

# Request for clarification on the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat (Part 1 and Part 2)

## European Food Safety Authority

### Abstract

Following the adoption by EFSA's BIOHAZ Panel of the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 1 and Part 2, the European Commission requested clarification before considering EU provisions based on the EFSA recommendations. EFSA was asked to clarify that additional research data provided by KU Leuven and TNO on the removal of body heat from carcasses, do not require an update of recommendations made in the EFSA opinion Part 1. EFSA confirmed that, although the focus of the KU-Leuven study is different to the EFSA opinion and was conducted using a different model, different conditions, different chilling profiles and a target pathogen, the results do not contradict any of the conclusions or recommendations of the EFSA opinion. EFSA was asked to confirm that the additional requirement (maximum core temperature before transport) would be a good additional parameter to better control and maintain surface temperature during storage and transport. There are many factors that influence the relationship between core and surface temperature in relation to the capacity of a chilling process. Chilling the core of a carcass to a specified temperature is a relevant management option to achieve that sufficient heat is removed. The specified temperature has to be determined in relation to the conditions of the chilling process. For beef under a set of conditions, 15°C was indicated to remove 70% or carcass heat which was sufficient in relation to conditions of transport in that example. EFSA clarified that the expected outcome would be the same for raw materials used for minced meat as for meat preparations and that the conclusions and recommendations of the EFSA opinion (Part 2) apply equally to all animal species and there is no need for differentiation.

© European Food Safety Authority, 2015

### Keywords:

carcass chilling, clarification, time-temperature integration, transport

**Requestor:** European Commission

**Question number:** EFSA-Q-2015-00162

**Correspondence:** biohaz@efsa.europa.eu

**Acknowledgements:** EFSA wishes to thank the members of the Working Group on the Request for clarification on the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat: Declan Bolton, Laurent Guillier and Kostas Koutsoumanis, and EFSA staff member: Michaela Hempen for the support provided to this scientific output.

**Suggested citation:** EFSA (European Food Safety Authority), 2015. Request for clarification on the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat (Part 1 and Part 2). EFSA Journal 2015;13(11):4291, 6 pp. doi:10.2903/j.efsa.2015.4291

**ISSN:** 1831-4732

© European Food Safety Authority, 2015

Reproduction is authorised provided the source is acknowledged.



The EFSA Journal is a publication of the European Food Safety Authority, an agency of the European Union.



## Table of contents

Abstract.....	1
1. Introduction.....	4
1.1. Background and Terms of Reference as provided by the European Commission.....	4
2. Clarifications.....	4
2.1. Clarification point 1.....	4
2.2. Clarification point 2.....	5
2.3. Clarification point 3.....	5
2.4. Clarification point 4.....	5
References.....	6

## 1. Introduction

### 1.1. Background and Terms of Reference as provided by the European Commission

Following the adoption by EFSA's BIOHAZ Panel of the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 1<sup>1</sup> and Part 2,<sup>2</sup> initial consultation has taken place with Member States and stakeholders on possible amendments of EU provisions based on the EFSA recommendations.

In the course of this consultation, some concerns have been identified which need clarification before considering amendments. EFSA is therefore requested to provide a formal reply on the following points, in accordance with Article 31 of Regulation (EC) No 178/2002.<sup>3</sup>

- Clarification point 1

Clarifying that the additional research data provided by the KU Leuven (Belgium) and the TNO report (the Netherlands) on the removal of body heat from carcasses, do not require an update of the recommendations made in the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 1;

- Clarification point 2

Confirming that the additional requirement (maximum core temperature before transport) would be a good additional parameter to better control and maintain the surface temperature during storage and transport;

- Clarification point 3

Confirming that the outcome of Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 2, applies similarly to raw materials used for minced meat and meat preparations;

- Clarification point 4

Confirming that the outcome of the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 2 is valid for all species.

EFSA is requested to deliver its reply not later than 31 October 2015.

## 2. Clarifications

### 2.1. Clarification point 1

EFSA is asked to clarify that the additional research data provided by the KU Leuven (Belgium) and the TNO report (the Netherlands) on the removal of body heat from carcasses, do not require an update of the recommendations made in the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 1.

The TNO information/data was available and considered during the formulation of this Opinion (TNO, 2013). The results of the report were therefore in line with the conclusions and recommendations of the EFSA opinion.

