Supplementary file

Table S1. Main characteristics of the three herds considered

| | Herd | | |
	A	B	C
Milking parlour	tandem	herringbone	herringbone
Lactating cows (N)	22	117	85
Parlour stalls (N)	2+2	6+6	7+7
Milkers (N)	1	1	2
Pulsation ration	60/40	60/40	60/40
Milking vacuum (kPa)	42	42	42
Milkings/d (N)	2	2	2
Average milk yield (kg/d)	24,6	21,5	30,8
Healthy cows (N)	7	32	29
Chronic cows (N)	2	7	6
Chronic treated cows (N)	2	9	8

Table S2. Results of statistical analysis for repeated measurement on the factors potentially affecting overall milking.

	Main factors					Interactions with GROUP			
	GROUP	HERD	AGE	DIM	TIME	HERD	AGE	DIM	TIME
Total milk yield (kg, MGG)	n.s.	0.0002	n.s.†	0.006	0.0036	0.0177	n.s.	n.s.	n.s.
Total milking period (min, tMGG)	0.046	n.s.	n.s.	n.s.	n.s.	n.s.	0.0484	n.s.	<0.0001
Average milk flow (kg/min AMF)	n.s.	n.s.	0.0013	n.s.	0.0462	n.s.	n.s.	n.s.	n.s.

† not significant

Table S3. Results of statistical analysis for repeated measurement on the factors potentially affecting main milking process.

	Main factors					Interactions with GROUP			
	GROUP	HERD	AGE	DIM	TIME	HERD	AGE	DIM	TIME
Time of main milking process (min, tMHG)	0.0285	n.s. †	n.s.	0.0226	0.0496	0.0471	n.s.	n.s.	0.0046
Average yield in main milking process per min (kg, DMHG)	n.s.	0.0041	n.s.	n.s.	0.0001	n.s.	n.s.	n.s.	0.0106
Maximum peak flow per min (kg, HMG)	n.s.	0.0518	n.s.	n.s.	0.0063	n.s.	n.s.	n.s.	n.s.

† not significant

Table S4. Results of statistical analysis for repeated measurement on the factors potentially affecting incline and plateau phases

	Main factors †					Interactions with GROUP			
	GROUP	HERD	AGE	DIM	TIME	HERD	AGE	DIM	TIME
Duration of rise phase (min, tAN)	n.s.ⱦ	0.0011	n.s.	n.s.	0.009	n.s.	n.s.	n.s.	n.s.
Time of plateau phase (min, tPL)	n.s.	n.s.	n.s.	0.0032	n.s.	n.s.	n.s.	n.s.	n.s.
Maximum milk yield per min (kg, HMG)	n.s.	0.0518	n.s.	n.s.	0.0063	n.s.	n.s.	n.s.	n.s.
Amount of milk 1st min (kg, MG1)	n.s.	0.0021	n.s.	n.s.	<0.0001	n.s.	n.s.	n.s.	0.0001
Amount of milk 2nd min (kg, MG2)	n.s.	0.0183	n.s.	n.s.	<0.0001	n.s.	n.s.	n.s.	0.0034
Amount of milk 3rd min (kg, MG3)	n.s.	0.0182	n.s.	n.s.	<0.0001	n.s.	n.s.	n.s.	0.0158
Maximum milk flow (kg/min, HMF)	n.s.	0.0513	n.s.	n.s.	0.0181	n.s.	n.s.	n.s.	n.s.

† Results for all main factors and interactions with GROUP were not statistically significant when time difference rise (tAND), and time to maximum milk flow (tHMF) were considered and they were not reported in the table.

ⱦ not significant

Table S5. Results of statistical analysis for repeated measurement on the factors potentially affecting to decline, overmilk and stripping phases in the three group of cows considered.

	Main factors †					Interactions with GROUP			
	GROUP	HERD	AGE	DIM	TIME	HERD	AGE	DIM	TIME
Time of decline phase (min, tAB)	n.s. Ŧ	n.s.	n.s.	0.0806	n.s.	0.0466	n.s.	0.0298	n.s.
Time of overmilking by machine (min, tMBG)	n.s.	0.0518	n.s.	n.s.	0.0063	n.s.	n.s.	n.s.	n.s.
Time of stripping phase (min, tMNG)	n.s.	<0.0001	n.s.	n.s.	0.0018	n.s.	n.s.	n.s.	n.s.
Milk flow at the beginning of MNG (kg, MFOS)	n.s.	n.s.	n.s.	0.051	n.s.	n.s.	n.s.	n.s.	n.s.
Time of subsequent milking phase (min, tMBG2)	n.s.	0.0018	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.0113

† Results for all main factors and interactions with GROUP were not statistically significant when duration reduction (t400), time difference decline (tAbD), and subsequent milk yield (MNG) were considered and they were not reported in the table.

Ŧ not significant

Table S6: Mean values (± SD) observed for Lactocorder parameters related to electrical conductivity in the three group of cows considered.

	Healthy	Chronic	Treated
At initial phase (Plateau) (mS/min, ELAP)	6.31 ± 0.82	7.20 ± 1.09	6.90 ± 1.23
Peak difference (mS/min, ELAD)	0.46 ± 0.65	1.12 ± 0.99	0.80 ± 1.03
Maximum (mS/min, ELMAX)	6.04 ± 0.54	6.45 ± 0.78	6.36 ± 0.51
At the point of maximum milk flow (mS/min, ELHMF)	5.77 ± 0.43	6.09 ± 0.68	6.07 ± 0.45
Difference (mS/min, ELND)	0.72 ± 0.36	0.78 ± 0.43	0.65 ± 0.31
At minimum milking flow (mS/min, ELMNG)	4.51 ± 2.26	4.29 ± 2.97	4.61 ± 2.51

Table S7. Results of statistical analysis for repeated measurement on the factors potentially affecting to electrical conductivity (mS/min).

