



Effect of Machine-milking Regimes on Lactation Performance and Oxytocin Release in Syrian Shami Cattle

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Background

Cattle husbandry plays a major role in supplying milk and meat for human consumption in Arabic countries such as Syria. About 50 years ago Shami was the predominant breed in Syria and the whole Middle East, the region where domestication of cattle has started (Troy et al. 2001). In the meantime, most of the Shami cattle had been replaced by imported Holstein-Friesian, Friesian and Schwarzbuntes-Milchrind animals despite the local breeds being better adapted to the specific climatic conditions. However, it seems to be necessary and it is traditionally practised, that Shami cows are milked in the presence of their calves to achieve adequate emptying of the udder. Because of lower yields and the higher work load due to the calf-handling during milking, Shami cattle are economically unattractive for dairy farmers.

However, in breeds not particularly bred for machine milking suitability such as Shami cattle, no data on OT release and machine milking behaviour are available.

Goal

The aim was to establish OT profiles throughout the milking process and to determine lactation performance in primiparous Shami cows that were machine milked either with or without the presence of their calves.

Material and Method

Animals

- 12 primiparous Shami cows at the Animal Wealth Research Administration close to Damascus were used.
- Cows were randomly selected either for machine milking without the presence of the calf (WC; n = 6) or for machine milking in the presence of the calf and restricted suckling at the end of machine milking (PC; n = 6).

Recordings

Milk yield and milk composition was measured during two milking (morning and evening) each week from day 7 until day 91 of lactation.

Estimation of degree of udder filling

To determine the degree of udder evacuation residual milk was extracted after one regular morning milking in 9 cows (5 WC, 4 PC) using an i.v. Injection of 50 IU OT.

Blood Sampling

A day before blood sampling, cows were catheterized in jugular vein.

Blood samples were taken during the two milking times from each individual cow between days 43 and 65 of lactation. Sampling was performed before, during and after milking. OT concentrations were measured according to Schams (1983).

Statistical evaluations

For statistical evaluation, analysis of variance was calculated based on least-square means using the MIXED procedure of SAS (SAS, 8.1). Results are presented as means ± SEM.

Results

Fig. 1. Daily milk yield throughout the experimental period. Open circles indicate cows that were milked without the presence of their calves (WC). Closed circles indicate cows that were milked in the presence of their calves (PC). * indicate significant differences between treatments (P<0.05).

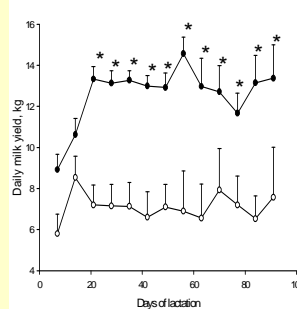


Table 1. Daily milk yield and milk constituents during the experimental period of the first 91 days post partum

Parameters		Milking in the presence of the calves (PC)	Milking without the presence of the calves (WC)
Milk yield	kg/day	12.6 ± 0.3 ^a	7.1 ± 0.4 ^b
	Fat		
g/l		33.9 ± 0.7 ^a	42.0 ± 1.4 ^b
	g/day	439 ± 14 ^a	301 ± 20 ^b
Protein	g/l	37.2 ± 0.3	36.8 ± 0.4
	g/day	464 ± 10 ^a	256 ± 13 ^b
Lactose	g/l	48.6 ± 0.2 ^a	45.2 ± 0.3 ^b
	g/day	613 ± 15 ^a	324 ± 18 ^b

Table 2. Milk yield and milk constituents in main and residual milk during one morning milking between days 50 and 60 of lactation.

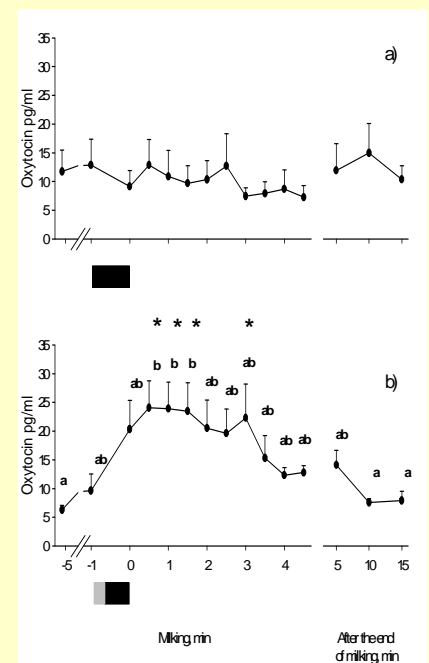
Milking in the presence of the calves (PC, n=4)		Main milk	Residual milk	% Residual Milk to total
Milk yield	kg/milking	5.8 ± 0.5 ^a	0.76 ± 0.3 ^a	11
Fat	g/l	32.0 ± 5.8	117.3 ± 7.4 ^a	
	g/milking	187 ± 4 ^a	88 ± 3 ^a	32
Protein	g/l	35.7 ± 2.1	30.7 ± 2.1	
	g/milking	209 ± 3 ^a	24 ± 2 ^a	10
Lactose	g/l	50.0 ± 1.5 ^a	45.2 ± 1.9	
	g/milking	294 ± 3 ^a	35 ± 2 ^a	11
Milking without the presence of the calves (WC, n=5)				
Milk yield	kg/milking	1.4 ± 0.5 ^b	1.9 ± 0.6 ^b	58
Fat	g/l	37.9 ± 7.9	63.9 ± 7.3 ^b	
	g/milking	46 ± 3 ^b	117 ± 5 ^b	72
Protein	g/l	34.9 ± 3.2	36.7 ± 2.3	
	g/milking	49 ± 3 ^b	69 ± 3 ^b	59
Lactose	g/l	41.6 ± 3.5 ^b	42.6 ± 3.5	
	g/milking	60 ± 3 ^b	84 ± 4 ^b	58

Results

Fig. 2 Shami cow in the first Lactation



Fig.2. Oxytocin concentration before, during and after milking without the presence of the calf (a, WC), and with the presence of the calf (b, PC). The black bar indicates manual pre-stimulation of the teat, the grey bar indicates stimulation by the calf.



*indicate significant differences between treatments, means without common letters within treatments differ significantly (P<0.05)

Conclusions

In the present study the hypothesis was tested that the stimulatory effect of exclusive machine milking is sufficient to release OT during milking in Syrian Shami cattle. However, in breeds not particularly bred for machine milking suitability such as Shami cattle.

In conclusion, Syrian Shami cattle are not suitable to be exclusively machine milked without the presence of their calves.

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