

# Comparative Carbon Footprint Assessment: Meat & Veg Beef Mince

## Tesco Beef Mince 500G 20% Fat vs. Tesco Meat & Vegetable Beef Mince 500G

Anthesis Consulting Group Ltd has prepared this report for the sole use of the Tesco PLC and for the intended purposes as stated in the agreement between Anthesis and the Tesco PLC under which this report was completed. The Carbon Footprint study described in this summary has been conducted according to the requirements of ISO 14067:2018. This published International Standard, provides the globally agreed criteria for the quantification and reporting of a product Carbon Footprint.

### Executive summary

Tesco PLC commissioned Anthesis to conduct a comparative Carbon Footprint of their Tesco Beef Mince 500G 20% fat, compared with Tesco Meat & Vegetable Beef Mince 500G 12% fat. Tesco PLC seeks to understand how the Carbon Footprint of their new of Meat & Veg products compare to one traditional alternative, and to communicate differences between these two products to their customers.

This study has used a cradle to grave methodology to measure the Carbon Footprint associated with all stages in the life cycle of the products; this includes the production and processing of the raw materials, manufacturing, distribution, customer preparation and end of life processes.

According to the ISO standard, such a comparison has to be based on the function delivered by the product. There is significant debate and method development occurring in the Life Cycle Assessment (LCA) community in approaches to food LCA including how to define Functional Unit (FU) for food. There are many 'functions' that food deliver, be it the most basic of alleviating hunger, nutritional (kJ calories, g protein, g salt), social (providing the basis of a shared interaction), or multiple other psychological functions. Due to these multiple functions and the challenges with quantifying many of them there is not currently one standard way to define the FU of food products.

For the purpose of this study, the chosen FU is defined as: "1 kg of mince (sold weight) consumed." The weight of packaging is not included in the weight of the FU but it is included in the scope of the analysis. The comparison is only valid on the assumption that the two mince products would be purchased interchangeably by consumers.

### Results

In the base case, 1 kg of Meat & Veg Beef Mince with 30% vegetable content has a 23% lower total Carbon Footprint than 1 kg of Beef Mince (Figure 1). Across the sensitivity scenarios the impact per kg of Beef Mince ranges from 29 to 58 kg CO<sub>2</sub>e and per kg of the Meat & Veg Mince from 23 to 49 kg CO<sub>2</sub>e (see discussion around Figure 2 for explanation of upper and lower values).

The majority of the contribution to the Carbon Footprint comes from upstream processes. Beef production contributes significantly to the total Beef Mince Carbon Footprint and the Meat & Veg Beef Mince Carbon Footprint. This result is as expected given the high embodied carbon associated with beef production and the significance of its use in this

product, the results are therefore sensitive to the sourcing of the beef and the differences in beef quality for the two products.

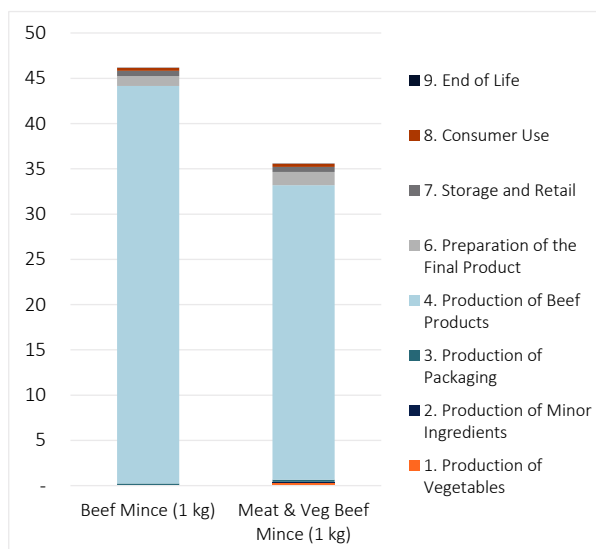


Figure 1. Absolute GWP results per kg mince (sold weight) for the life cycle stages

The Beef Mince uses 95% visually lean cut of beef and the Meat & Veg Mince uses a 60:40 split of 98% to 95% visually lean cuts of beef for its meat component. For the base results, both cuts are assumed to have an equal mix of dairy and suckler herd sourced beef in each product, representative of the UK beef market – based on evidence and subsequent validation from the supplier (Existing data is used to estimate the UK average emission factor for both dairy and suckler beef, average market values calculated from 2021 AHDB beef market deadweight prices for England and Wales are used allocate impacts for different cuts).

The upper error bars on Figure 2 represent if the products are made exclusively with suckler beef and the lower bars represent exclusive use of dairy beef. While the source of beef varies from batch to batch at the manufacturers, there is no differentiation in the batch used for each of the mince products or any correlation in the different fat content cuts coming from certain batches. While individual batches of both products could have higher or lower carbon footprints based on the source of the beef, the proportion of dairy and suckler herd beef in the Meat & Veg Beef Mince and Beef Mince is likely, across the production average, to contain similar amounts of dairy and suckler herd beef. In direct comparison to 100% beef mince, the beef and vegetable alternative uses a lower fat and higher protein meat. This meat bears a higher carbon footprint per kilogram of mince.

The results should be interpreted taking into the assumptions discussed above.

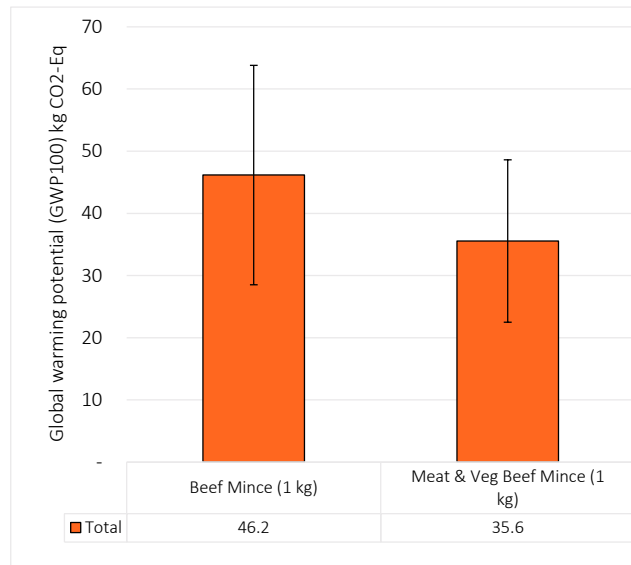


Figure 2. Absolute GWP results per kg mince (sold weight) consumed with variability

While the functional unit is based on a consumer purchasing the two products interchangeably, it is recognised that the two products have differing nutrient profiles and due to the higher fat content, the Beef Mince has higher calories than the Meat & Veg Mince and the higher meat content also means the Beef Mince has higher protein. Therefore, the Beef Mince has a lower carbon footprint per calorie and the Meat & Veg only has a marginally lower carbon footprint per gram of protein.

## Critical Review

The full study has successfully undergone critical review by a panel of independent reviewers to ensure conformance to the ISO 14067:2018 standards. The review was completed by the following panel members:

- Dr Niels Jungbluth (Chair) - Dr. Sc. Techn., Dipl.-Ing. TU - Chief Executive Officer (CEO) of ESU-services Ltd.;
- Prof Sonal Choudhary, Chair Professor in Sustainable Management and PI, STFC Food Network+ at the School for Business and Society, University of York, UK; and
- Dr Heinz Stichnothe - Senior Scientist, employed at the Thünen Institute of Agricultural Technology, Germany.

A copy of the full report can be made available on request, please email [Emily.Rout@tesco.com](mailto:Emily.Rout@tesco.com).