BioControl
Technology for biology

SUMMARY

Udder health problems are often related to the milking equipment, many times in combination with inadequate milking routines. Notorious are teat-end vacuum fluctuations due to poor quality liners, liner slips or insufficient vacuum capacity. Pathogens reaching the teat-end due to 'back-spray' or 'cluster-flooding' is another known cause.

This poster is about experiences of milking advisors with a new technology that is now available to log the vacuum at relevant points during milking ('wet test') to better analyze milking equipment and milking routines.

The development of this new technology was initiated by the IDF Working Group "Milking Time Tests methodology and interpretation of results" and deployed by Tine, the Norwegian dairy farmers cooperative. This new technology (VaDia: Vacuum Diagnostics ofmilking) is a battery operated data logger, small and light enough to be taped to a teatcup during milking. VaDia logs the vacuum data at four points during milking and works completely 'stand-alone'. This enables the advisor to forget about the actual measurement and concentrate on observations of milking routines and collection of other relevant information. After the milking the data can be analyzed in detail, indicating clearly all vacuum irregularities and thus where the milking equipment and milking routines are underperforming.

VaDia has been recently introduced to the milking advisors in some Nordic countries. This poster elaborates on the experiences of milking advisors with this new technology and how it helps the advisors to do a better job when assisting farmers in controlling their udder health problems.

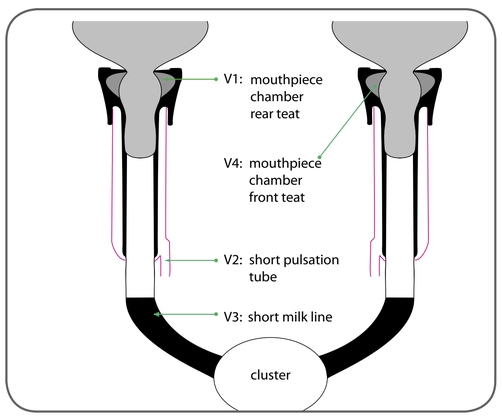
CONCLUSIONS

This new technology helps milking technicians and advisors to better log, analyse and understand the milking vacuum during the milking (dynamic test).

The used calculation methods and algorithms result in a 'snap-shot' summary of the current milking situation, enabling the advisors to present an overview that is easy to understand by the farmer.

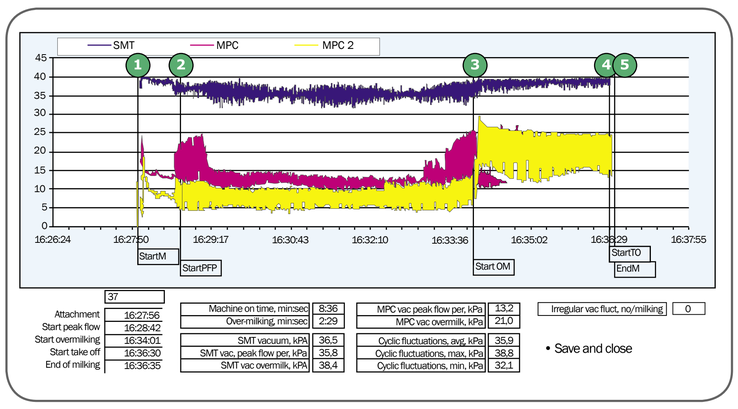
This new technology helps the advisor to better log, analyze and communicate

- Test vacuum level and fluctuations
- Linerslips
- Backspray
- Take-off settings
- Vacuum and pulsation settings

