Why mastitis is the most costly problem on today's dairy farms

Subclinical mastitis is one of the most common infections on dairy farms globally. Pain is highly detrimental for dairy cow welfare and mastitis is a widely used model for udder inflammation and the associated signs of pain in cattle.

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Euthanasia is a common practice implemented on dairy farms in the USA and it is estimated that, on an annual basis, more than 300,000 dairy cows die unassisted without the benefit of euthanasia in the US as stated in Journal of Dairy Science (JDS) studies published in 2023

How can the industry still be suffering from mastitis and poor milking performance after so many decades of modernising milking equipment and practices? The impact on the financial performance of the dairy farm and the environment is significant. The substantial percentage of young dairy cows lost annually increases land use and associated water consumption.

The US state of California wastes enough water annually to fill over 500 stadiums, a significant volume for a state suffering water shortages. In The Netherlands it a similar waste of land and excess nutrients that are of concern. The industry has been continuously attempting to address these problems as is evident in the many patents awarded for new products, many of which are never marketed but document the numerous failings farmers face every day in the parlour.

Liner design

Hundreds of new liner designs created in recent years. Those designs seem to consider every possible shape imaginable, all for milking a cow with a simple round teat. It is frustrating that no one liner is offered to provide speed, comfort, healthy teat ends, low slip and no crawl – you actually have to select a feature and accept that not everything is available in one liner.

Adding to the problem is that in many cases your dealer must 'tune' the liner to your specific parlour which basically is adjusting your vacuum level to achieve the best of the poor performance possible.

Recent JDS research studied milking performance at vacuum levels of 42, 52 and 60 kilopascals (kPa) with the conclusion "overall, several milking characteristics appeared to reflect a higher milking efficiency with increasing vacuum up to 60kPa."

However, as milk flow rates slowed the higher vacuum was less beneficial.

This is no surprise given that your dealer advises to keep your vacuum down to 42kPa for the liner 'tuning' as he knows very well that teat ends will quickly become a disaster at a higher vacuum because of milking system limitations. This costs you an extra couple minutes to get a cow to milk out simply because your milking equipment lacks ability to properly rest the teat.

The performance limitations of liners and pulsation quickly start to make it difficult to achieve what research shows is possible. Research has noted 'when teatcup liners get older they soften, and their elasticity or resiliency gradually diminish resulting in less gentle teat treatment'.

Vacuum variation

Claw vacuum variation also impacts liner performance while milking, in particular fluctuation from alternating pulsation. Many dairy equipment companies have disclosed known harsh teat treatment issues associated with the equipment you milked with this morning.

The basic pulsation design remains unchanged while the hundreds of different liners available require 'tuning' with known limits in vacuum level and performance.

Ideally the vacuum within the claw will remain unchanged from attach to detach while liner performance is the same from new to old to provide the teat with a proper massage along the full length, not just the end where everyone focuses.

You instead get vacuum fluctuation combined with varying liner performance yielding battles with

mastitis, kicking cows, damaged teat ends and good cows culled well before their prime. Seeking solutions from your dealer most often generates questions about your management and looks in all directions other than the equipment actually interacting with the teat.

The industry must move forward to eliminate the flow restrictive sensors and meters to reduce vacuum fluctuations, identify a simple liner design shape that massages the full teat while preventing direct vacuum on the canal during rest and improve pulsation to enable consistent liner action.

These actions need to be accomplished to achieve a milking system capable of the optimised efficiency of higher vacuum levels to reduce standard milking times by 30% or more while increasing longevity by at least 50%.

Direct full flow meters and sensors are becoming more available. One large dairy equipment manufacturer recently developed and tested such a meter on a large dairy using the TridentPulsation pulsation system.

The dairy was specifically selected as it was a dairy known to achieve very high sustained peak flow rates operating at 52kPa with very low mastitis rates with this pulsation. The team testing the meter noted they had never seen cows milk so fast.

Following the successful testing of the TridentPulsation with the full flow meter a comparative test was conducted on another dairy. Two TridentPulsation pulsators were installed in a dealer recommended 2x8 parlour. Milking performance data for the random cows entering those stalls was recorded and compared to the data for the other cows in the herd.

The data demonstrated a 16% increase in peak flow rates, a 3.6% increase in production all achieved with reduced milking time and no change in the operating vacuum level in just one milking.

Production data for those cows the following milking using the conventional pulsation showed a corresponding reduction in production proving that the change to simultaneous pulsation with a very short A/C phase provided by TridentPulsation had a definitive positive performance impact.

Conclusion

The dairy industry and world expectations are rapidly evolving. Animal welfare, environmental impact and financial challenges must be addressed for dairy farmers to succeed.

Every manufacturer recognises the technology and design of the milking equipment is directly responsible along with its capability to perform over a full range of vacuum levels.

Short A/C phase simultaneous pulsation with a proper round liner have been demonstrated to meet those challenges. Environmental and animal welfare expectations can be met with well-designed milking equipment. ■

References are available from the author on request