UHT treatment and storage effects on the biological quality of liquid infant formulas

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Aim

In this project, differently UHT-treated milk and liquid milk-based preterm formula are packaged, stored and the Maillard reaction, oxidation, AGEs, protein damage and bioactivity are investigated.

Description

UHT treatment is used prior to storage of milk and infant formulas. Weak newborn infants fed milk formula have 10 times greater risk todevelop severe inflammatory intestinal diseases, compared with breast-fed infants. Recently, UHT treated, liquid ready-to-feed (RFT) milk formulas for preterm infants are used worldwide. Compared with powdered formulas, UHT treatment destroys more bioactive proteins. Moreover, storage with high water content, lactose, polyunsaturated fat (PUFA), protein and high temperatures in hospitals, activates the Maillard reaction. PUFA oxidise proteins to advanced glycosylation end products (AGE). AGEs may limit protein digestion and bind to intestinal cells likely promoting further gut inflammation. However, these effects on the gut are not well known. In this project, differently UHT-treated milk and liquid milk-based preterm formula are packaged, stored and the Maillard reaction, oxidation, AGEs, protein damage and bioactivity are investigated. AGE binding to receptors on pig intestinal cells and inflammation are studied and selected products are fed to weak, preterm pigs to study effects on digestibility, intestinal functions and inflammation in the intestine.