

## **Onset of Oxidation in Milk: Effect of Fatty Acid Profile and Packaging**

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An enrichment of polyunsaturated fatty acids (PUFA's) in milk is obtained by feeding cows protected linseed. The milk was UHT-processed and filled in different packaging types. Due to the presence of antioxidants milk proteins and lipids are - at the beginning of storage - protected against oxidation. Depending on the storage conditions and packaging type, antioxidants will start to degrade after some time. Hence lipids and proteins are not protected and become sensitive to oxidation. Those oxidation products will diminish the quality of the milk.

The objective of this study was to monitor the degradation of these antioxidants in two types of milk, control milk and milk enriched with PUFA's, which were stored under different conditions of light intensity and oxygen concentration (glass, multilayer HDPE and monolayer HDPE). In the serum phase, the concentration of riboflavin was monitored, combined with the FRAP and DPPH methods, giving an idea of the total antioxidative status of milk serum. Further, the degradation of vitamin E was investigated as a parameter for the stability of the fat phase.

For the monolayer HDPE packaging, antioxidants both in the serum phase and the fat phase were degraded very fast, resulting in lipid oxidation even after a few days of storage. In contrast, milk protected from light (glass; multilayer HDPE) remained constant during the whole storage period, although a slow degradation of antioxidants was observed.

The effect of fatty acid composition of the milk was less pronounced than the effect of packaging. However, milk enriched with PUFA's showed a faster degradation of antioxidants than the control milk.