

# Effect of suckling ('restricted suckling') on dairy cows' udder health and milk let-down and their calves' weight gain, feed intake and behaviour

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## Abstract

The aim of this study was to evaluate the effects of restricted suckling (RS) in Holstein cattle on the weight gain, health and behaviour of calves and on udder health and milk let-down in cows compared to artificial rearing (AR). The study was conducted in Mexico. The 27 cows with calves were assigned to one of the two treatments and studied until weaning 8 weeks postpartum. Cows were milked three times daily. RS calves were allowed to suckle for 30 min 2 h after morning and afternoon milking, whereas AR calves were fed milk from buckets through a floating nipple at the same time. During suckling/milk feeding, the AR calves performed more oral behaviours such as 'cross-suck' and 'lick object' than RS calves. The RS calves spent a longer time suckling on the front teats than the rear teats. During observations of general behaviour when calves were not milk fed, AR calves displayed more often 'cross-suck', 'lick object', 'eat concentrate', 'eat hay' and 'ruminant' than RS calves. Milk consumption (286 kg) over 8 weeks in both groups and live weight gain (LWG) were similar in RS ( $26.2 \pm 3.9$  kg) and AR calves ( $26.1 \pm 1.4$  kg), but the individual variation in LWG was higher in RS calves. The milk suckled by RS calves contained more fat and metabolisable energy (ME) per kg than the parlour milk fed to AR calves (6.1% vs. 4.2% and 3.5 MJ/kg vs. 2.9 MJ/kg) whereas AR calves ingested more than fourfold as much concentrate as RS calves (21.6 kg vs. 4.8 kg), which resulted in

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similar total ME intake in treatments. The California Mastitis Test scores revealed a tendency to improved udder health in RS cows compared to AR cows. The average time to milk let-down was similar in treatments. In conclusion, the RS system with the Holstein dairy cattle reduced 'cross-sucking' and 'licking objects' in the calves and tended to improve udder health in the cows, compared to the AR system.

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## 1. Introduction

In intensive dairy farming, it is common to remove the calf from the cow immediately or shortly after the parturition and to rear the calf on whole milk or milk substitute using buckets or nipples. In most countries in Latin America, however, the practice is to let the calf suckle the cow until weaning. There are indications that the early interaction between the cow and calf has influences beyond the beneficial effects of colostrum intake on the calf's immune system (Krohn et al., 1999). A higher weight gain during the suckling period has been reported for restricted suckling calves compared to artificial reared calves (Fallon and Harte, 1980; Knowles and Edwards, 1983; Jonasen and Krohn, 1991). Moreover, Bar-Peled et al. (1997) found that heifer calves suckling during the first 42 days of life had a higher daily pre-weaning weight gain and higher body weight at 12 weeks of age, a lower age at calving and a tendency for a higher milk production during their first lactation.

Calf behaviour can be influenced by the management system. Calves raised in isolation spend much time licking objects (Stephens, 1982) and may also lick themselves excessively (Fraser, 1983; Wood-Gush et al., 1984). In group-housed calves there can be a high frequency of sucking on other calves in the group, i.e., cross-sucking (Stephens, 1982; Lidfors, 1993). The behaviour can cause, e.g. disease transmission (de Passillé, 2001) and hair loss (Dybkjær, 1988). Cross-sucking (Lidfors, 1993) and health problems such as diarrhoea (Preston and Vaccaro, 1989) are less common in calves that suckle the dam. Digestive problems constitute 21.2% of calf mortality in the USA (USDA, 2005).

In Mexico, Zebu cattle or their crosses have traditionally been managed in restricted suckling systems. Due to an increased demand for milk production, intensive systems based on Holstein cattle are nowadays a common practice where the climate is not too harsh such as in the tropics. Consequently, the herds have become larger with more intensive management thus establishing artificial rearing system of calves as the primary management procedure (Martínez-Borrego and Salas-Quintanal, 2002). In some reports, suckling has increased milk production capacity (Bar-Peled et al., 1995; Fröberg et al., 2007). However, studies conducted on dairy cattle have also shown that milk ejection can be disturbed when cows are machine-milked during the suckling period (Sandoval-Castro et al., 1999; Krohn, 2001) and that the teat skin condition is affected when cows are suckled compared with machine-milking (Rasmussen and Larsen, 1998). Moreover, from an animal welfare point of view, the restricted suckling system is known to have considerable benefits in Zebu cattle and their crosses (Hernández et al., 2006). Therefore it is tempting to recommend such a practice also in intensive systems as there are added positive effects for milk production, udder health, calf weight gain and health and a reduction in the frequency of sucking behaviours such as cross-sucking in the calves. The aim of this study was to compare two calf rearing systems in dairy cattle in Mexico: restricted suckling (RS) and artificial

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