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Short Communication

Transport as a Key Factor for Muscle pH (Meat Quality) in Pigs

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Transport is considered as one of the main causes of stress in the swine production system [1] due to the challenges that pigs have to cope with within the process, such as vibration, movement, loading and unloading stress, changes of social groups and temperature, which pigs are not prepare to deal with. Because of all of this, transportation have a significant impact in animal welfare and meat quality indicators, and there is a need to understand all its implications and outcomes to implement strategies to diminished economic losses.

Transport inflicts stress and several metabolic changes in pigs, for instance increases secretion of cortisol and epinephrine, which increase the glycogen breakdown in muscle tissue [2]. Which can lead to an acidosis state (low PH and high blood lactate) [3,4]. This pigs have difficulties of movement especially during the unloading process [5] and display a variety of symptoms in behavior due to their inability to maintain homeostasis. This state is called non-ambulatory pigs which can be fatigued or injured pigs, and it´s a main concern for the industry.

Meat quality responds directly to pH values in muscle after slaughter and the behavior of the pH curve, for instance with low amplitude of pH decline, as in reduced glycogen reserves produced by muscle activity or stress during hours preceding slaughter, high ultimate pH can be observed and so the presence of Dry Firm Dark DFD meat [6]. Contraire to the Pallid Soft and Exudative found in cases of on-farm long term stress.

In the financial aspect, fatigued pigs represent big issues related to: economic losses, due to bruises [7], high costs of time and labor to mobilize animals in the slaughter plant and pigs that die before stunning and changes in meat pH. This could represent up to 30% of pig´s value [8].

There are several factors that contribute to the presence of non-ambulatory (fatigued) pigs during transportation, and understanding their origins, it's needed to mitigate their effects.

Truck design has an important influence on the presence of fatigued pigs and pig´s behavior [9], they can be from single deck to 3-deck trailers and made of a variety of materials for flooring and compartments, altering the density of pigs transported [10]. All of this is important because the change into a new environment or a group of more than 5 pigs produces an increase in heart rate and is associated with a stress response [11]. In developing countries is usual that pig transportation trucks have passive ventilation, therefore there is a marked influence of the micro weather (Temperature and Humidity) in pig´s behavior and stress during transportation. For last the ramp angle for the unloading process also has proven to affect directly losses for transportation, and changes in meat quality [12]. Steep angles of more than 20 degrees difficult the process and make the pig more susceptible to stress or injuries.

Pig´s handling is another important factor to consider when pigs are transported, since the loading and unloading process are determined as stressors that affect meat quality and losses due to transportation [13]. Mainly to aggressive handling maneuvers by handlers which are increased when the facilities are not adequate or there is exhaustion caused by the physical effort due the loading/unloading process [14]. This event affects directly lactate concentrations, which are produced by the muscle tissue [15]. Affecting muscle pH and meat quality, therefore the importance of trained personal as a protective factor for meat quality in pre-slaughter.

Pig gender has an influence on the sensibility to transportation stress being greater in gilts compared to barrows [16]. Possibly due to the difference of metabolic rates and energy reserves. Although barrows show a set of agonistic behaviors such as fights for space that may affect their energy reserve, it has not been reported as a reason to explain gender effect on stress level. Also mixing pig groups even it seems like a financial aid it has proven to be more stressful and has a strong impact upon the loading/unloading process. A group of about 15 pigs kept in the same compartment is proven to promote resting behavior, so to reduce aggression and skin lesions. Also, it is recommended to separate the sexes from each other to reduce the percentage of dead and fatigued pigs [5].

Al of this factors contribute to affect quality of transportation and impact negatively animal welfare and meat quality for the reasons showed above. But there is an opportunity for the driving operators with all this data to set changes into the pigs transport; whether it is the decision of mixing groups or gender, the handling, and ramp angles during the loading/unloading procedure, count with the presence of an assistant during the ride. With little modifications as those an improvement over the one of the most critical aspects of commercial pigs as is transportation could be overcome.

It is important as well, that abattoirs invest in training personnel for the critical areas of pre-slaughter under their control, such as; the unloading process, have a system to facilitate the management of fatigued pigs, for instance a driving system and exclusive pens for recovery, hydration and control of this pigs, in order to diminish the impact on meat quality and improve overall welfare.

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