

BOOK OF ABSTRACTS

10th International Symposium on **RECENT ADVANCES IN FOOD ANALYSIS**

**September 6-9, 2022
Prague, Czech Republic**

Jana Pulkrabová, Monika Tomaniová, Stefan van Leeuwen,
Michel Nielen and Jana Hajšlová
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CHANGES IN THE PROFILE OF HYPERCHOLESTEROLEMIC FATTY ACIDS IN COW COLOSTRUM DURING THE FIRST DAYS OF LACTATION

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Bovine colostrum is a secretion of the mammary gland produced by cows within the first 72 h after parturition; later, the secretion is called immature or transitional milk. It is an important source of a highly concentrated complex of nutritional and biologically active compounds needed for the early nutrition of a newborn calf. For its unique composition, bovine colostrum and colostrum-based products are recently used in humans as dietary, nutraceutical, and medicinal supplements for the prevention and healing of cardiovascular and immunity-related diseases, allergies, neurological and skin disorders, and type-2 diabetes. Although the variation in the content of many nutritional and bioactive compounds has been widely studied, the information on fatty acids (FA) profile changes during the first days of lactation is lacking.

Yet, FAs in colostrum are considered important components. The most important FAs in colostrum include saturated FAs, mainly palmitic, myristic, and lauric acid. Studies showed that these three FAs could have a hypercholesterolemic effect, which can cause increased levels of LDL cholesterol and risk of cardiovascular diseases, hypertension, and arthritis. On the other hand, colostrum also contains hypocholesterolemic FAs that are represented by oleic acid and polyunsaturated FA. A ratio between hypo- and hypercholesterolemic FAs can be used for the evaluation of the health properties of bovine milk fat.

The aim of our work was to study changes in the levels of hyper- and hypocholesterolemic FAs in bovine colostrum and immature milk during the first four days of lactation to evaluate their possible impact on human health. The colostrum was obtained from eight Czech Fleckvieh cows kept on a private dairy farm (Klíčová, Božice, CZ). The samples were taken from morning milking during the first four days of lactation, and FA profiles were analyzed using comprehensive two-dimensional gas chromatography with a vacuum ultraviolet spectroscopy detector (GC×GC-VUV), which provided a better separation for such complex samples.

The sum of hypercholesterolemic FAs was the highest on day 1; it was 54.81% in milk and declined $p < 0.05$ to 38.98% in milk found on day 4. A detailed look at the profiles of individual FAs revealed that palmitic acid had the highest concentration while lauric acid had the smallest representation out of the hypercholesterolemic FAs. The sum of hypocholesterolemic FAs showed the opposite trend, with the lowest value on day 1 (27.83%) and the highest on day 4 (37.51%). The hypo-/hypercholesterolemic ratio (h/H index) calculated for day 1 exhibited a low value of 0.51, gradually increasing to 0.96 on day 4. This demonstrates that consumption of colostrum from later phases is more advantageous for human health. Our results suggest that day of lactation has a great impact on the health properties of milk fat and should be considered in the production of colostrum-based products for nutraceutical and medicinal purposes.

Keywords: bovine colostrum, fatty acids, hypercholesterolemic effect, GC×GC-VUV