VEAL CALF CLEANLINESS: RATING METHODS TO MEET THE NEEDS OF THE FRENCH VEAL CALF INDUSTRY

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Abstract – Fecal contamination of veal calf hides is a major risk for carcasses contamination. In 2007, the Institut de l'Elevage carried out a study for the French veal calf industry, to rate dry fecal stain in veal calves and to describe the animal cleanliness when arriving to the slaughterhouse. A rating table for dry fecal staining of calf hides was devised, with four classes (A, B, C and D) based on previous studies of adult cattle cleanliness. 120 groups were rated in 7 slaughterhouses, representing 7418 veal calves. Only 10% of veal calves were dirty and required measures to improve cleanliness to meet current European regulation. Because of the good correlations between collective and individual rating (0.7 to 0.8), it seems possible to assess cleanliness from a sample of veal calves in a group. This could speed up the assessment. Results of research on factors affecting fecal contamination of hides were not conclusive, but it seems transport time, feeding system and floor type have an influence. Further studies are nevertheless requested to assess wet fecal staining, to test collective rating on a large scale and to explore the factors causing variation of cleanliness at farms.

Key Words – Veal calf production, Cleanliness, Rating tables, Fecal staining

I. INTRODUCTION

The European food hygiene security regulation (EC 852/2004, 853/2004 and 854/2004) applied from January 2006. This legislation covers animal cleanliness, i.e. the presence of fecal stains on hides which is an important risk for contamination of carcasses. Moreover, European regulation provides that breeders have to take measures to assure cleanliness of animals going to the slaughterhouse, that slaughterhouses check each animal's cleanliness before slaughter, and that veterinarian services make sure that "unacceptable" animals are not slaughtered without corrective actions to improve cleanliness. The regulation applies to all cattle, sheep and swine. Studies were recently conducted by the Institut de l'Elevage on the adult cattle cleanliness [1] [2] [3] [4] [5], but there has been no assessment of the cleanliness of veal calves arriving at slaughterhouses.

In 2007, the French veal calf industry asked the Institut de l'Elevage to develop a rating table for dry fecal staining of veal calves, to assess the veal calf cleanliness at the slaughterhouses, and to identify factors that possibly contribute to variation of cleanliness from data obtained at the slaughterhouse.

II. MATERIALS AND METHODS

The protocol of the present study was defined according to previous studies on adult cattle cleanliness [1] [2] [3] [4] [5].

About 60 veal calves were photographed, covering all states of cleanliness that can be encountered. The pictures were classified by the Institut de l'Elevage according to a gradient of dry fecal staining, four classes were defined (Table 1).The classification was based directly on the one elaborated for adult cattle to ensure us a consistent method. This cleanliness rating table applies to living animals and focuses only on dry fecal staining.

Table 1 Veal calves cleanliness rating table

Rating	State of cleanliness	Description
A	Clean	No dry fecal stains
B	Slightly dirty	Dry fecal staining on the lower half of the thigh and on belly
C	Dirty	Dry fecal staining from the top of the thigh to the front of the sternum
D	Very dirty	Coat totally covered by dry fecal staining

Surveys were conducted in 7 slaughterhouses to get a picture of the variation of cleanliness in veal calves and to be representative of veal calf production. Cleanliness ratings were conducted

only in winter (February 2008), with the assumption that calves are generally clean in summer. Therefore, the seasonal effect was not studied.

Ratings were performed by two persons of the Institut de l'Elevage trained to use the rating table. All veal calves slaughtered during a week were rated. The notations were made in two steps:
- Cleanliness of live animals: individual rating (A, B, C or D) of each animal of a group [1] and collective rating according to the numbers of animals rated A, B, C and D in the group. This step is called the "live rating" for the rest of the paper.
- Cleanliness of dead animals: individual rating (A, B, C or D) of each animal in the slaughter line. This step is called the "dead rating" for the rest of the paper.
All relevant information (alimentation, transport time, litter type, etc.) was provided by the slaughterhouse when it was available.

