Mean ± S.E and analysis of variance for coliform count in the air (cfu per 30 l) of sheep pens with different flooring pattern at different periods of time (May 2000 to September 2000).

Parameter	Period	Floor		`F' value	
		Slatted floor	Mud floor	Between Period	Between floor
Coliform count (cfu/30 l of air)	Morning (8.00 am)	2.39 ± 1.00	6.80 ± 2.14	2.752	1.607
	Afternoon (2.00 pm)	8.11 ± 3.76	11.56 ± 4.76		
Atmospheric temperature (°C)	Morning (8.00 am)	30.06 ± 0.32	30.11 ± 0.33	64.561**	0.005
	Afternoon (2.00 pm)	33.50 ± 0.50	33.51 ± 0.51		
Relative humidity (per cent)	Morning (8.00 am)	59.43 ± 1.60	59.72 ± 1.65	24.268**	0.0006
	Afternoon (2.00 pm)	50.74 ± 1.97	50.55 ± 2.00		
Air velocity (m/sec)	Morning (8.00 am)	0.76 ± 0.04	0.73 ± 0.04	63.622**	0.973
	Afternoon (2.00 pm)	1.23 ± 0.09	1.41 ± 0.10		

** P<0.01

The floor of sheep pens did not have any significant influence on the air temperature, relative humidity and air velocity (Table 2). The two pens located in the same building might be considered as a factor for the non significant difference between the floors. With regard to periods, highly significant (P<0.01) increase in air temperature was obtained in the afternoon when compared to morning (Table 1).The period had a highly significant (P<0.01) influence on relative humidity and it was higher in the morning and lower in the afternoon

(Table 1). It might be due to lower air temperature and air velocity during morning. The period exerted a highly significant (P<0.01) difference on air velocity, which was lower in the morning when compared with afternoon (Table 1). This might be due to lower air temperature and higher relative humidity in the morning.

Table - 2 : Over all Mean ± S.E and significance of coliform count and climatic values in sheep pen with different flooring pattern

Parameters	Floor	
	Slatted floor	Mud flo
Coliform count (cfu/30 l of air)	5.25 ± 2.35	9.18 ± 3
Air temperature (°C)	31.78 ± 0.41	31.81 ± 0
Relative humidity (Per cent)	55.09 ± 1.73	55.14 ± 1
Air velocity (m/sec)	1.00 ± 0.01	1.07 ± 0

It was co ncluded that coliform count did not differ significantly between the floors and periods where as climatic variables showed significant difference between the periods but not between the floors.

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