

Suckling systems in calf rearing in organic dairy farming in the Netherlands

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Key words: natural behaviour, weaning, liveweight, milk quality

Abstract

In an on-farm experiment three calf rearing methods were compared: bucket feeding of milk replacer, bucket feeding of tank milk and suckling of mother or nurse cow up to three months of age. Aim was to determine whether the technical results of suckling systems in calf rearing were satisfactory. Calves reared in a suckling system reached significantly higher liveweights at weaning (90 days). Although the average growth rate between weaning and the age of 1 year did not differ significantly, liveweight at 1 year did still differ significantly. Compared to both bucket fed rearing groups, suckling did not have a significant effect on Somatic Cell Count (SCC) of mothers. Suckling systems in calf rearing in organic dairy production show satisfactory technical results. Calves have the potential to grow fast and no negative effect of suckling on SCC or general animal health were observed.

Introduction

The lives of calves in current organic dairy herds can still be considered to be very 'un-natural'. As with conventional systems, organic calves are separated from their mothers shortly after birth, they are bucket fed and raised according to a housing concept that reduces contact with animals of other age groups. Old habits, efficiency in terms of feed cost, as well as labour input and minimizing the risk of disease transmission, play an important role in the traditional calf rearing approach. In the case of calf rearing, organic standards only specify minimum requirements for stocking density, space requirements, specifications to the design of buildings and prohibition of tethering. Critical consumers find it hard to understand that there is little attention for natural behaviour in organic calf rearing. Some farmers realized the importance of trying to make changes to the existing calf rearing method. Together with researchers they developed a calf rearing system in which calves were allowed to suckle their mother and were raised within the dairy herd (Wagenaar and Langhout, 2006). In order to study the potential of suckling systems in modern dairy farming, suckling was compared with two traditional calf rearing systems. The expected result was that suckled calves perform as well as, or even better, than traditionally reared calves in terms of liveweight development and animal health and that suckling had no negative effects on milk production performance and mastitis problems of mothers. This article presents the results of the monitoring of traditional parameters in an ongoing on-farm experiment.

Materials and methods

In an on-farm trial, initiated at the end of 2004, three calf rearing methods were compared at three farms. Calf rearing methods tested were: bucket feeding with milk

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replacer, bucket feeding with tank milk and a suckling system. Between October 2004 and April 2005 newly born calves were alternately allocated to one of the rearing groups. Each rearing group involved 5-8 calves per farm. Farms were allowed to apply their own suckling system, but apart from that had to follow identical calf rearing and data collection protocols. All calves were weaned at 90 days of age. In order to assess liveweight development, a weighing scale was installed at all farms. Calves were weighed at 0, 30, 60, 90 and 365 days of age. In case calves were not weighed at exactly the right age, liveweights were corrected by extrapolating the weight to the exact ages using the growth-rate of individual calves in the period before the measurement. Data on calf and cow health were recorded in individual logbooks. Recording of milk production was carried out at 4 or 6 weekly intervals. Bacteriology and determination of Somatic Cell Count (SCC) in milk of cows in all the treatments were carried out at 0, 30, 60 and 90 days after birth. Thereafter SCC and bacteriology were carried out during routine milk quality control. Liveweight and milk data were analysed in GenStat version 7.2 using Regression Analysis and ANOVA.

Results

Liveweight development

Calves reared in a single suckling system, even if their mother is being milked twice a day, have the potential to grow very fast. Liveweight monitoring indicated that more than 1 kilo growth per calf per day was possible. Table 1 shows the average liveweight development of calves raised in the 3 different rearing methods. Up to weaning (90 days) suckling calves had a higher growth rate compared to bucket fed calves on tank milk or milk replacer. Average liveweight at weaning was 136 kg, 101 kg and 95 kg for suckling, bucket fed tank milk and bucket fed milk replacer respectively. Average pre-weaning growth rate of suckled calves was 1.080 kg per day vs. 0.658 kg per day for bucket fed calves on tank milk and 0.630 kg per day of calves on milk replacer. Rearing method ($P < .001$) and farm ($P < 0.01$) had a significant effect on pre-weaning growth and liveweight at 90 days (weaning age). Rearing method had no significant effect on growth between 90 and 365 days. Liveweight at 365 days, however, did differ significantly ($P < 0.01$) between rearing methods.

Tab. 1 Average liveweight (kg) and standard deviation (kg) of calves in different rearing groups at 5 ages and Dutch general liveweight norm for dairy cattle.

