

7. Summary

The effect of CO₂ anaesthesia on slaughter pigs suffering from pneumonia

CO₂ is considered as a feasible way to stun pigs for slaughter.

This circumstance includes the necessity of having an efficient method of stunning animals with pathologic changes in the lung parenchyma, when a decreased exchange of respiratory gases could be assumed.

This work should contribute to evaluate the efficacy of CO₂ stunning in pigs showing alterations in the lung parenchyma (e.g. pneumonia).

Stunning systems in two different slaughterhouses have been investigated. Slaughterhouse 1 uses a concentration of 90% CO₂ with a residence time of 120 seconds. Slaughterhouse 2 applies 90% CO₂ for a time span of 90 seconds.

Preassigned, criteria have been established to evaluate the efficacy of stunning, which includes the corneal reflex and the nose prick reflex. Additionally, any occurrence of gasping breathing was documented. This data has been obtained immediately after throw-off from the CO₂ stunning system.

Following bleeding, blood was collected from the incision site for blood gas analysis and blood chemistry from whole venous blood. PO₂, PCO₂ and pH have been determined as blood gas parameters. A decrease of the pH caused by the inspired CO₂ served to assess the stage of narcosis.

Sodium, Potassium and Chloride were determined from serum samples to assess the strong ion difference (SID) in accordance to the Stewart- model. The purpose was to evaluate the ability and dimension of electrolyte changes caused by CO₂ intake.

The pathological findings in the lung parenchyma could be divided in a mild, moderate and severe stage. The analysis was designed to combine results from lung evaluation with reflex response, blood gas analysis and serum analysis, respectively.

Furthermore, the results of reflex response were associated with the findings of the blood gas analysis (pH, PCO₂, PO₂) and the SID value. Regarding this particular evaluation, discrimination between both slaughterhouses were possible. Thus, in slaughterhouse 1, the absence of reflexes correlates with a lowered pH, and in addition, blood gas samples of these animals were characterized by decreased PO₂ and increased PCO₂. SID values, in average, were decreased in animals without showing reflexes.

These observations were not reproducible in slaughterhouse 2: a longer residence time in slaughterhouse 1, which comparatively provoked a higher toxic effect, could serve as an explanation.

There was no correlation between findings in the lung parenchyma and the observed reflexes; both animals with and without pathologic findings displayed reflex responses in the same percentage. In addition, this was the same in animals with severe pathologic changes, respectively when both slaughterhouses were evaluated in a separate way.

The evaluation of the blood gases revealed no difference between animals with and without pathologic findings. Both groups were characterized by markedly reduced pH and PO₂ values and increased PCO₂ values. The evaluation of SID elicits no differences within the groups.

For these particular slaughterhouses, using a CO₂ stunning method, pneumonia did not cause a difference in the level of anaesthesia.