	Main factors					Interactions with GROUP			
	GROUP	HERD	AGE	DIM	TIME	HERD	AGE	DIM	TIME
At initial phase (Plateau) (ELAP)	0.0429	0.0205	0.0006	0.0846	n.s. †	n.s.	n.s.	n.s.	n.s.
Peak difference (ELAD)	n.s.	0.0002	n.s.	n.s.	<0.0001	n.s.	n.s.	n.s.	n.s.
Maximum (ELMAX)	0.0141	0.0546	<0.0001	0.0378	0.0046	n.s.	n.s.	n.s.	n.s.
At the point of maximum milk flow (ELHMF)	0.0084	0.0501	<0.0001	0.0549	0.0004	n.s.	n.s.	n.s.	n.s.
At minimum milking flow (ELMNG)	n.s.	0.0008	n.s.	0.0195	n.s.	n.s.-	n.s.	n.s.	n.s.

† not significant

Figure SF1

Pattern of average yield in main milking process per min (DHMG) during the follow up in the three
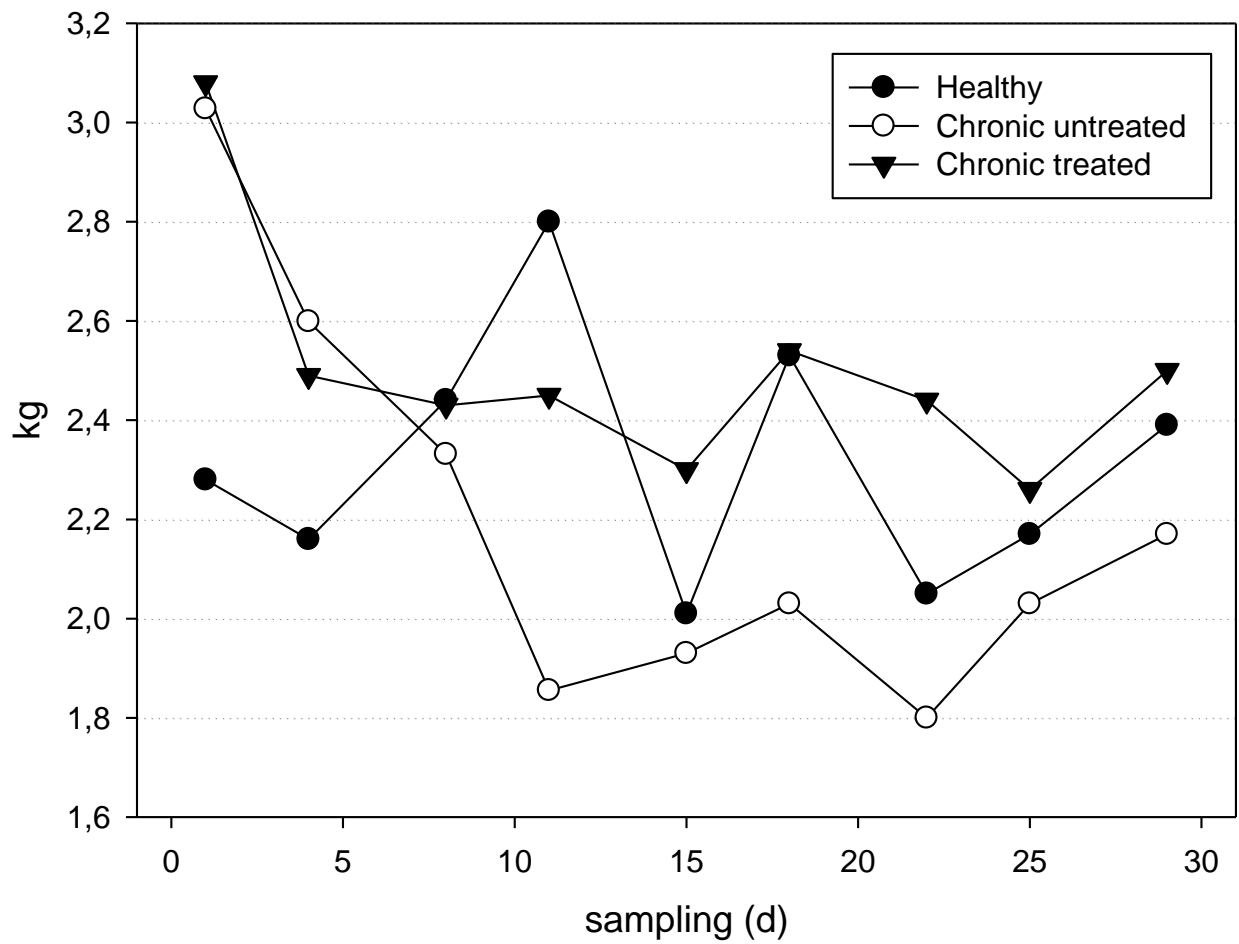
group of cows considered.

Figure SF2

Pattern of amount of milk in the 1st min (MG1) during the follow up in the three group of cows considered.