



Articles in this issue

[Higher antioxidant content in organic milk than in conventional milk due to feeding strategy](#)

[Low nitrate leaching from long-term grass-clover](#)

[Lupin grows well where pea is destroyed by soil borne diseases and vice versa](#)

[Nitrate leaching in organic arable crop rotations](#)

[Band-steaming reduces laborious hand-weeding in vegetables](#)

[Soil organic carbon as an indicator of soil quality](#)

[Contamination of oilseed rape varieties by pollen and seeds](#)

[Broilers reduce the apple sawfly population in organic apple growing](#)

Higher antioxidant content in organic milk than in conventional milk due to feeding strategy

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DIAS has over the period May 2003 to February 2004 studied the content of potential antioxidants and vitamins in organic and conventional milk. Once a month, a milk sample was taken from the silo tanks at Arla Foods dairy plant In Hobro, where large amounts of organic and conventional milk are processed. The content of milk in the silo tanks at the time of sampling varied between 30,000 kg and more than 100,000 kg. The samples therefore represent milk from many herds. The studies comprised a number of fat-soluble vitamins and the composition of fatty acids in the milk.

More vitamin E

One of the components that were given most attention was the content of vitamin E (alpha-tocopherol), which is known to prolong the shelf-life of milk, because it acts as an antioxidant. Vitamin E is available partly in the plants and the plant-based feed products eaten by the cow, but a synthetic product is also available. In the synthetic production process, eight different stereo-isomers (varieties) of alpha-tocopherol are formed of which only one is nature-identical.

The present analyses showed that organic milk in 7 out of 10 samples contained significantly more vitamin E than conventional milk (see [Figure 1](#)). [Figure 2](#) shows the percentage content of synthetic a-tocopherol stereo-isomers in the milk. These stereo-isomers of a-tocopherol constitute 15.8-24.7 per cent in the conventional milk, but only 6.2-13.5 per cent in the organic milk.

[Threshold levels for seed borne diseases in organic cereals](#)

[New fungicides for apple scab control in organic growing](#)

[Major congress on Organic Farming, Food Quality and Human Health](#)

[News briefs](#)

[Front](#)

The results indicate that less synthetic vitamin E is added in the organic milk production, and in spite of this, the content of vitamin E is higher in organic milk than in conventional milk. Therefore, from a quality point of view, there is hardly any need to prolong the exemption concerning use of synthetic vitamin E for dairy cows in the organic production.

Higher carotenoid content and similar fatty acid content

The other group of components given much attention was the carotenoids. These compounds act as antioxidants, but also a number of significant flavour components in the milk are formed on the basis on this group of components. The content of carotenoids was higher in organic milk, and the content of beta-carotene was 2- to 3-fold higher in organic milk than in conventional milk.

In relation to the fatty acid composition of the milk the study showed no difference between organic and conventional milk. Also, the content of nutritionally interesting conjugated linoleic acids (CLA) was identical in the two milk types.

Differences caused by feeding

The higher concentrations of vitamin E and carotenoids in organic milk are a result of feeding differences between the conventional and the organic productions. The most important reason for the observed differences is presumably the large amounts of maize silage used in the conventional production, whereas a considerable amount of grass and leguminous plants are used in the organic production.

If the organic farmers wish to produce milk with a high level of vitamin E and carotenoids in the future, the share of maize in the feed rations should not be increased.

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