Introduction and Objective

The objective of this study about vacuum optimization in individual quarter milking systems was to find out, if there is an effect of teat-end vacuum behavior in a Multilactor® milking system, when it is working with simultaneous, alternating or sequential pulsation setting. Each of the three settings was adjustable in a laboratory milking parlour.

Materials and Methods

- Test set-up was designed to find out, if there is an effect of the independent variables milk flow and pulsation setting on the dependent variable teat-end vacuum.
- Teat-end vacuum was determined for b- and d-phase vacuum.
- Sequential pulsation (SEQ) is a pulsation system with four, instead of one (SIM) or two (ALT) pulsators, used for each for teat cups, respectively. In comparison to SIM and ALT the pulsation of each udder quarter starts into its pulsation cycle 25% of pulsation duration later, in comparison to the pulsator in the turn before.
- The vacuum was measured in the Multilactor® at one udder quarter using a Bovi Press measuring system which took samples greater than 300 Hz, with an accuracy of ± 0.1 kPa.

Results

- Regarding SIM, the lowest vacuum fluctuation of 4.4 kPa was recorded at the tested pulsation settings, while the lowest vacuum reduction of 1.3 kPa also was obtained, when SIM pulsation was applied. Both values were recorded at a flow of 4 l/min in the suction phase (b).
- Concerning SEQ and ALT pulsation, a higher level in vacuum reduction and fluctuation was measured for suction phase at a flow of 4 l/min (SEQ: 7.6/ 1.8 kPa) (ALT: 9.0/ 1.9 kPa).
- Consequently, it was concluded that SIM pulsation is the most appropriate pulsation setting, when an optimization for low vacuum reduction and fluctuation in the suction phase is demanded.
- When a low slop of regression line in vacuum reduction in suction phase is demanded ALT and SEQ pulsation is the better alternative (Fig. 2).

Fig.1: Drawing of the Multilactor® milking location in the laboratory-parlour at the Leibniz Institute for Agricultural Engineering Potsdam-Bornim (ATB), with the equipment for the wet-test-method.

Fig.2: Vacuum reduction at the teat-end in the b-phase of pulsation with ALT, SEQ and SIM pulsation settings at different flow rates.