



# REVIEW OF EVIDENCE ON THE WELFARE IMPACTS OF HIGH CONCENTRATION CO<sub>2</sub> GAS STUNNING AND OF ALTERNATIVE STUNNING METHODS FOR PIGS

Submissions to the Animal Welfare Committee  
8th December 2024



# Submissions to the Animal Welfare Committee (AWC) on the review of evidence on the welfare impacts of high concentration CO<sub>2</sub> gas stunning and of alternative stunning methods for pigs

UK Centre for Animal Law

8<sup>th</sup> December 2024

We write in response to your call for information in relation to welfare impacts of high concentration CO<sub>2</sub> gas stunning of pigs and alternative stunning methods that may be available. We appreciate being consulted on this important topic and set out below a number of points that should be taken into consideration.

Since the mid 1990s, attention has been drawn to the problems associated with using high concentrations of CO<sub>2</sub> to stun pigs. Despite this, in 2013, 50% of pigs in England and Wales were stunned with high concentrations of CO<sub>2</sub>. In 2018 this increased to 86% and we are now looking at a further increase to 90% in 2024.<sup>1</sup> We have passed the time when action should have been taken to prioritise the welfare of pigs at the time of slaughter and we have instead seen a sharp increase in the number of pigs being stunned using this method. A rapid shift away from high concentration CO<sub>2</sub> stunning must be made by the industry in favour of methods more conducive to animal welfare, and our recommendation is that this shift be accelerated by the introduction of a phased ban on using the slaughter method.

The below sets out the law, associated welfare issues, proposed alternative practices, proposed changes to labelling, and a conclusion.

## 1. Applicable legislation

- 1.1. The welfare of animals killed for food is protected by retained EC Council Regulation 1099/2009 (“the 2009 Regulation”), which is implemented in England through the Welfare of Animals at the Time of Killing (England) Regulations 2015 and equivalent regulations in the devolved nations.
- 1.2. The 2009 Regulation prioritises the minimisation of pain and suffering of farmed animals through the proper use of stunning methods. Annex 1 to the 2009 Regulation sets out a list of stunning methods, together with the technical requirements for each of them.
- 1.3. Article 3(1) of the 2009 Regulation provides that “[a]nimals shall be spared any avoidable pain, distress or suffering during their killing and related operations.” Article 3(2) goes on to state that, for the purpose of this, “*business operators shall, in particular, take the necessary measures to ensure that animals:*
  - b) are protected from injury;*
  - f) are prevented from avoidable interaction with other animals that could harm their welfare.*”

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<sup>1</sup> This has been confirmed in the recent FSA slaughter survey: [https://assets.publishing.service.gov.uk/media/67487a1f2ac8a6da307239a0/24-11-13\\_Slaughter\\_Sector\\_Survey\\_2024\\_NEW\\_DEFRA\\_DOC\\_VERSION\\_.pdf](https://assets.publishing.service.gov.uk/media/67487a1f2ac8a6da307239a0/24-11-13_Slaughter_Sector_Survey_2024_NEW_DEFRA_DOC_VERSION_.pdf). The other 10% are mainly stunned using electronarcosis, predominantly to the head only (as opposed head and body).

- 1.5 Article 4(1) provides that “[a]nimals shall only be killed after stunning in accordance with the methods and specific requirements related to the application of those methods set out in Annex I. The loss of consciousness and sensibility shall be maintained until the death of the animal.”
- 1.6 Article 4(2) provides that derogation from Article 4(1) is permissible by the appropriate authority “to take account of scientific and technical progress ... Any such amendments shall ensure a level of animal welfare at least equivalent to that ensured by the existing methods.”
- 1.7 Whilst high concentration CO<sub>2</sub> is included at table 3 of Annex 1 as a method for stunning pigs, the preamble (at paragraph 6) to the 2009 Regulation provides the following:
- Recommendations to phase out the use of carbon dioxide for pigs and the use of waterbath stunners for poultry are not included in this Regulation because the impact assessment revealed that such recommendations were not economically viable at present in the EU. However, it is important to continue the discussion in the future.*
- 1.8 Retained Regulation (EU) No 1169/2011 (“the 2011 Regulation”) relates to the provision of food information to consumers and is relevant in the context of ensuring consumers are given accurate information about the origin of their food. Recital 50 to the 2011 Regulation states the following:
- Union consumers show an increasing interest in the implementation of the Union animal welfare rules at the time of slaughter, including whether the animal was stunned before slaughter. In this respect, a study on the opportunity to provide consumers with the relevant information on the stunning of animals should be considered in the context of a future Union strategy for the protection and welfare of animals.*
- 1.9 Article 3(1) of the 2011 Regulation provides that “[t]he provision of food information shall pursue a high level of protection of consumers’ health and interests by providing a basis for final consumers to make informed choices and to make safe use of food, with particular regard to health, economic, environmental, social and **ethical considerations**.” [our emphasis]
- 1.10 Article 7 of the 2011 Regulation relates to fair information practices, with article 7(1) providing:
- Food information shall not be misleading, particularly:*
- (a) *As to the characteristics of the food and, in particular, as to its nature, identity, properties, composition, quantity, durability, country of origin or place of provenance, method of manufacture or production;*
- ...

