Summary

Analysis of udder health and raw milk quality in an automated milking system

The present thesis examines whether and how udder health of a dairy herd in an automated milking system (AMS) could be continuously conserved, in order to enable lastingly economic milk production and high milk quality. To achieve this, the udder health of two dairy herds milked on a Lely-Astronaut, were studied over a longer period. Furthermore the performance of the diagnostic methods of the milking robot, and the effectiveness of the robots measures for conserving udder health were examined. As a result, a programme for safeguarding udder health of a dairy herd in an automated milking system was developed.

Under good, concrete pre-conditions it was observed that it was possible to safeguard udder health of a herd milked in an AMS. The pre-condition of a problem herd and the absence of effective hygiene measures, on the other hand, led to a continuous decreasing of udder health.

The insufficient milking hygiene of the robots on both farms pointed to a specific risk area for udder health. The fact that 180 milkings per day are done with one module, already presents a critical hygiene problem. Insufficient milking hygiene of the robots, creates an even greater problem. (This insufficient hygiene being the bad disinfection of the cleaning brushes, the brush driving block and the teat cup rubbers, between two milkings, and the main rinsing of the robots.) Due to this situation the transfer of pathogens from cow to cow could not be prevented, therefore increasing the risk of mastitis.

It is due to this that the two external influences, husbandry and feeding, are very important in keeping cows udders clean. These factors are also important with regard to producing the highest milk yields. The appropriate requirements of the cows, with regard to husbandry and feeding, have to be met to minimise the risk of mastitis. Cleaning and disinfection of the barn ensures a long-lasting low number of pathogens in the cows environment.

A further weak point of the milking robot is its inaccuracy in diagnosing mastitis. Neither the electrical conductivity, nor the data of the MQC, were able to give definite diagnosis on the existence or non-existence of mastitis. If there will be no more accurate additional examinations of udder health, big financial losses have to be

expected and with a view to consumer protection it is not acceptable. It is therefore necessary that veterinary examinations of herd udder health should be carried out at regular intervals with the help of regular diagnostic methods (clinical, bacteriological, cytological), for accurate diagnosis of mastitis. Analysis of data and veterinary advice to the farmer and staff have to follow. Furthermore the somatic cell count from the monthly milk recording of individual animals, as well as the somatic cell count from the bulk tank should be used for analysis.

With regard to the utilization of foremilk for diagnosis, it was detected that the foremilk was not separated, and therefore was always added to the bulk milk, apart from the foremilk of treated cows, of which milk were separated.

The California Mastitis Test, is a suitable test for use in the AMS, but only if the cows were tested directly before their normal milking time (milking interval > 5 hrs.)

With regard to food production, the continued usage of antibiotic treated cows in the robot-herd, and the influence of the milking frequency on iodine concentration in milk was examined. In 27,3 % of the cases, the milk of the following milked cow, contained residues of the antibiotic from the previous milked cow. The contamination of the bulk milk with antibiotics could not be prevented by the rinsing after milking of a treated cow.

No correlation between iodine concentration and milking frequency could be detected. All data regarding iodine concentration in AMS milk shows, that it is safe for human consumption.

It was also noted that the connection between milking interval and udder health, was greatly influenced by the lactation number. It was detected that the connection between milking interval and quarter somatic cell count was influenced by the existence of pathogens in the quarter. Because low somatic cell counts and high milk yields are required, milking intervals of minimal 5 and maximal 12 hours have to be met.

The results of the studies show, that the production of high quality milk with an AMS, needs a change of farmers work to strategic prophylactic measures in all husbandry areas. Veterinary support characterised by expertise regarding AMS is therefore necessary.