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Effect of short dry periods on milk production, composition and reproductive parameters in Holstein cows

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Introduction

It is well known that the dry period is necessary for mammary gland involution of dairy cattle (1). Reduction of the dry period is beneficial if shortening the dry period doesn't affect the next lactation milk yield. We hypothesize that shortening the dry period could be a good management strategy to reduce the diet stress induced by the change in feeding frequency during the dry period. The objective of this study was to determine to what extent the dry period length would affect milk production, milk composition and nominal reproductive performance of high-producing dairy cows.

Materials and Methods

One hundred and twenty two primiparous and multiparous Holstein cows were selected for this experiment. Cows assigned randomly to one of 3 treatments as following: 56, 42 and 35 d dry period lengths. Weekly collected milk samples (50 ml) at three consecutive milking (0500, 1300 and 2100 h) were analyzed for fat, protein and SCC. Daily milk production by all cows was recorded through 210 d of lactation. Reproductive parameters were obtained within 4 months after parturition for all cows. The PROC MIXED procedure of SAS (2) was used to analyze milk yield and composition and reproduction parameter data.

Results

➢There were no significant differences on milk yield among treatments from 8 weeks pre-partum to 30 weeks of lactation.

➢No treatment effect was observed in the average daily milk production of multiparous cows in 35 and 56 d dry period lengths from 3 to 210 DIM (Table 1).

➢As expected, among primiparous cows, 35 d treatment produced lower ($P < 0.01$) both mean daily and 305 d lactation milk yield than those in 56 d treatment (Table 1).

➢Subsequently, primiparous cows in 35 d group were less capable in milk production compared with multiparous cows at the same group ($P < 0.001$, Table 1).

➢Milk fat percentage and yield were similar across experimental treatments (Table 1) .

➢No significant differences were observed in milk protein percentage among treatments (Table 1).

➢There were significant difference ($P < 0.05$) on milk protein yields of 35 and 56 d dry period groups (1.06 ± 0.07 and 1.24 ± 0.07 kg/d, respectively for cows in 35 and 56 d dry periods), regardless of parity.

➢ Reproductieve status of cows assigned to different dry period lengths is summarized in Table 2.

Table 1. Milk production and composition of cows given different dry periods lengths

Item	Treatment					
	Primiparous cows			Multiparous cows		
	35 d	42 d	56 d	35 d	42 d	56 d
210 DIM milk yield	33.74 ^{a}	35.1 ^{b}	37.12	35.42 ^{b}	34 ^{a}	35.18 ^{b}
305 d milk yield	10564 ^{a}	10656 ^{a}	11918 ^{b}	11202 ^{ab}	10264 ^{a}	10849 ^{ab}
Milk protein yield (kg/d)	0.99 ^{a}	1.14 ^{ab}	1.29 ^{b}	1.11 ^{ab}	1.00 ^{ab}	1.19 ^{ab}
Milk protein (%)	2.99	3.34	3.44	3.04	3.04	3.19
Milk fat (%)	3.6	3.68	3.43	3.96	3.53	3.79
Milk fat yield (kg/d)	1.23	1.27	1.29	1.45	1.18	1.43
Adjusted SCC (× 1000)	279.8 ^{a}	272.9 ^{a}	476.6 ^{ab}	371.5 ^{a}	777.7 ^{b}	320.5 ^{a}

Table 2. Summary of reproductive parameters in cows assigned to different dry period lengths

Item	Treatment					
	Primiparous cows			Multiparous cows		
	35 d	42 d	56 d	35 d	42 d	56 d
Cows no.	16	21	18	19	16	18
Pregnancy rate (%)	48.0 ^{a}	49.01 ^{ab}	69.27 ^{ab}	71.22 ^{b}	50.61 ^{ab}	67.11 ^{ab}
Open days	105.9 ^{ab}	121 ^{b}	85.2 ^{a}	91.9 ^{ab}	109.5 ^{ab}	85.2 ^{ab}
Days to first service	49.6	53.4	50.8	56.9	46.1	55.6
Services per conception	2.83 ^{ab}	2.93 ^{ab}	2.09 ^{ab}	2.00 ^{a}	3.00 ^{b}	2.39 ^{ab}
First service conception rate (%)	25 ^{ab}	19 ^{b}	39 ^{ab}	53 ^{a}	25 ^{ab}	39 ^{ab}

Discussion

Our results, supports the contention that primiparous cows are very susceptible to short dry period (35 d). Delay in mammary growth, depression of mammary gland performance or combination of both could be reasons for sensitivity of primiparous cows subjected to short dry periods. This also could be attributed to less differentiated cells in mammary gland at parturition time gaining their productive capacity as lactation cycle approaches. Our results are in agreement with the observations of other studies (3 and 4). Significant differences of milk protein yield between 35 and 56 d groups may be explained by less capability of cows assigned to 35 d DP in milk production.

Conclusion

In conclusion, primiparous cows subjected to a 35 d dry period length, showed considerable milk loss in the next lactation. Shortening the dry period had no effect on milk production capacity in multiparous cows. Except with reduced milk protein yield in primiparous cows; shortening the dry period to 35 d had no considerable effect on milk compositions. Regardless of parity, cows given 42 d dry period revealed a decreased reproductive performance.

References

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