Partitioning of milk accumulation in the udder of Tsigai, Improved Valachian and Lacaune ewes

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Introduction

➢ In last decades, the number of farms with machine milking or interest to milk the sheep with machine is increasing. This fact evokes the question, if the autochthonous breeds kept in Slovakia (Tsigai, Improved Valachian) are suitable for machine milking. This can be found out by evaluation of the milking characteristics.

➢ The response of ewes to machine milking can be evaluated by partitioning of milk collected during milking (machine milking, machine stripping), amount of residual milk or by the analysis of milk flow kinetic (Labussière, 1988; Bruckmaier et al., 1997).

Aim

The aim of this investigation was to evaluate partitioning of milk accumulation in the udder of Tsigai, Improved Valachian (most used breeds in Slovakia) and Lacaune during machine milking.

Material and methods

Animals

➢ Tsigai (TS), Improved Valachian (IV), Lacaune (LC)
➢ n = 16 from each breed

Recording of milk flow and residual milk

➢ The ewes were milked twice daily in a 1x24 low–line milking parlour with 12 milking units.

➢ Milking machine was set up to provide 150 pulsations per minute in a 50 : 50 ratio with a vacuum level of 38 kPa.

➢ Milk flow data were recorded during three consecutive evening and morning milkings in the middle of June and July with four electronic jars collecting the full milk produced at milking.

➢ The volume of residual milk was evaluated immediately after fourth morning milking. Oxytocin (OT) was injected i.v. at a dose of 2 UI to ewes after milking with usual milking routine. The ewes were milked again after 40 s from OT injection in order to remove residual milk.

➢ According to Bruckmaier et al. (1997) and Rovai et al. (2002) classification into four types (Fig. 1).

• 1 peak (1P), represents milk flow curves with one peak of milk flow before stripping (only cisternal fraction is removed)

• 2 peaks (2P), this type of milk flow has two clearly separated milk flow peaks (first peak – cisternal and second peak – alveolar fraction), i.e. transient decreasing followed by increasing milk flow, before stripping was performed

• plateau (PLI), represents milk flow by ewes with larger emission curves and maximal milk flow rate > 0.4 l/min without clear differences between peaks 1 and 2

• plateau (PLII), represents milk flow by ewes with emission without clear differences between peaks 1 and 2 and maximal milk flow rate ≤ 0.04 l/min
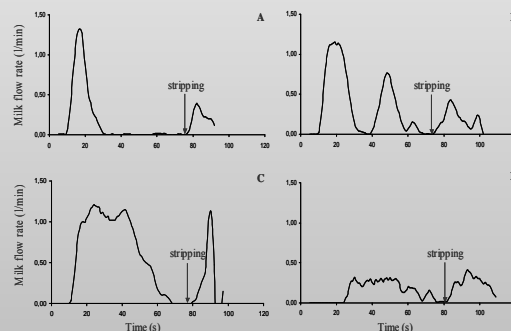

Fig. 1. Different milk flow patterns: A - 1P, B - 2P, C - PLI, D - PLII

Results

Table 1. Parameters of milkability of different breeds

Traits	Tsigai	Breed Lacaune	Improved Valachian	F-test P
Total milk yield (TMY), l	0.528 ± 0.025^{ab}	0.588 ± 0.020^{b}	0.464 ± 0.031^{a}	0.0041
Milk yield (MY), l	0.440 ± 0.023^{a}	0.534 ± 0.019^{b}	0.395 ± 0.028^{a}	< 0.0001
Machine milk yield (MMY), l	0.328 ± 0.024	0.375 ± 0.020	0.317 ± 0.030	0.1594
Machine stripping (MS), l	0.112 ± 0.013^{a}	0.160 ± 0.011^{b}	0.078 ± 0.017^{a}	0.0002
MS / TMY, %	21.41 ± 2.61^{ab}	29.10 ± 2.10^{a}	18.26 ± 3.23^{b}	0.0092
Milking time, s	55 ± 3^{a}	62 ± 2^{b}	51 ± 4^{c}	0.0403
Maximal milk flow rate, l/min	0.834 ± 0.087	0.742 ± 0.070	0.806 ± 0.108	0.6968
Residual milk (RM), l	0.088 ± 0.008^{a}	0.054 ± 0.006^{b}	0.069 ± 0.010^{ab}	0.0055
RM/TMY, %	16.47 ± 1.44^{a}	9.86 ± 1.16^{b}	15.99 ± 1.78^{a}	0.0007

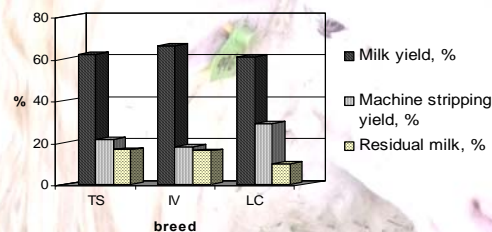[a,b,c] means in the same line without a common superscript letter were significantly different (P < 0.05)

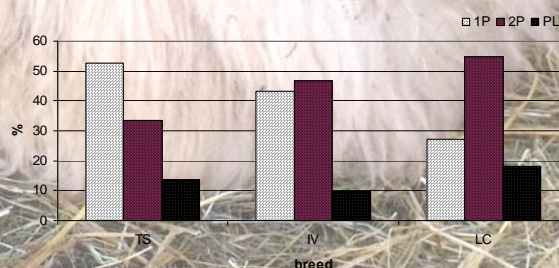Fig. 2. Partitioning of milk accumulation in the udder during machine milking

Fig. 3. The frequency of occurence of different milk flow types in TS, IV and LC

Conclusions

➢ The ewes of breed LC had the lowest RM/TM, the highest milk yield, and the highest occurrence 2P and PLI milk flow curves. It can be supposed that LC ewes had better milkability and better aptitude to machine milking than TS and IV. But the results of residual milk measurement indicate that also breed TS and IV have a good potential for machine milking.

➢ In the next studies, the measurements of OT concentrations during machine milking could reveal more about milkability of TS and IV breeds.

Literature

Bruckmaier RM, Paul G, Mayer H, Schams D (1997): Machine milking of Ostfriesian and Lacaune dairy sheep: udder anatomy, milk ejection, and milking characteristics. J. Dairy Res. 64, 163-172.
Rovai M, Such X, Caja G, Piedrafita J (2002): Milk emission during machine milking in dairy sheep. J. Anim. Sci. 80, (Suppl.) 5.