

THE INFLUENCE OF AMBIENT TEMPERATURE ON ANIMAL LOSSES DURING TRANSPORT AND THE QUALITY OF MEAT OBTAINED FROM SWINE

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Abstract: The transformation of swine into meat by processing involves a series of events, including their handling and boarding at the farm, transport to processing facilities, transport conditions and control of microclimate factors, unloading and resting in boxes prior to antemortem action and the slaughter process. During these procedures, improper techniques and operational facilities, failure to control the ambient temperature, can lead to high losses in terms of quality. The environmental temperature, the lack of welfare during the arrival of swine at the slaughterhouse has effects on animal losses and the quality of the meat obtained by slaughtering them. Animal transport is undoubtedly the most stressful and damaging stage on the way from the farm to the slaughterhouse and contributes significantly to a low level of animal welfare and production losses. To avoid heat stress during the transport of swine to the slaughterhouse, managerial measures are proposed to avoid the undesirable effects of temperature on the animals in the different stages of the road from the farm to the slaughterhouse: at pre-loading, during transport and upon arrival at the processing facility.

Key words: swine, meat, transport, ambient temperature

INTRODUCTION

The types and categories of animals raised for human consumption vary from continent to continent and from country to country, but in principle, they are raised and exploited for meat, approximately the same species of animals and birds all over the world: bulls, buffaloes, sheep, goats, swine, birds and rabbits [14,15].

The improvement of transport conditions at processing units for animals intended for slaughter has effects of primary importance for the meat-producing industry:

- a. improving animal welfare from the farm to the slaughterhouse;
- b. ensuring appropriate ante-mortem rest conditions [11,12,20];
- c. on the technological flow of obtaining carcasses and meat [3,13];
- d. of farm productivity [1,19] and recovery yields;
- e. of the safety of meat and meat products consumers [2,16].

Improving animal welfare conditions from farm to processing facility and in the processing facility to carcasses is necessary to reduce stress, suffering, in line with the increasingly welfare-conscious demands of consumers, governments and NGOs, which cares more and more about the welfare of animals, which is possible through:

- designing a marketing and payment system that involves those in the field and/or organizations to answer for losses caused by non-compliance with the principles of animal welfare in their handling and transport and on the technological flow of obtaining meat;
- efficient and safe organization of transport, temperature control;
- training and qualification of the human resource that performs the transport, the care of animals after transport and the slaughter of animals;

Improving farm productivity, obtaining quality meat and high yields at slaughter means increasing the quantitative and qualitative value of meat by:

- improving the integrative management of production;
- decrease in the number of excoriations, bruises or injuries during boarding, disembarking, resting or when introducing animals to the stunning aisles [4,5];

- reduction of animal stress throughout the process of obtaining carcasses and meat [6, 10];

- reduction of casing damage on the conveyor;
- decrease in the mortality rate on boarding, during transport or before slaughter;

Improving the safety of workers in animal husbandry and the meat industry is possible by ensuring better conditions regarding transport safety, technological control of the animals conditions at the arrival at slaughterhouse, ensuring the safety of the personnel dealing with animal handling, compliance with the quality and hygiene conditions of the meat in slaughterhouses, obtaining carcasses and quality meat from healthy animals, not stressed, not contaminated with pathogenic germs [7,9,18] so as to ensure consumer safety and make it competitive on the meat market. For proper management of the agents that cause the pain requires collaboration between farmers, who must have the necessary knowledge in the field, have experience in the field, have self-confidence, have personality, be able to reduce dissonance, be empathetic, be able objectively identify value and non-value and respond positively to social pressure regarding animal welfare, veterinarians, scientists and specialized people [8,15,17].

MATERIALS AND METHODS

Achieving quality meat production can only be assured by controlling the welfare of the animals from the boarding from the production farms until the carcasses and meat are obtained in the processing units, which implies the implementation of the best management of the transport and preparation of the animals before of sacrifice. Within this scientific approach, the aim was to find solutions to improve the well-being of swine destined for slaughter by controlling the quality of the transport means, ensuring temperature conditions and avoiding tissue degradation through bruises, excoriations or other trauma. Solutions to improve well-being by controlling temperature and losses of transport, considered the methods of assessment applicable to fattening pigs, proper management according to weight, optimal number and collaboration with the transporter and processor to obtain quality carcasses.

