



## Project 2.5.4

Developing a supply chain framework for measuring CO<sub>2</sub> emissions from plough to plate

**Food researchers from Sheffield Hallam University have come up with an innovative new method of calculating the carbon footprint of food products and applied it to some familiar high-street bakery favourites.**

The method calculates the carbon dioxide (CO<sub>2</sub>) emissions in each stage of the products' production including the primary production and processing of specific bakery products using recipe, processing energy and farm production data.

The work has utilised recipes from two catering companies and a high-street baker.

### Major results

The research has found that primary production emissions are always greater than processing and manufacturing emissions.

This suggests that resource efficiency improvements can be made at primary production levels. The project also found that livestock products are more CO<sub>2</sub> intensive and products containing plant oils can also significantly increase CO<sub>2</sub> production emissions.

### Developing areas

The project is currently investigating the relationship between carbon emissions and the health and well-being value of the product as well as developing methods of accounting for distribution impacts.



Above: The carbon in a ham sandwich



**Total CO<sub>2</sub> emissions (primary production, processing, manufacturing)**

The graph below shows examples of the range of products assessed.

CO<sub>2</sub> emissions are calculated on a wheat grain conversion basis. Wheat grain yields are assumed to be 8t/ha with CO<sub>2</sub> emissions of 1500kg/ha (Kusters 1999, Clift and Cowell 1995

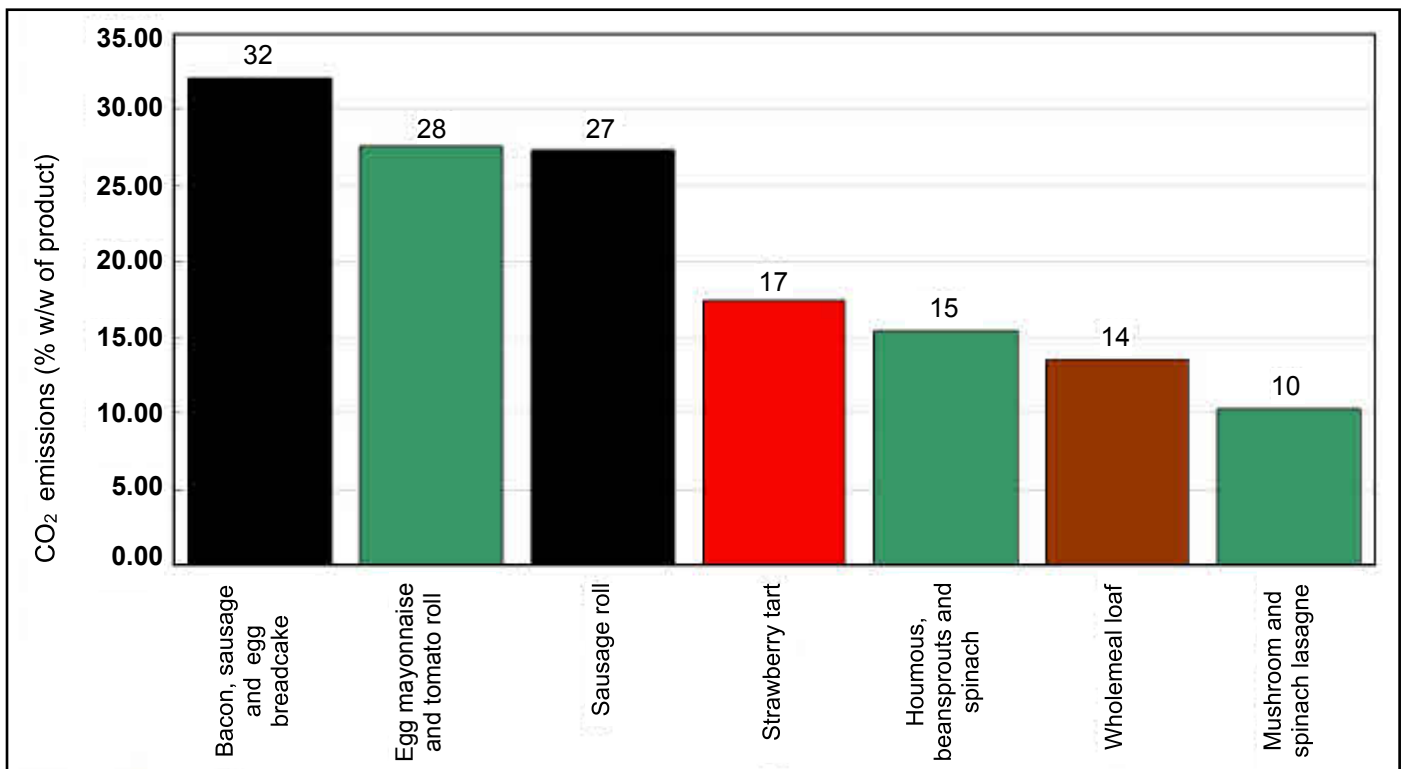
Proc. International Fertiliser Society No's 438 and 375).

Livestock conversion factors for dairy (0.3), carcase (2.2) and eggs (2.3) are obtained from Imhoff et al. (Nature 429, 870-873 2004).

Emissions for processing operations were calculated using typical energy costs for baking, milling and drying of produce and ingredients.

**The Food Innovation programme**

This project is part of the University's £1.3m Food Innovation programme. Funded by the Higher Education Funding Council for England (HEFCE), the Food Innovation programme is designed to help companies respond to the business growth opportunities created by the healthy eating agenda.



Above: Graph shows the CO<sub>2</sub> emissions from a range of common high-street products

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