
PigStun
Developing non-aversive stunning methods for pigs

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Conclusions & Recommendations

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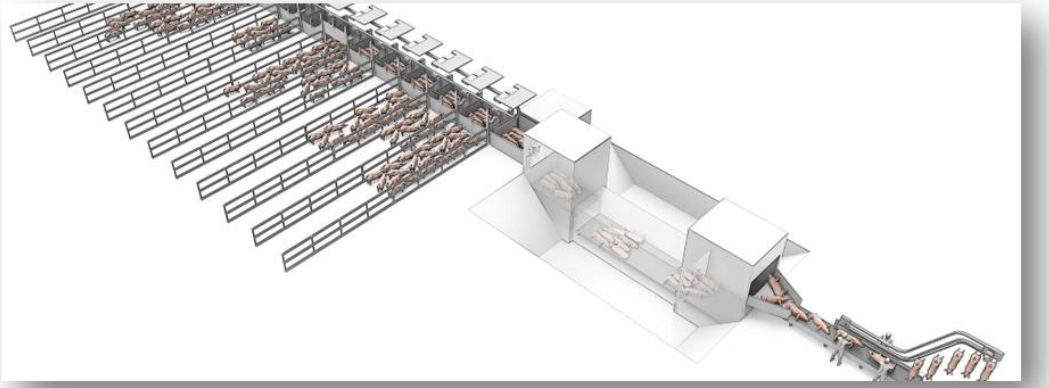
Optimised CAS Process: Impact on key points

- ## Animal welfare:

  Both solutions intend to enhance animal welfare beyond conventional high CO_2 stunning systems, by supporting calm, low stress movement to the stunner and maintaining stable gas concentrations for effective stunning.

- ## Meat Quality:

  Both solutions aim to reduce stress of pigs by streamlining pig handling, therefore supporting good meat quality. For example, by reducing the occurrence of PSE (pale, soft, and exudative).



Optimised CAS proces: Impact on key points

- ## Economy:

  The modified backloader would require a relatively small initial investment as it retrofits existing equipment, making it a cost-effective option for slaughterhouses with limited budgets.

  The tunnel system, being a new build, will demand higher investment but offers probably long-term efficiency and reliability, potentially reducing operational costs over time.

- ## Environment:

  Improved gas microclimate control in both systems reduce gas wastage, lowering CO_2 emissions and the environmental footprint of the stunning process.

- ## Labour:

  Both potential solutions reduce the need for manual pig handling. The automated walkways and enhanced gas controls require staff training, but they simplify operations in the long run, potentially reducing labour costs.

Argon Retrofit system: Impact on key points

- ## Animal welfare:

  Significantly reduced aversion during the induction phase compared to CO_2, with fewer pigs showing strong agitation (2.3% vs 60.0%) and none showing abnormal breathing (vs 59.0% for CO_2). Pre-stunning stress was also reduced in this system compared to high CO_2, as pigs were less reluctant to enter the argon stunner (5.7% vs 11.3%).

- ## Meat Quality:

  Trial results differed. No differences in meat quality were found between the Argon Retrofit system and the local CO_2 control inside the same stunner, but the level of blood spots in the comparative trials was relatively high for argon.

Argon Retrofit system: Impact on key points

- ## Economy:

  The conversion can be implemented relatively quickly, 1-2 days in a working slaughterhouse.
  However, due to the 40% lower throughput rate, more lines should be implemented, if this cannot be compensated by longer working hours. For this reason, the estimated cost per pig is about 2 to 3 times higher than selected high CO_2 stunners used as reference in the PigStun project.

- ## Environment:

  Argon is a good alternative to CO_2 as it can be produced in practically unlimited quantities.

- ## Labour conditions:

  The risk of inhalation by humans of toxic levels of argon was estimated to be lower compared to CO_2.

Helium system: Impact on key points

- ## Animal welfare:

  In terms of animal welfare, the system is a significant improvement compared to conventional CO_2 stunning, as the animals show no reaction to the helium atmosphere whilst losing consciousness.

- ## Meat Quality:

  The level of blood spots in the comparative trial and the helium stunning system, where more or less the same, but higher than in the CO_2 control. The other meat quality data showed no significant difference between the helium system and the local CO_2 control.

Helium system: Impact on key points

- ## Economy:

  The cost of helium is significantly higher than the cost of CO_2 on the European mainland. A helium recovery system can help to reduce these additional costs and reduce bottlenecks in availability.

  The time per pig for stunning is considerably longer than for CO_2 stunning. The relatively lower efficiency will result in a higher use of resources per pig for stunning.

- ## Environment:

  Helium is a limited resource that can be difficult to obtain and compete with medical applications.

- ## Labour:

  The completely automated process from driving in the stunner, stunning and ejecting the animals from the stunning system significantly reduces the number of process steps that must be carried out by employees and therefore the workload is reduced.

  Helium is a light, highly volatile and inert gas, thus the safety of employees is not endangered even in the event of a gas leak, as helium escapes upwards.

Improved Electrical Stunning system: Impact on key points

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- ## Animal welfare:

  Compared to conventional electrical stunning, improved electrical stunning results in a lower throughput rate and reduces the need for driving aids (brushes, paddles or electric prods). Electric stimulation is only applied on animals entering from the raceway into the stunner (approx. 20% of the animals).

  The exposure time and the accuracy of placing the electrodes is improved due to the longer exposure duration in the stunner.

- ## Meat Quality:

  The pH decline has improved compared to the old situation.

  Bloodspots occur in part of the pigs (57%), which is high compared to CO_2 stunning.

Improved Electrical Stunning system: Impact on key points

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- ## Economy:

  The improved electrical stunning will increase the costs per pig stunned compared to traditional electrical stunning.

- ## Environment:

  Using 4 stunners instead of 1 stunner means that it takes more time to clean the stunners and their surrounding area (as well as more water, electricity, and disinfectants).

  Overall, more electricity is used.

- ## Labour:

  Using 4 stunners instead of 1 stunner has consequences for the number of staff required, as more people are needed to work along the raceway and bleeding table.

Recommendations & points to consider

The Recommendations of deliverable D4 are grouped as follows:

1. **General recommendations for slaughterhouses**
    1. Pre-stunning handling
    2. Switching to alternatives to high CO_2 stunning
2. **General recommendations for Policy makers**
3. **General recommendations for Retailers**
4. **System-Specific recommendations**

General recommendations for slaughterhouses

Pre-stun handling

Reduce pre-stun stress through improved handling, because this will pose a significant improvement to animal welfare and may increase meat quality and worker satisfaction.

Switching to alternatives

As the tested systems pose the opportunity to significantly increase animal welfare, slaughterhouses should consider the possibility of changing to one of them.

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