

Assessment of the sanitary impact of two transport practices not provided for by the Regulation (EC) 2017/1981

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Context

Commission Regulation (EC) 2017/1981 sets out the necessary conditions for the transportation of partially cooled carcasses (with core temperature between 7°C and 15°C), but it does not take into account the common practices of French beef and pork meat sectors, such as transporting multiple products (meat cuts and/or offal in the same compartment as carcasses) or multi-loading transports (carcasses loaded from more than one slaughterhouse per transport) with partially cooled carcasses.

As part of European negotiations, Ifip and Idele were mandated by Culture Viande to conduct an experimental study to assess the impact of transporting partially cooled carcasses in the context of multiloading (MC) transport for beef and multi-product transport (MP) for pork and beef. These practices, although not specifically covered by the regulation, are commonly used in the French beef and pork meat sector.

Objectives

The main objective of the study is to gather reliable and representative data on the surface temperatures of carcasses and products during various MC and MP transports of partially cooled carcasses. By monitoring the temperature throughout the transportation, the study aims to:

1. Record accurate data on the conditions of these types of transport with partially cooled carcasses.
2. Evaluate the impact of these temperatures on the potential growth of bacteria, which are indicators of meat hygiene: *Pseudomonas spp.*, *Escherichia coli*, *Salmonella spp.* and *Listeria monocytogenes*.

Materials and Methods

Monitoring of transports including partially cooled carcasses (with core temperature between 7°C and 15°C) were carried out on ML transports (5 transports for beef) and on MP transports (11 for pork, and 6 for beef).

Temperature measurements were performed at the core and the surface of around 20 carcasses/quarters during loading and unloading. Recordings throughout the whole transport durations of temperature at the core and at surface of 5 carcasses/quarters per load, and of the ambient conditions in different locations.

Prediction of the growth of each studied bacteria, was conducted with the most unfavorable kinetics of each transport using SymPrevious software, based on a logistic primary growth model (Rosso, 1996), and the cardinal model to include the influence of environmental factors on the growth rate and of their interactions (Rosso, 1998, Augustin, 2005). The physicochemical characteristics of each species of meat and the cardinal values of strains isolated in the meat sector were also used as entrance data of the model. The approach is recognized by French authority (DGAL/SDSSA/2019-861). To secure the predictions, delay phase was fixed to zero in the model due to the difficulty to settle the physiological state of bacteria in real conditions.

Results

The results of the study showed that the kinetics monitored during the multi-loading (ML) and multi-product (MP) transports demonstrated:

1. A continuous decrease of core temperatures during transport of the initially partially cooled carcasses, similar to carcasses refrigeration in a cold room.
2. Decreasing trends of surface temperatures (carcasses and products) but with some fluctuations, due to defrosting and door openings which occasionally impact the ambient conditions within the trucks.

The growth models carried out with the surface temperatures kinetics of carcasses for ML transports and products for MP transports showed that even in the worst cases (slower chilling profile or most fluctuating temperatures), no growth of bacteria such as *Pseudomonas spp.*, *E. coli*, *Salmonella spp.* and *L. monocytogenes* were observed in beef multiloading short transport (less than 5 hours). For long beef multiloading transport of 58 to 60 hours, a *Pseudomonas* growth rate of 1.52 Log₁₀ CFU/g and 2.73 Log₁₀ CFU/g, and a *L. monocytogenes* growth rate of 1.02 Log₁₀ CFU/g was determined.

For beef multi-products transports, no growth of the studied bacteria for beef was observed. For pork multi-products transports, a growth of *Pseudomonas spp.* similar to that observed in cold room conditions at 2°C (± 0.1°C) was observed: 0,60 Log₁₀ CFU/g. For the other bacterial populations, no growth was observed.

Conclusion

In conclusion, the study shows that the transport of partially cooled carcasses with other carcasses or cut pieces and/or offal at regulatory temperatures does not enhance the hygiene level or the safety of these products. These practices ensure the maintenance of a high level of food safety while allowing a logistical rationalization of transport operations leading to environmental gains and a better sustainability of the meat industry. In addition of the MC or MP impact, it is also important to take into account the duration of the transport, as long transport can cause growth of some bacteria (*Pseudomonas spp.* and *L. monocytogenes*).

The results of this study will be useful for the representatives of the concerned meat sectors as it will provide them with data to support their arguments for the MC and MP transports of partially cooled carcasses. These results will be also useful for the regulatory authorities to consider in their evaluations and decisions about these specific types of transport.