In the EFSA opinion alternative chilling time-temperature combinations were evaluated based on equivalent growth potential for several pathogens and animal species. The KU-Leuven report

---

<sup>1</sup> EFSA Journal 2014;12(3):3601.

<sup>2</sup> EFSA Journal 2014;12(7):3783.

<sup>3</sup> Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (OJ L 31, 1.2.2002, p. 1).

evaluated the growth potential of *E. coli* O157:H7 on beef carcasses for a couple of scenarios based on modelled chilling curves with the end-point of a core temperature of 7°C. The results were validated based on measurements of real chilling in trucks and storage. The required chilling capacity was also estimated. Based on the results, the report concludes that growth of *E. coli* O157:H7 is negligible under the evaluated scenarios. Thus, although the focus of the KU-Leuven study is different to the EFSA opinion and was conducted using a different model, different conditions ( $a_w$  0.95 as compared to 0.993), different chilling profiles and a target pathogen (*E. coli* O157:H7), the results do not contradict any of the conclusions or recommendations of the EFSA opinion (Part 1) (EFSA BIOHAZ Panel, 2014a).

The issue of core versus surface temperature is the subject of ongoing discussion. While it is generally accepted that the vast majority of bacterial contamination occurs on the surface and therefore surface and not core temperature should be the target for temperature control, the possibility of heat rising from the core and heating the surface after the target temperature has been achieved, must be considered. To protect against this scenario, it would seem prudent to recommend a core temperature that removes sufficient heat from the carcass. In the KU-Leuven study, for example, achieving a core temperature of 15°C removed approximately 70% of the heat from beef carcasses, preventing subsequent 'heating' of the surface under the conditions investigated.

## 2.2. Clarification point 2

EFSA is asked to confirm that the additional requirement (maximum core temperature before transport) would be a good additional parameter to better control and maintain the surface temperature during storage and transport.

As detailed in the answer to clarification point 2.1, setting a core temperature that would consistently remove sufficient heat from the carcass to prevent subsequent heating of the surface is a good idea. As there are many factors that influence the relationship between core and surface temperature, including fat content, carcass mass, chilling capacity, etc., it is difficult to determine a generally applicable core temperature that should be achieved which would consistently prevent any rise in surface temperature during transportation. Recent research at the KU-Leuven suggests that chilling the core of a beef carcass to 15°C removes sufficient heat from the carcass to prevent core heat increasing the surface temperature under the conditions investigated. Under those conditions, this target could be used to ensure surface heating from the core does not occur during, for example, transportation.

## 2.3. Clarification point 3

EFSA is asked to confirm that the outcome of Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 2, applies similarly to raw materials used for minced meat and meat preparations.

Based on the approach used, the expected outcome would be the same for raw materials used for minced meat as for meat preparations.

## 2.4. Clarification point 4

EFSA is asked to confirm that the outcome of the Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat, Part 2 (EFSA BIOHAZ Panel, 2014b) is valid for all species.

Different pathogens would be more relevant for the different animal species, e.g. *Yersinia enterocolitica* in pigs, verotoxin-producing *Escherichia coli* (VTEC) in cattle, etc. However, the approach used was to apply the same parameters of pH and  $a_w$  for the different animal species with some of the models taking lactic acid (ComBase lactic acid model & SSSP lactic acid model) into account. *Listeria monocytogenes* and *Y. enterocolitica* were used as the target pathogens as they grow faster at lower temperatures than other bacterial pathogens (worst case scenario). The conclusions and recommendations of the EFSA opinion (Part 2) should therefore apply equally to all animal species and there is no need for differentiation.

## References

- EFSA BIOHAZ Panel (EFSA Panel on Biological Hazards), 2014a. Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat. Part 1 (meat of domestic ungulates). EFSA Journal 2014;12(3):3601, 81 pp. doi:10.2903/j.efsa.2014.3601
- EFSA BIOHAZ Panel (EFSA Panel on Biological Hazards), 2014b. Scientific Opinion on the public health risks related to the maintenance of the cold chain during storage and transport of meat. Part 2 (minced meat from all species). EFSA Journal 2014;12(7):3783, 30 pp. doi:10.2903/j.efsa.2014.3783
- TNO (Netherlands Organisation for Applied Scientific Research), 2013. Analysis of temperature profiles of beef and veal carcasses in cooling cells and trucks. Report R11286. TNO innovation for life, 54 pp.