

Bacterial migration through teat canal related to liner action

Udder health and behavior of cows being milked are directly related to the performance of milking machines. Observations of milking animals reveal common problems of teat swelling, kicking/stepping, increased heart rates, increased adrenaline, uneven udders and slow milking quarters associated with the milking process.

Mastitis is the most costly problem in the dairy industry with cleanliness and procedures identified as a means of achieving quality milk and positive animal health but the mechanisms by which bacteria cross the teat canal are not fully understood. Research (DF) shows skin bacteria, including *S. aureus*, can remain confined in the teat canal for long periods. Milk collected conventionally was contaminated by the bacteria in the teat canal, while milk extracted by syringe directly from the teat sinus was sterile. It is postulated that the liner pinching the teat apex causes an intrusion of the wax-like keratinaceous lining moving bacteria into the teat sinus, introducing an intra-mammary infection.

A unique pulsation system (WG) with two valves, one for vacuum, one for air was developed supporting this idea. A combination of a very short C phase with longer D phase and low collapse pressure round liners changes the closing liner action. This simulates full teat length massage similar to suckling action of a calf as opposed to a common pinching action. Liner action and vacuum cause milk flow from the teat creating the milking environment for the cow. The pulsator is the core of a basic milking system with air and vacuum dynamics from the pulsator interacting with the liner playing a key role in final results.

Results using this unique pulsation system show longer sustained peak flow, shorter milking time, fewer infections, improved teats, better udder integrity with less kicking. Inspection of worn liners proves unique liner action from a compressive massage. An extended D phase improves teat massage while retaining natural integrity of the teat canal with similar improvements for cows and goats.