Abstract

Well-tasting milk drinks with long shelf-life

The shelf life of long life liquid dairy products, such as ultra-high temperature (UHT) milk, is limited by sensory deterioration due to physical and chemical changes, rather than microbial spoilage. Changes in sensory quality may cause consumers rejection of the product. Chemical changes include Maillard reactions and oxidation of lipids and proteins, resulting in off flavor generation and browning, which have been observed to be more challenging in lactose-hydrolyzed UHT milk compared to conventional UHT milk. Development of feasible strategies for inhibition of Maillard reactions in UHT milk would be favorable for prolonging shelf life.

We have examined how addition of small doses of plant extracts containing polyphenols may inhibit Maillard reactions in UHT milk during storage, and how this affects the sensory quality of milk. We found that addition of green tea extract to lactose-hydrolyzed UHT milk inhibited the formation of Strecker aldehydes, Maillard-derived flavor components, by up to 95% after storage at 40 °C for 42 days. Free amino acids were released into the milk during storage due to proteolytic activity, but their concentration was significantly reduced by addition of green tea extract. In addition, a high degree of protein-polyphenol binding was observed in milk added green tea extract, and the chemical mechanism for the reaction between proteins and polyphenols is currently under investigation.