## **2 Welfare issues associated with high concentration CO<sub>2</sub> stunning**

- 2.5 In 2004 the European Food Safety Authority (EFSA) concluded that at concentrations above 30%, CO<sub>2</sub> “is known to be aversive and cause hyperventilation and irritation of the mucous membranes that can be painful, and elicits hyperventilation and gasping before loss of consciousness”.<sup>2</sup>
- 2.6 Numerous reports document the aversive behaviours caused by high CO<sub>2</sub> concentrations, including lateral head movements, sneezing, gasping, vocalisations, muscular excitation,

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<sup>2</sup> European Food Safety Authority (EFSA). *Welfare aspects of the main systems of stunning and killing the main commercial species of animals*. The EFSA Journal 2004, 45, 1-29.

aggression, neck extension, eye rotation and violent bulking,<sup>3</sup> with some pigs even regaining consciousness before slaughter.<sup>4</sup> This response in pigs does not accord with the aim of the 2009 Regulation to protect the welfare of animals at the time of killing.

2.7 A more recent Scientific Opinion published by EFSA in 2020 (“the 2020 EFSA Opinion”) states that “[t]here are no preventive or corrective measures to the pain, fear and respiratory distress caused by the exposure to high CO<sub>2</sub> concentrations as this is inherent to the stunning method. The only way to prevent the hazard related to exposure to high CO<sub>2</sub> concentrations is to use other gas mixtures like inert gases or mixtures of inert gases containing local CO<sub>2</sub> concentrations.”<sup>5</sup>

### 3 Alternatives

3.1 Certain inert gases seem to be more suitable to use than CO<sub>2</sub> in high concentrations in that the detriment caused to pig welfare is less.

3.1.1 As referenced in the AWC Call for Information, PigStun Project has been undertaking research on potential better options, the results of which will be published in early 2025. Helium is one gas considered. Helium in one or two phases appears to be a gentler method of stunning when compared with high concentration CO<sub>2</sub> but has a range of supply and expense issues.<sup>6</sup>

3.1.2 Argon is also considered by the PigStun Project, and is better from a welfare viewpoint than CO<sub>2</sub>, although there appears to be some suffering entailed in the use of argon.<sup>7</sup> With Argon the stunning process is longer, raising the expense, something that may be unavoidable with any method.

3.1.3 A combination of gases has not been considered by the PigStun Project, because it is not currently permitted for stunning pigs in Europe (though it is permitted for poultry). However, a method that should be explored is the use of a non-aversive or minimally aversive gas or gas mixture to produce unconsciousness **followed** (once the pigs are unconscious) **by** the use of a high concentration of CO<sub>2</sub> to kill the pigs. The difficulty with gases other than CO<sub>2</sub> is that they take longer and the state of unconsciousness is shorter, but with a mixture of non-aversive gases followed by high concentrations of CO<sub>2</sub>, it might solve the problem of the pigs regaining consciousness. This needs exploring further.

