

## Summary

Council Regulation (EC) No 1099/2009 on the protection of animals at the time of killing lists in its Annex I the stunning interventions currently allowed in the European Union (EU), together with the related conditions under which those interventions can be implemented. With the aim of constantly improving animal welfare, the Commission can amend the list of the approved methods in Annex I, taking into account scientific and technical progress. However, in order to be listed in Annex I, a new stunning intervention has to provide evidences that it ensures a level of animal welfare at least equivalent to that ensured by the currently approved methods. The European Food Safety Authority (EFSA) was requested to perform such assessment with regard to the implementation of the low atmospheric pressure stunning (LAPS) system on broiler chickens.

An ad hoc Working Group (WG) was set up by EFSA to address the Terms of Reference of the mandate received by the Commission. As a first step, the WG assessed the scientific papers and the related annexes based on the criteria described in the EFSA Guidance (EFSA AHAW Panel, 2013). The outcome was that, individually, no paper was able to pass the criteria. Nevertheless, the most relevant data and information on the stunning methodology under evaluation were provided, although distributed over the different scientific papers. For this reason, the WG decided to evaluate the data and information distributed over the different scientific papers as a unique set of evidences. However, some important aspects, considered crucial for the welfare assessment, were not available in the dossier from the applicant. EFSA, therefore, requested the applicant to provide an additional set of data and statistical analysis as well as access to the raw data underpinning the scientific publications. The most critical phase of the assessment was to compare the LAPS method with the existing stunning interventions, in terms of impact on animal welfare, with a quantitative approach. In fact, an Extensive Literature Search followed by data extraction was performed, but it was not possible to retrieve quantitative data (i.e. quantitative parameters to assess the welfare implications associated with the interventions) from stunning interventions other than LAPS. This is partly due to the fact that the stunning methods currently available in EU were approved before the publication of the EFSA Guidance (EFSA AHAW Panel, 2013) and partly because, to a certain degree, recognised standards of animal welfare are still lacking. Therefore, the EFSA WG undertook another approach, based on expert opinion. As a first step, the WG experts identified the main hazards related to each stunning intervention, i.e. electrical water-bath, gas stunning methods, excluding hypoxia induced with inert gases, and LAPS. A pool of field experts, with different background and responsibilities, was set up and asked to rank these hazards in terms of impact on animal welfare.

The LAPS procedure, leads to loss of consciousness followed by death in all birds. The LAPS procedure does not induce immediate unconsciousness. During the first 50 s of the LAPS procedure the broiler chickens are likely to fall into a state of drowsiness. When oxygen concentration drops to a low level (about 7% atmospheric equivalent), the broilers show electroencephalography (EEG) signs of arousal, indicating capacity to experience potential aversive stimuli (on average at 50 s from the start of the LAPS process). The mean time to induction of unconsciousness, based on the mean time to loss of posture, as a proxy, varies between 58 and 80 s in different studies.

As main conclusion, the LAPS intervention was found to be able to provide a level of animal welfare at least equivalent to that provided by at least one of the currently allowed methods.

It is important to stress that this assessment was performed under the conditions described in the submitted dossier and, for this reason, its conclusions are valid ONLY under those conditions, i.e. (i) the technical specifications (e.g. rate of decompression, duration of each phase, total exposure time); (ii) the animal characteristics (e.g. broiler chickens weighting less than 4 kg, dry vs wet chickens) and (iii) the ambient conditions (e.g. temperature, humidity). Deviation from the conditions might have different consequences for animal welfare which were not assessed in this exercise and will need a dedicated assessment.

Considering the important lack of comparable data on the stunning interventions other than LAPS, EFSA recommends dedicated studies to be performed to enable a proper assessment in case the EC needs more support from EFSA on this subject. The emergency procedures associated with system failures should be included by the manufacturer in the manufacturer's instructions for the use of the equipment and Food Business Operators should follow the manufacturer's instructions and include them in the standard operating procedures. Finally, based on the evidences provided, the LAPS method may, in addition to commercial slaughter, be suitable for depopulation of farms, respecting the technical conditions defined in the present conclusions.