

Chemical changes in **lactose-hydrolyzed UHT milk** during storage

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AIM

To elucidate the chemistry behind the formation of off-flavor in lactose-hydrolyzed UHT during 9 months of storage.

CONCLUSION

Increased proteolysis and Maillard reaction products were observed in lactose-hydrolyzed UHT milk compared to conventional UHT milk during storage.

Proteolysis contributed to formation of free amino acids which in combination with the increased reactivity of the hydrolyzed lactose products, glucose and galactose enhanced the formation of Strecker degradation products in lactose-hydrolyzed milk.

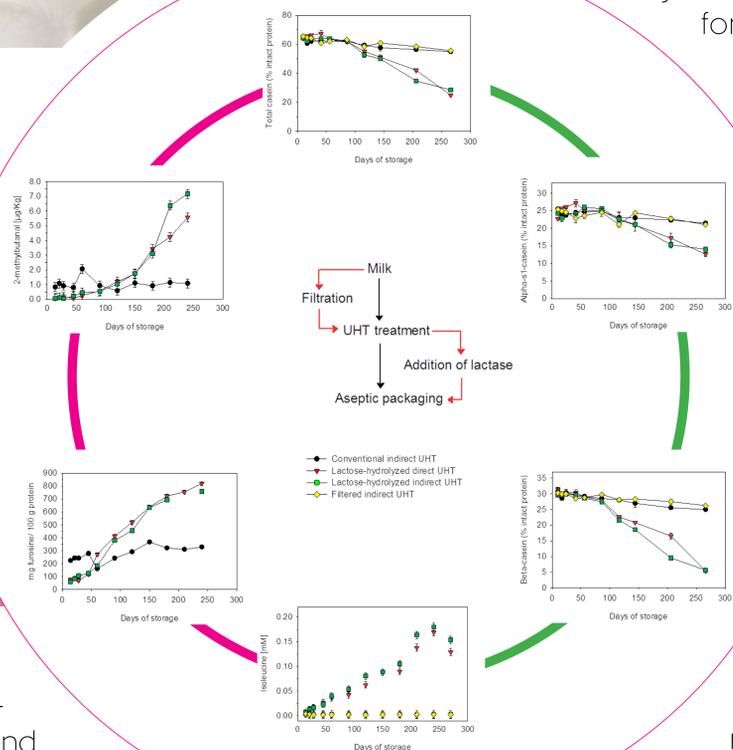


RESULTS

See figures in the circle.

MAILLARD REACTION

Increased level of furosine and 2-methylbutanal was observed in lactose-hydrolyzed UHT milk while the level remained constant in the conventional UHT milk during storage



PROTEOLYSIS

The relative amount of total intact casein was reduced more in lactose-hydrolyzed milk compared to conventional and filtered milk. The proteins most prone to proteolysis were β -casein and α s1-casein. Higher level of free amino acids were observed in lactose-hydrolyzed milk than in conventional milk during storage.

BACKGROUND

Approx. 70% of the world's population are lactose-intolerant and cannot digest lactose. Milk is an important nutritious source of proteins, vitamins and minerals which are now available for lactose-intolerant consumers by means of lactose-hydrolyzed dairy products.

Chemical changes in lactose-hydrolyzed UHT milk during storage have implications for the quality of the milk, e.g. contribute to an off-flavor development and decrease the nutritional value of the milk.

METHOD

Intact protein and furosine in the milk were analyzed by RP HPLC MS. Free amino acids were analyzed by ¹H NMR spectroscopy and dynamic headspace sampling GC-MS was used to extract and quantify volatile compounds in the milk.

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