

## **The Dutch Milk Genomics Initiative: genetic improvement of milk-quality traits and product innovation**

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The aim of the Dutch Milk Genomics Initiative is to identify genes that contribute to natural genetic variation in milk-quality traits, in particular milk-fat and milk-protein composition. The program will provide tools for improved breeding programs to exploit natural genetic variation in milk-quality traits and contributes to the knowledge base needed for innovative dairy products. The Milk Genomics Initiative combines expertise in the fields of dairy science, quantitative genetics, genomics and bioinformatics.

Milk samples and blood (for DNA extraction) have been collected in a resource population consisting of 2000 Dutch Holstein Friesian cows in their first lactation. This population has been designed for estimation of genetic parameters (such as heritabilities and genetic correlations) as well as for detection of QTL. All biological samples are stored in our bio bank. Detailed milk composition has been determined, resulting in information on routine milk recording data (milk, fat, protein and lactose production, fat, protein and lactose concentration, somatic cell count, urea, pH), protein composition (all major milk proteins, including genetic variants), and fat composition (individual fatty acids). This unique, extensive set of data is now subjected to quantitative genetic analyses which generate heritabilities and genetic correlations. A whole genome scan with 1500 molecular markers (SNP) is set up in order to detect chromosomal regions (QTL) influencing milk composition. Next, fine mapping will be conducted for a limited number of QTL using analysis tools that incorporate linkage disequilibrium information. Future plans comprise determination of opportunities for marker assisted differentiation and marker assisted selection to improve milk quality and efficiency of milk production. Furthermore, we intend to evaluate the quality of dairy products of animals with extreme genotypes.

The industrial partners in the Dutch Milk Genomics Initiative guarantee the utilisation of results and ensure a fast diffusion of the relevant knowledge to the practise of dairy cattle improvement and product innovation.