3.1.4 Hazards which have been identified common to all methods using gas include too short exposure time and overloading of the gondola. Pain and fear are the welfare consequences identified in the 2020 EFSA Opinion in relation to these hazards, stemming from lack of skilled

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<sup>3</sup> Atkinson S, Larsen A, Llonch P, Velarde A, and Algers B. 2015. Group stunning of pigs during commercial slaughter in a Butina paternoster system using 80% nitrogen and 20% carbon dioxide compared to 90% carbon dioxide. SLU Technical Report ; and Rodríguez P, Dalmau A, Ruiz-de-la-Torre JL, Manteca X, Jensen EW, Rodríguez B, Litvan H and Velarde A. 2008. Assessment of unconsciousness during carbon dioxide stunning in pigs. *Animal Welfare* 17: 341-349

<sup>4</sup> ‘Suffering of Gassed Pigs Laid Bare in Undercover Footage from UK Abattoir’, <https://www.theguardian.com/environment/2023/may/02/suffering-of-gassed-pigs-laid-bare-in-undercover-footage-from-uk-abattoir>

<sup>5</sup> Nielsen S, Alvarez J, Bicoût D *et al*, *Welfare of Pigs at Slaughter*, 17 June 2020, [Welfare of pigs at slaughter - - 2020 - EFSA Journal - Wiley Online Library](https://www.efsa.europa.eu/en/efsajournal/doc/5242/1), accessed 1 December 2024.

<sup>6</sup> Machtolf M, Moje M, Troeger K and Bülte M, *Stunning Slaughter Pigs Using the Inert Gas Helium*, [https://digicomst.ie/wp-content/uploads/2020/05/2014\\_07\\_07.pdf](https://digicomst.ie/wp-content/uploads/2020/05/2014_07_07.pdf), accessed 24 November 2024.

<sup>7</sup> Dalmau A *et al*, 2010, Stunning Pigs with Different Gas Mixtures: Aversion in Pigs. *Animal Welfare* 2010, 19: 325-333

operators and issues with the equipment used to distribute the gas.<sup>8</sup> All of these need improvement.

### 3.2 Improved electrical stunning

3.2.1 The PigStun Project is also considering improved methods of electrical stunning with a focus on handling and slaughterhouse design. When carried out correctly, this can be a more humane way of stunning than using CO<sub>2</sub>. However, there are issues with separating the pigs from each other and violent methods being adopted in order to do so, as well as human error issues around restraint, wrong placement of the electrodes and too short exposure time. This is why there was a move towards increased use of CO<sub>2</sub>.<sup>9</sup>

3.2.2 Eyes on Animals, an animal welfare organisation based in the Netherlands, has been working on improving electrical stunning. We note that the organisation is on the list of consultees and is part of the PigStun Project. We would like to highlight the work that they have been doing in relation to the redesign of a pig slaughterhouse, moving it away from the use of CO<sub>2</sub> to a re-designed automatic stunning system. We expect they will respond to the consultation, so we do not propose to repeat the results of their work here, but more information can be found on their website [here](#) and [here](#).

## 4 Labelling

4.1 Until an alternative can be found that scientists agree meets the high welfare standards generally protected under the 2009 Regulation and WATOK, meat from pigs killed using CO<sub>2</sub> should not be permitted to be labelled as high welfare, as this is misleading to consumers. Currently, voluntary assurance schemes Red Tractor, RSPCA Assured, and Soil Association Organic, require stunning prior to slaughter for certification, giving a false impression to consumers that the stunning provided assures high animal welfare. The preamble to the 2009 Regulation makes clear that CO<sub>2</sub> is only allowed because there is no economically viable alternative. This needs to be reflected in labelling of such products.

## 5 Conclusion

5.5 It is clear that the welfare advantages of using high concentration CO<sub>2</sub> are inadequate, with the main driving force behind allowing this method of stunning to continue being commercial benefit. The legislation currently in place to protect animals at the time of slaughter fails to reflect the best available animal welfare science. The scientific advice has not been followed due to economic concerns, rather than any dispute with the science, and successive governments have failed to follow their own scientific advisory body. A better alternative must be found as a matter of urgency. Food labelling, in so far as it is currently misleading, must also be altered.

If you have any questions on the information provided in this response, please do not hesitate to get in contact with us.

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<sup>8</sup> Nielsen S, Alvarez J, Bicout D *et al* (n 5).

<sup>9</sup> EFSA Panel on Animal Health and Welfare (AHAW) and others, *Welfare of pigs during killing for purposes other than slaughter*, 25 June 2020, EFSA Journal, 26, <https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6195> accessed 24 November 2024.





A-Law, c/o Emstrey House North  
Shrewsbury Business Park  
Shrewsbury, SY2 6LG United Kingdom

Email: [info@alaw.org.uk](mailto:info@alaw.org.uk)

Visit: [www.alaw.org.uk](http://www.alaw.org.uk)

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