Rearing group	age		0 days		30 days		60 days		90 days		365 days	
	avg.	std.	avg.	std.	avg.	std.	avg.	std.	avg.	std.	avg.	std.
Tank milk	42	3	58	7	77	11	101	17	316	39		
Replacer	40	6	52	7	71	10	95	15	288	30		
Suckling	40	5	65*	12	100*	14	136*	13	343*	38		
Liveweight norm			59		77		104		330			

* significant for $P < 0.05$

Milk production and quality

Because data on milk production and SCC were incomplete at the time this paper was prepared, only the results for one farm are presented. Although milk production in the first 3 months of lactation was significantly lower for cows suckling calves, there was no significant difference in milk production between rearing groups from the fourth

month onwards. Figure 1 shows the mean natural logarithm of the SCC and standard error for the mothers of calves in the different rearing groups. Due to missing data SCC at day 0 could not be depicted. There were no significant differences in SCC between rearing groups up to 180 days. SCC levels were always below the upper critical value of 400,000 for all rearing methods. The percentage of milk samples in which no bacteria were found was 63%. The highest percentages of positive samples were found just after calving.

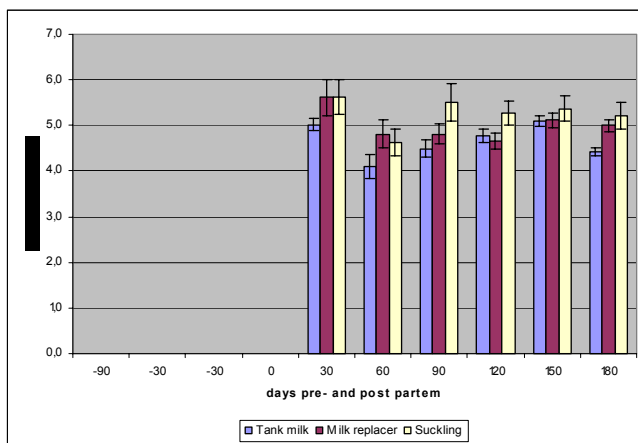


Figure 1: Mean natural log and standard error of somatic cell count (SCC) of cows whose calves were included in the calf rearing method comparison.

Calf health

Diarrhoea, an important cause of mortality in conventional calf rearing, was found to be a less frequent problem in suckling systems. Farmers observed that sometimes suckling calves drink too much milk. This resulted, compared to the type farmers observed in bucket fed calves, in 'a different type' of diarrhoea. According to farmers most calves learned quickly and stopped consuming too much milk. In the cases that diarrhoea was a problem, farmers did not observe that calves dirtied their backsides, like in diarrhoea of bucket fed calves. These diarrhoea cases were therefore spotted relatively late. However, even in these cases diarrhoea did not result in mortality. During the limited period of observation suckling calves which grazed together with their mothers or nurse cows, showed no problems with intestinal worms. During the research period one out of 3 farms tested positive for Para-tuberculosis. At some point during the research cross-suckling heifers did occur at all farms, however, not to an extent that this could be linked to the use of suckling systems.

Discussion

For farmers the first requirement of a calf rearing method is achieving optimal calf growth and development, resulting in healthy dairy heifers. Suckling systems in calf rearing result in high initial growth rates of calves. Jasper and Weary (2002) found that ad libitum milk intake had no detrimental effects on intake of solid food after weaning.

Nauta (2006) found that the age of organic Holstein heifers at first calving is up to 1.7 months higher compared to conventional heifers. This difference can be the result of individual farmers' feeding regimes and management. However, results presented in this study show that suckling systems have the potential to produce well developed heifers, calving down at the same age as traditionally reared heifers. In order to obtain good results, appropriate weaning practices are of crucial importance.

Our study showed that there was no difference in SCC between suckled and non-suckled mothers. In theory suckling can have a curative effect on mastitis because frequent drinking keeps the udder empty. On the other hand suckling might have a negative effect on mastitis because of cross-contamination. Moreover, frequent drinking can inhibit proper teat closure which makes it easier for pathogens to enter. Farmers in our study expected that exposure to a wider range of pathogens in early life would make dairy cows less susceptible to mastitis in later life. Our research is currently inconclusive in this regard, but the 2007 evaluation of the milk production performance of the calves raised in the different rearing methods will provide useful information.

Conclusions

Calves have the potential to grow fast and no negative effect of suckling on SCC or general animal health was observed. In order to obtain good results, appropriate weaning practices are of crucial importance. Suckling systems in calf rearing in organic dairy production show satisfactory technical results. In 2007 the evaluation of the calves raised in the three rearing methods will be completed.

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