

Poster 8

Identification and quantification of milk oligosaccharides from different mammals

Katja Zerge, Ingrid Clawin-Rädecker, Peter Chr. Lorenzen, Hans Meisel
Max Rubner-Institut, Federal Research Institute of Nutrition and Food,
Department of Safety and Quality of Milk and Fish Products
Kiel, Germany

The aim of this work was to characterize oligosaccharides (MOS) from goat, sheep, mare and camel milk in relation to those from human and bovine milk. Because of their assumed beneficial prebiotic and anti-infective effects, MOS are substances of particular interest in human nutrition. However, MOS are not available as dietary ingredients. Therefore MOS from bovine and non-bovine milk may be an attractive source for potential application in human nutrition. For this reason, raw milk samples from different mammals were analyzed.

The milk samples were defatted by centrifugation at 4°C and the proteins were removed by ultrafiltration (NMWCO 10kDalton). Size exclusion chromatography was used to separate the MOS from lactose, monosaccharides and other undesired analytes. The identification and quantification of MOS was performed by high-pH anion-exchange chromatography (HPAEC) with pulsed amperometric detection (PAD) and parallel on-line electrospray ion-trap mass spectrometry (IT-MS). This analytical system allows a direct characterization of the composition and structure of the MOS fractions without derivatization.

The results demonstrate that milk samples are species-specific in relation to the type and content of MOS. As expected, the highest amount of MOS was found in human milk. The MOS content in sheep, mare, goats and camel milk was approximately 20 times smaller and more similar to the amount in cow milk. Nevertheless, the structure and amount of oligosaccharides in milk of different origin can vary significantly.

To provide a better understanding of the relation between structure and possible health benefits of MOS, further studies will deal with the prebiotic and anti-inflammatory properties of oligosaccharides from different species.