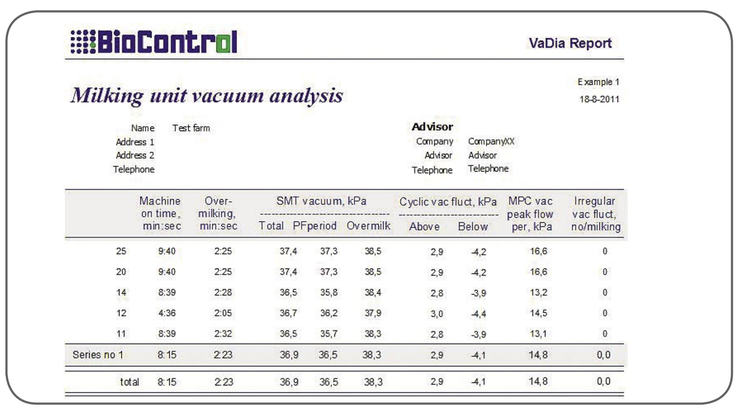


VaDia logs the vacuum at 4 points in the milking cluster

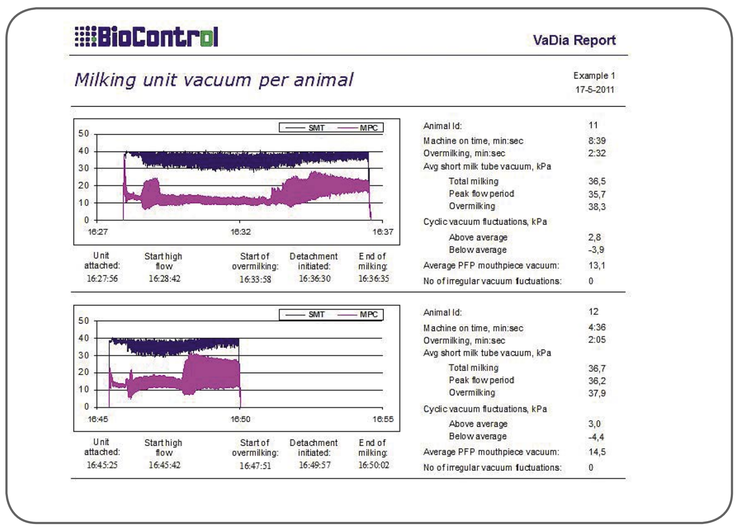
VaDia logger can be used on any type and brand of milking equipment, including robot



Automatic detection of milking phases



Summary of all analysed milkings



Report with individual milkings

In co-operation with:

USED CALCULATION METHODS AND ALGORITHMS

Four milking phases are defined. The five marker lines are calculated as follows (see graph on the left)

1 *Start Milking*

This is the moment when the teatcup is attached to the teat.

Automatic detection

The moment when SMT vacuum rises above 25 kPa.

2 *Start peak flow period*

This is the end of the period when the teatcup is establishing a stationary position on the teat, and milk flow is established. It is also the start of a period with relatively stable conditions and a relatively stable milk flow.

Automatic detection

Is based on the common mechanism that vacuum level declines when milk flow increase. The average SMT vacuum in 10 seconds periods after attachment is monitored. When the average vacuum from one period to the next declines less than 0,15 kPa, the midpoint of the first (of the two) periods is indicated as start of peak flow period. The first 20 seconds period is excluded from the calculations, so there will be a minimum value of 25 seconds.

3 *Start overmilking*

Overmilking of the relevant teat can be detected by means of MPC vacuum. When the teat gets empty, there will ordinarily be a shift in the MPC vacuum level, or a marked change in the MPC vacuum fluctuations, or both.

Automatic detection

is based on an increase in MPC vacuum variation. When the current variation is equal to or above 1,3 times the preceding running average variation, start of overmilking is denoted. Current and running average variation is calculated every two seconds. Variation is the difference between maximum and minimum per two seconds. New running average is 0,7 times the old running average plus 0,3 times the current variation.

4 *Start take-off*

Is the moment when teatcup detachment is initiated. It can be seen on the SMT vacuum as the start of a rapid decline towards zero, or it may be a shift in vacuum in some types of equipment.

Automatic detection

The program loops through all datapoints after start peak flow period and finds maximum vacuum. Then the program loops through backwards from the end of milking until the SMT vacuum is less than 5 kPa below maximum vacuum. This datapoint denotes the start of takeoff.

5 *End of milking*

Is when the SMT vacuum falls below a set value.

Automatic detection

The program loops through all datapoints after start of peak flow period. The first datapoint with SMT vacuum below 5 kPa denotes the End milking.

RESULTS

Machine on Time

Time in minutes and seconds from Start milking till End milking

Overmilking

Time in minutes and seconds in the Overmilking period

SMT vacuum

Average vacuum in kPa of all datapoints of the short milk tube vacuum channel, given for various phases of milking:

- Total – from Start milking till End milking
- PFperiod – in the Peak-Flow period
- Overmilking – in the Overmilking period

MPC vacuum in Peak-Flow period

Average vacuum in kPa of all datapoints of the mouthpiece chamber in the Peak-Flow period.

Cyclic vacuum fluctuations

This value is assessed for ten pulsation cycles 60 seconds after the start of the Peak-Flow period. Average, maximum and minimum vacuum in each of the ten cycles are calculated. Finally the averages of the ten individual values are formed. Results are presented as fluctuations Above (maximum) or Below (minimum) the average vacuum.

Irregular vacuum fluctuations

An irregular vacuum fluctuation is a rapid drop of a certain magnitude in SMT vacuum. A vacuum change of 56 kPa/second and a magnitude of 14 kPa is set as limits to qualify for an event of Irregular vacuum fluctuations. Results are given in events of Irregular fluctuations