



**Education: MSc in Molecular Nutrition and Food Technology, Aarhus University**

**Area of expertise: Milk, milk functionality, UHT stability**

## **Marije Akkerman**

**PhD Student, Aarhus University, Department of Food Science**

**[marije.akkerman@food.au.dk](mailto:marije.akkerman@food.au.dk)**

---

## **Abstract**

### **Differentiation of milk, including organics, with storage outside the cold chain**

**Marije Akkerman<sup>1</sup>, Nina Aagaard Poulsen<sup>1</sup>, John Sørensen<sup>2</sup>, Lotte Bach Larsen<sup>1</sup>**

Differentiation of milk into dairy products utilizing the natural variation in milk composition is of interest for the dairy companies to be able to produce high-value, clean label products with high quality and stability outside the cool chain. According to regulations for organic milk production, dairy cows are required to go on pasture during the summer half. With an increase in organic milk production, variation in milk composition according to feeding and season will become more pronounced. The aim of this study is to analyze natural variations in especially milk calcium, citrate and urea levels and elucidate possible implications for functional properties, including UHT stability of milk from organic and conventional production systems.

Milk composition and physicochemical properties were analyzed on milk samples from individual cows from two organic and one conventional dairy farm, collected before and after cows went on pasture during Spring 2017. Furthermore, pooled milk samples with natural high or low contents of citrate from organic and conventional farms were subjected to UHT treatment and a stability study consisting of 12 months of storage at ambient temperatures.

Milk samples were significantly different from each other on most analyzed parameters relative to the individual farms. However, these changes did not lead to a decrease in the milk functionality. Interestingly, a positive correlation between complexed serum calcium and milk citrate was found. Furthermore, a negative correlation between milk urea and ionic calcium was observed. UHT storage stability of milk with natural high content of citrate had higher serum calcium and complexed serum calcium, while low citrate milk displayed larger casein micelle size along with higher conductivity, as observed for milk from both organic and conventional farms. Currently, the impact of these differences on UHT stability is being studied in storage experiments.

<sup>1</sup> Aarhus University, Department of Food Science

<sup>2</sup> Arla Foods Innovation Centre