

Oxidative Stability of Milk in Accelerated Conditions

Impact of the Cow's Diet

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European health authorities recommend to reduce the consumption of saturated fatty acids. These fatty acids are provided in a great part of the European diet by whole milk and dairy products. One way to reduce this intake is to modify the lipid composition of the milk fat throughout the cow's diet. However, increasing the lipid unsaturation can lead to a decrease of the oxidative stability of milk. The objective of this study was to determine the oxidative stability of milks nutritionally improved through their enrichment in unsaturated fatty acids and antioxidants by modification of the cow's diet.

Experimental design included the measurement in accelerated conditions of the oxidation of thermally treated milks obtained from cows fed with various diets (maize silage, maize silage + 5 % linseed oil, grass silage, grass silage + 5 % linseed oil). Oxidation was evaluated by several complementary methods : O₂ consumption, hydroperoxides formation, formation of volatile compounds, front-face fluorescence.

The milks presented a good oxidative stability whatever the cow's diet. The use of light illumination (photo-oxidation) at 50 °C was therefore required to observe significant oxidation within 15 days of storage. In these conditions, oxidation not only affected unsaturated fatty acids but also other milk components such as liposoluble vitamins and proteins. It was slightly but significantly higher when the cows were fed diets containing linseed oil or grass silage in relation to the modifications of milk fat composition. **Some experiments with model dairy emulsions prepared with the fat extracted from the same milks were finally performed to better relate the observed variation of the milk oxidative stability to the fat composition.**

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