First, a descriptive data analysis was performed to characterize the cleanliness state of the population we studied. Observed frequencies, means, standard deviations, minima and maxima were estimated for each class and each group. Then, the correlation between collective live ratings and individual live or dead ratings was calculated to assess the feasibility of collective rating in slaughterhouses. To complete the collective method, it was necessary to establish maximum proportions of dirty animals for each class of cleanliness (Principal Component Analysis and Hierarchical Clustering – SPAD).
A logistic regression (SAS®) was used to test risk factors which could explain the variation of cleanliness between animals. These factors were first tested one by one, then interactions between significant factors were checked.

III. RESULTS AND DISCUSSION

A total of 120 groups were rated, representing 7418 veal calves. The group size was highly variable, from 10 to 210 veal calves. Most veal calves were fed from the bucket (75%) and housed on slatted floors (85%), with straw in only 5% of cases. The average time of transport was 3.5 hours, but it was a highly variable (from 0.5 to 17 hours). The lairage time in slaughterhouse was also very variable, from a few minutes to 13 hours with an mean time of 4.5 hours.

Table 2 Proportion of each state of cleanliness for the three rating methods

Rating	Individual live rating	Individual dead rating	Collective live rating
A	74,0%	66,2%	69,0%
B	18,3%	23,5%	22,5%
C	6,0%	8,2%	7,1%
D	1,6%	2,1%	1,3%

Individual dead ratings (Table 2) show that nearly 90% of calves were clean or slightly dirty. The proportion was slightly higher (92%) for individual live ratings, but both methods gave coherent results. Difference between both ratings may be explained either by the soiling of veal calves during the lairage time before slaughter or by the easiest rating of dead veal calves. Only 10% of veal calves were dirty or very dirty. These are the calves to which preventive or corrective measures have to be applied according to the European food hygiene security regulation.

Table 3 Correlations between individual dead ratings and collective live ratings

Collective live rating	Individual dead rating			
	A	**B**	**C**	**D**
A	0,78			
B		0,69		
C			0,70	
D				0,77

Individual dead ratings and collective live ratings were correlated (Table 3), independently of the cleanliness ratings A, B, C or D. The result indicates that the collective method could be used as a quicker method to describe the state of cleanliness of veal calves.

According to the proportions of individual rating for veal calves contributing to each collective

[1] A group is defined as all veal calves from the same farm and slaughtered the same day.

rating obtained during the study (Table 4), the following rule to classify a group of veal calves is proposed:

- "A" group: > 90% of "A" veal calves
- "B" group: > 90% of "A" and "B" veal calves
- "C" group: ≥ 10% of "C" and "D" veal calves
- "D" group: ≥ 10% of "D" veal calves

This proposal must be further tested and validated in slaughterhouses.

Table 4 Proportions of veal calves for each collective cleanliness rating

	Proportions of individual rating			
Individual ratings	**Group A**	**Group B**	**Group C**	**Group D**
A	90% ± 6%	72% ± 6%	47% ± 6%	17% ± 8%
B	8% ± 5%	23% ± 5%	37% ± 7%	41% ± 10%
C	2% ± 2%	5% ± 6%	13 ± 5%	30% ± 6%
D	0%	1% ± 1%	3% ± 3%	12% ±8%

Risk factors which could explain the differences of cleanliness between animals were explored. No significant difference was observed for feeding system or floor type, but this may be partly due to the unbalanced number of groups between bucket and automatic milk dispensers and, slatted floors and straw. However, some trends could be observed. Bucket feeding was more favorable (-10% of dirty veal calves), as well as slatted floor (-12%) compared to straw. The transport time had a significant relationship with cleanliness ($P<0.001$). When the transport time exceeded 6 hours, the state of cleanliness deteriorated (40% of dirty veal calves against 10% with shorter transport duration). These trends should be further explored and tested by surveys from farms to slaughterhouses.

IV. CONCLUSION

In the 7 slaughterhouses we surveyed, only 10% of veal calves were rated dirty with regard of dry fecal stains. These animals require preventive or corrective measures to meet with the requirements of the European food hygiene security regulation. However, our classification ignores wet fecal stains whereas the European food hygiene security regulation requires taking account all kinds of stains. So, it seems necessary to complete this study by integrating wet fecal stains into the rating table. To facilitate veal calves rating, a collective rating by group is possible and a method was proposed for this, but further work is needed to validate this method. Only transport appears significantly related to cleanliness variability between calves, trends associated with some others factors (feeding system, floor type) were observed and these should be further explored by surveys in farm.

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