RESEARCH RESULTS

Obtaining quality carcasses and meat requires concrete solutions to improve the welfare of the animals from boarding, transport and up to the utilization of the meat on the market according to consumer preferences. The managerial measures proposed for implementation will consider the following aspects:

- the application of biotechnologies and genetic selection to help meet consumer needs by raising and exploiting swine that adapt well to transport, temperate climates and antemortem maintenance conditions, as environment and breed affect some meat quality attributes;

- reducing the gap between old developments in the field and existing knowledge in order to create new methods for assessing welfare during the arrival of animals at processing units;

- establishing the path to follow in improving the welfare of the animals, their quality of life during the transport period and the preparation for slaughter in order to obtain good quality meat;

- proper weight management and optimal number of animals to be transported and collaboration with the transporter to deliver live animals suitable for slaughter;

- careful and serious intervention in the case of farm animals that have damaged skin, lameness, because lameness influences the welfare of the animals, reduces productivity and affects the quality of the carcass after slaughter;

- the prioritization of animal welfare control which must start on boarding from the farm, continue during transport from the farm to the slaughterhouse and be sustained at the slaughterhouse to produce healthy meat from stress-free animals;
- productivity can be improved through advances in various phases of production systems – from conception to consumption – by adopting new technologies;
- the selection of stress-resistant genes to solve the problems faced by the processing industry, since genomic selection would improve the proportions of the valuable portions of the carcass;
- proper training of the staff could reduce the animal's fear during embarkation-disembarkation, pain and could decrease avoidance behavior and improve productivity;
- the use of modern production systems for good hygienic meat production practices.

The environmental temperature, the lack of welfare during the arrival of swine at the slaughterhouse has effects on animal losses and the quality of the meat obtained by slaughtering them. Animal transport is undoubtedly the most stressful and damaging stage on the way from the farm to the slaughterhouse and contributes significantly to a low level of animal welfare and production losses. Improper transport can have serious detrimental effects on animal welfare, production and meat quality. The effects of transport and loading and unloading animals from farm to slaughterhouse include the following accidents on which we have systematized as follows:

- mortality during transport because swine are sensitive to high temperatures and humidity;
- stepping on more sensitive animals if the floor of the trailer is not rough due to overcrowding in curves;
- dehydration if the trailer is not equipped with water sources and the transport is carried out over distances greater than 40-50 km;
- exposure to the sun affects the fat pigs, they can get sunstroke if the pens are not provided with shade;
- pigs that have not been fed 12 hours before boarding may suffer during transport;

To avoid these inconveniences, we recommend that at high temperatures, when the risk of heat stress and mortality during transport increases, the animals should be at the slaughterhouse during the cooler mornings and evenings, or even at night. This is especially important in case of swine because the combination of high humidity and high temperatures is deadly for them. Heat can quickly build up to lethal levels in a stationary vehicle: therefore dousing pigs with water helps to cool them down. Also, wind blowing on wet animals being transported in cold weather causes chilling: body temperature is considerably reduced leading to severe stress or even death. Swine must be hydrated before transport in hot weather to prevent heat stress, as they do not have functional sweat glands:

- problems with thermal stress can start to appear at 16°C;
- at 32°C the death losses during transport are almost double compared to those at 16°C.

In order to avoid the stress caused by the heat during the transport of swine to the slaughterhouse, we propose for implementation in professional farms the following managerial measures to avoid the unwanted effects of temperature on the animals during the different stages of the journey from the farm to the slaughterhouse:

1. pre-transport and loading, period during which:
 - the combination of high heat and high humidity will reduce the density of the animals on the trailer by 15%, and the landing will be done in the morning or at night;
 - disconnect the ventilation holes;
 - the ventilation holes are opened;

- animals are loaded quickly to avoid heat build-up;
- pigs are watered at temperatures above 27°C after loading:
 - o excessive watering is avoided to prevent the increase of humidity;
 - o water is used for short periods to avoid shock;
 - o air movement is ensured for evaporative cooling with the help of air currents;
- 2. during transport:
 - stops are avoided;
 - overheating is prevented by ventilating the air in the trailer;
- 3. arrival at the processing unit:
 - sufficient boxes are provided for rest;
 - pigs are unloaded in small batches to avoid overheating;
 - they are provided with water at their discretion
 - wet the fat pigs with water for cooling and toileting.

CONCLUSIONS

Improving animal welfare conditions from the farm to the processing facility and in the processing facility until the carcasses are obtained is a necessary measure to reduce the stress and suffering of swine in accordance with consumer requirements, which is possible by designing a marketing system and payments, the organization in conditions of efficiency and security of transport and the training of qualified personnel for animal handling, embarkation-disembarkation and in the swine processing industry. To avoid the stress caused by high temperatures when the risk of poor welfare and mortality during transport increases, the animals will be in the slaughterhouse during the cooler mornings and evenings or even at night, this is particularly important for pigs because the combination of humidity high – high temperature is deadly . The heat stress problems start at 16°C and mortality losses double at 32°C during transport as heat can quickly build up to lethal levels in a stationary vehicle therefore watering pigs with water helps to cool them down along with the management measures proposed at pre-boarding, during transport and upon arrival at the slaughterhouse.

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