

Greenhouse Gas Emissions of Organic and Conventional Foodstuffs in Austria

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The consumer's choice in quality of foodstuffs can influence GHG-emissions from the food sector. Organic agriculture is discussed as a possible way to reduce GHG-emissions. However the amount of reducing CO₂eq per kg of organic products is unclear especially under supermarket conditions. The primary goal of the present study was to compare greenhouse gas emissions (CO₂-eq) of organic foodstuffs with conventionally grown ones. All balanced foodstuffs are retail products, processed and marketed by nationwide supermarket companies in Austria.

A life cycle assessment (LCA) according to IPCC (2007) guidelines and closely based upon the eco-balance guidelines (ISO 14040 and ISO 14044) was performed on organic and conventional food products from farm level to the supermarket store. The CO₂-eq balance was carried out along the entire supply chain, from the agricultural production including intermediate production, processing, packaging, storage to the retailer and individual stores in Austria. The balance is based on detailed primary data in the areas of agriculture, transport, processing, packaging and distribution that were accessed from the Austrian supermarket corporation HOFER KG's organic product line „Zurück zum Ursprung“. Furthermore, secondary data from GEMIS 4.42, Ecoinvent and approximately 200 relevant national and international publications and statistics were consulted. This detailed database made it possible to take the specific production conditions in Austria as well as the current level of knowledge about CO₂-balance evaluation, land use change (LUC) and humus accumulation through organic agriculture into consideration. With regard to transport, processing, packaging and storage for conventional products the same “supermarket-standards” have been used as are set for organic products. The conventional agriculture domain was modelled with regard to the Austrian agrarian environmental programme. Modelled conventional farms come from the same region as the organic farms. As a result the climatic, locational and geographical conditions of production are comparable between the production systems. Alongside the higher ecological standards of Bio-ZZU, the impacts of the EU organic regulation were calculated in a further organic variation (Bio-EU)

To date 95 organic products in two standards (Bio-ZZU and Bio-EU) and 95 comparable conventional products have been balanced. The reduction of GHG-emission of each organic product is made visible for consumers in a specific CO₂-label. Organic products of the brand „Zurück zum Ursprung“ (Bio-ZZU) constantly display lower CO₂-eq-Emissions than comparable, conventional products:

- Dairy products: 10 - 21 % lower CO₂-eq-emissions (based on 1 kg of the product)
- Wheat bread: 25 % lower CO₂-eq-emissions (based on 1 kg of the product)
- Vegetables: 10 - 35 % lower CO₂-eq-emissions (based on 1 kg of the product)

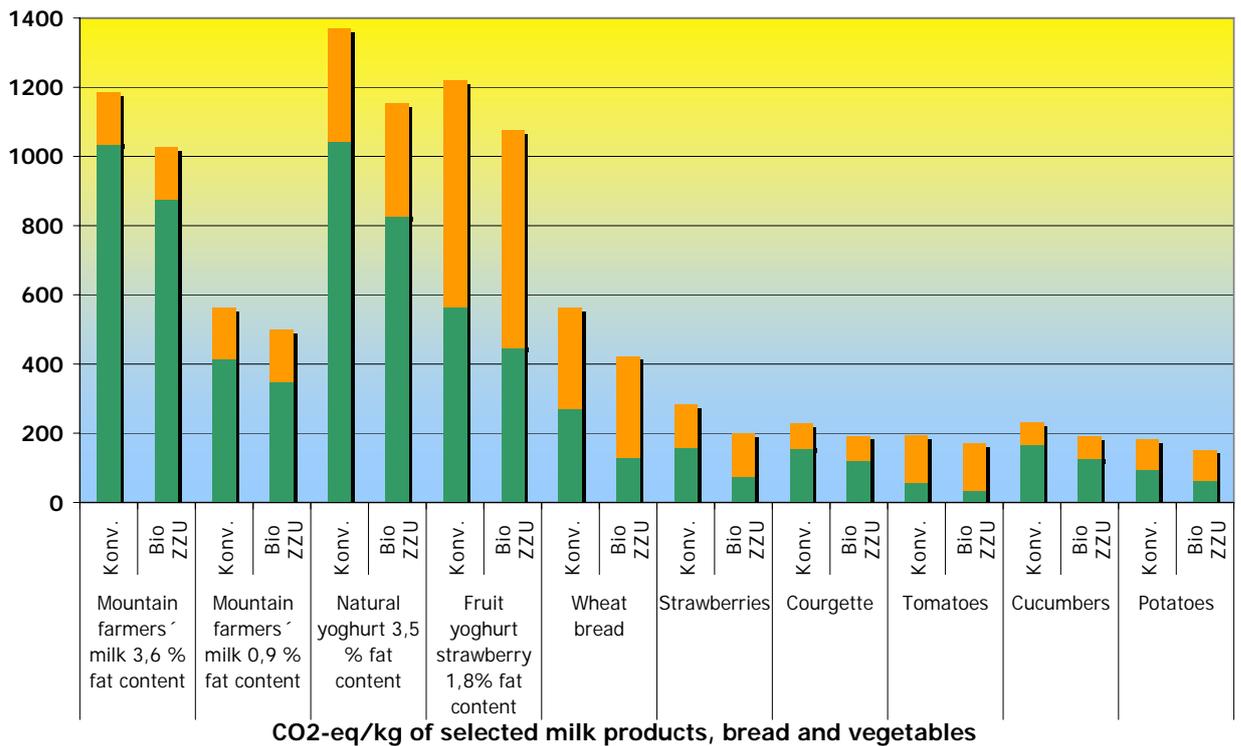
Within the CO₂-balance of wheat bread, the primary source of greenhouse gas emissions comes from the areas of agriculture and bakery. Both for dairy products and wheat bread the area of transport accounts for 5-10% of the entire CO₂-eq-emissions.

