DAIRY RESEARCH IN THE ENTIRE FOOD CHAIN
From genes to consumers

AARHUS UNIVERSITY
Dairy research activities at the Department of Food Science focus on characterization of milk components, milk as a raw material and changes induced by processing as well as health-related characteristics of milk and dairy products.

Key areas are protein chemistry (proteomics, milk genomics, enzymes), oxidative stability, structure and functionality of protein and lipid networks, metabolomics, bioactivity of milk constituents, and sensory science and preference studies in relation to milk and dairy products. Research is carried out on components that are transferred directly from feed to the final food product as well as research on how the metabolism of the animal influences the composition of the food and subsequently human health.

Our research is both basic and strategic and is carried out in close collaboration with Danish and international food industries, where results are applied in the development of new products and technologies.

**DAIRY RESEARCH IN THE ENTIRE FOOD PRODUCTION CHAIN**

- **Genes**
  - Milk genomics: Connection between genes and the functionality of milk from different breeds
  - Initiating research on the interplay between genetics, the cow metagenome, milk functionality and methane production

- **Production**
  - Differentiation of milk through feeding, i.e. altering the sensory characteristics, functionality and composition of milk
  - Quality effects of feeding cows both silages, herbs, 'standard' forages, and industry waste products
  - Effect of on-farm technology (milking method, concentration of milk, cooling) on quality and the shelf life of milk
  - Effects of season on milk functionality parameters, e.g. coagulation

- **Processing**
  - New technologies within cooling, concentration, heating and ultrasound treatment and their effects on fats, proteins, enzymes and sugars
  - Critical parameters in cheese production e.g. reduction of salt, oxidative changes during production, packaging and storage, redox potential, and milk’s inherent coagulation properties
  - Lactose-reduced dairy products
  - Physical-chemical characteristics of butter blends and the interplay with processing

- **Health**
  - Health effects of milk components and dairy products including bioactive compounds
  - Impact of milk proteins, short- and medium-chain fatty acids from dairy products, and the so-called fasting adipose inducing factor in milk on obesity and lifestyle-related diseases
  - The role of milk proteins in relation to wound healing
  - The effect of processing on health aspects of dairy products

- **Consumers**
  - Differentiated dairy products and sensory quality
  - Relating consumer preferences and liking to product knowledge and processing to ensure consumer acceptance of products, e.g. with respect to sensory and health-related aspects

**RESEARCH FACILITIES**

Department research facilities include a pilot dairy plant, differential scanning calorimeter, confocal microscope, rheometer, Texture Analyzer, tensiometer, Reorox, Malvern mastersizer, equipment for mass spectrometry (GC-MS, LC-MS, MALDI-TOF/TOF, LC-MS iontrap, Q-TOF ion mobility source and LC QQD), electron spin resonance spectroscopy, and ultrasound treatment. Furthermore, the Department has state-of-the-art in vitro laboratories for cell studies, separation and isolation of biomolecules (LC, one and two dimensional gel electrophoresis, preparative chromatography), low-field NMR, high-field NMR (600 MHz) and professional sensory science facilities. Additionally, the Department has access to excellent stable facilities for dairy cattle.