In general the cultivation of open land vegetables (e.g. onions) cause comparative little CO₂-eq-emissions, therefore transport causes 20-50% of the entire CO₂-eq-emissions/kg vegetables. The lower CO₂-eq-emissions of Bio-ZZU is due to the disuse of mineral nitrogen fertiliser.

Similar results were achieved, when the EU organic standard – as opposed to the higher ecological standards of Bio-ZZU – was used.

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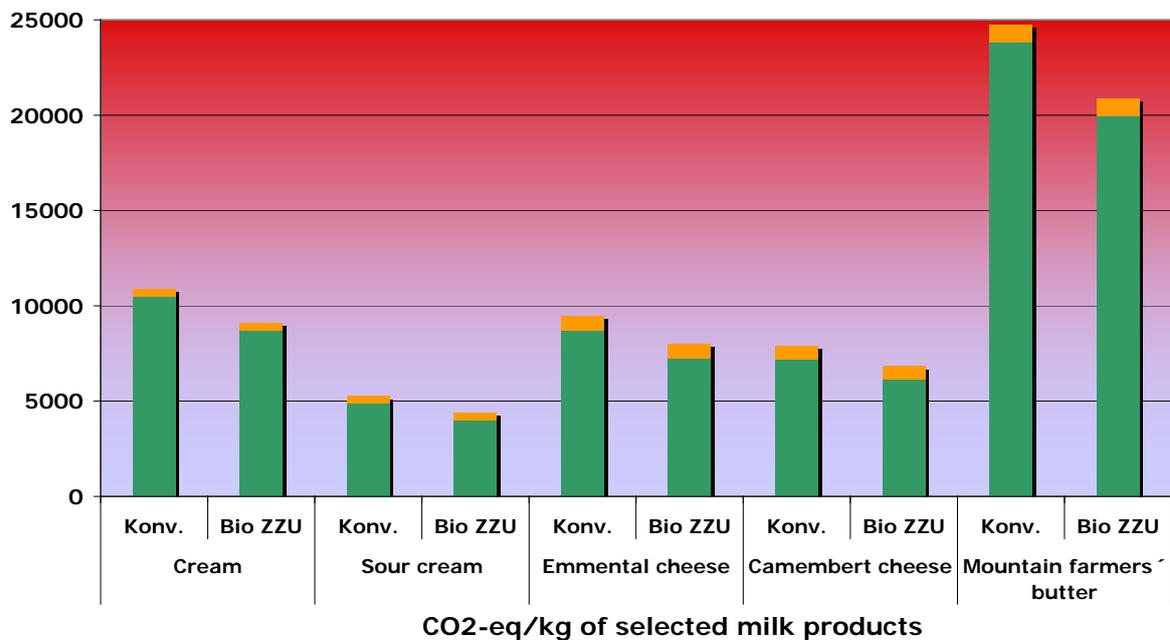
CO₂-eq/kg of foodstuffs



■ Agriculture ■ Sum of transport, packaging, storage, dairy, juice, fruits, sugar, fruit processing, mill, bakery, ingredients

Figure 1: CO₂-eq-emissions of selected foodstuffs (dairy products with low fat content, wheat bread and vegetables) in the conventional (KONV) and organic (BIO-ZZU) categories.

CO₂-eq/kg of foodstuffs



■ Sum of transport, packaging, storage, dairy, juice, fruits, sugar, fruit processing, mill, bakery, ingredients ■ Agriculture

Figure 2: CO₂-eq-emissions of selected dairy products with high fat content in the conventional (KONV) and organic (BIO-ZZU) categories.