POSSIBILITIES TO IMPROVE THE MANAGEMENT OF SWINE MEAT PROCESSING

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Abstract: *In order to improve the management of swine meat processing, it is necessary to implement measures to improve the management of inflow the fattening of pigs at the slaughterhouse and the antemortem waiting time, in order to obtain quality carcasses and meat. Regarding slaughtering technology it is necessary to improve a number of operations throughout the technological flow, by implementing managerial measures on preparing pigs for slaughter, life suppression, initial processing, carcass processing, veterinary examination, marking and classification of carcasses; and refrigeration and freezing methods. In order to improve the hygienic quality of swine meat, preventive measures will be implemented which to reduce the incidence of contamination throughout the carcass flow that will also improve swine meat.*

Key words*: swine, management, processing, meat quality*

INTRODUCTION

The major objective in raising and exploiting swine is represented by the obtaining some large quantities of high quality meat under economically advantageous conditions, because the productions: [2, 7, 9, 13, 20]

- potentials are determined by genetic factors and are based on sex, race, line, sow milk production, number and weight of weaned piglets, precocity and power of feed capitalization, health status and maintenance;
- real, obtained under the actual conditions of exploitation, being the real production as close as possible to the potential production, which is possible only when they are ensured adequate maintenance conditions, nutrition, correlated with the degree of improvement of the biological material;
- economic, when meat production is effective only when there is a perfect correlation between the value of the animals exploited and the technologies of growth and exploitation.

In order to obtain a quality meat on the entire production, processing and distribution flow, managerial measures on the following activity levels are necessary: [1, 4, 15,16, 18]

- in growing and fattening farms;
- on boarding the fattening pigs for slaughter;
- during transport of fattening pigs to the slaughterhouse;
- at the unloading of the fatty pigs in the slaughterhouse;
- on the technological flow of obtaining the carcasses;
- in the meat storage spaces, refrigeration and freezing facilities.

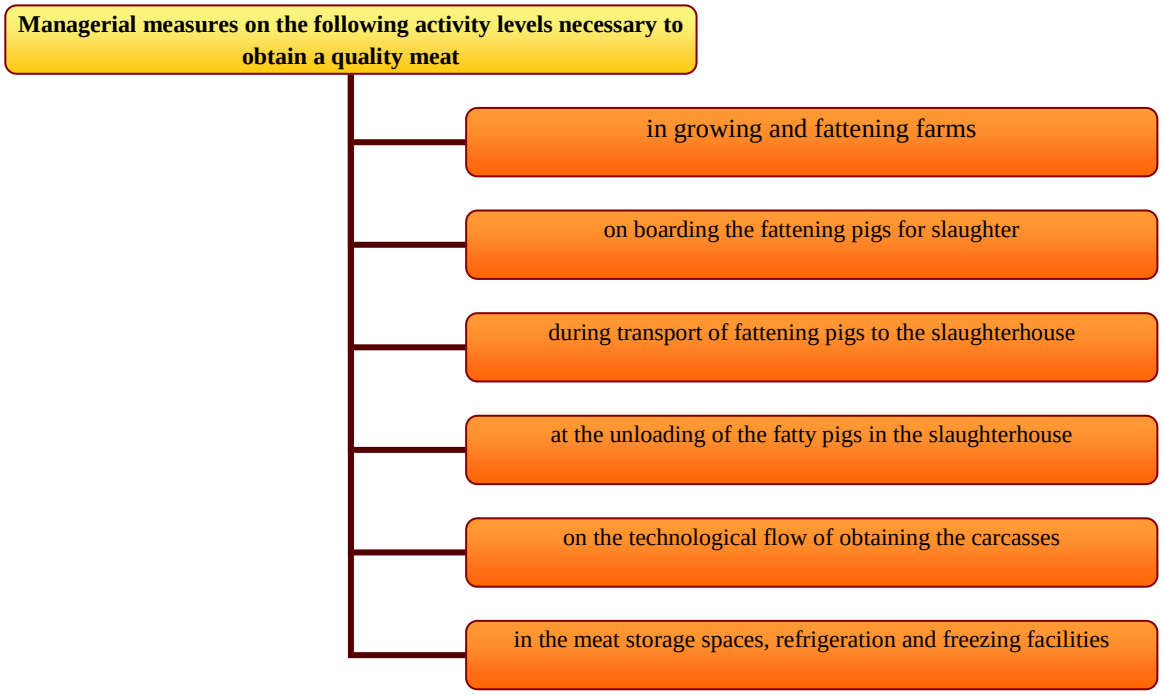

Figure 1. Managerial measures on the following activity levels necessary to obtain a quality meat

At the embarking on fatty pigs, there will be some aspects that will have a favorable or unfavorable influence on the meat and the economy of the fattening farm: [3, 5, 6, 17, 19]

- the quality of the means of transport, in order to avoid the deterioration of the carcasses obtained;
- 12-hour nutritional post of animals, for livestock feed economy;
- providing water to avoid dehydration;
- the quality of boarding and caregiver behavior to avoid stress and lactic acid accumulation in muscle;
- compliance with air temperature and pressure conditions;
- compliance of rest breaks, regarding the transportation on long distances;
- compliance of sanitary-veterinary norms regarding the approval of transport through certain areas.

The effects of transport are complex, influencing: body weight, health, meat quality and economic efficiency. Inappropriate transports cause changes in the quality of the meat: oxidative myopathy; changes in organoleptic characteristics of meat, in particular color and consistency; accumulation of metabolic products in muscle tissue, decreased glycogen from muscle, increased meat acidity. [8, 10, 11, 12, 14]

Within the slaughtering technology, a series of stages and operations are distinguished, each step described below requiring a series of operations that can be improved by implementing managerial measures:

- preparing pigs for slaughtering;
- suppressing the life of the swine,
- initial processing;
- carcass processing;
- veterinary examination;
- marking the carcasses;
- weighing and classification of carcasses;
- refrigeration or freezing of carcasses.

MATERIALS AND METHODS

In order to improve the management of the processing of swine meat, in this scientific approach we propose to implement managerial measures specific to each technological link, which contributes to the improvement of the production and the quality of the meat in the swine, to maintain the optimal parameters of the meat quality throughout the technological flow of production and minimize the changes that may occur during boarding of fattening pigs, during transport, during rest period until slaughtering and throughout the obtaining flow of the carcasses and meat.

RESEARCH RESULTS

For the improvement of the transport management of the fatty pigs to the processing unit, is required a good programming, organization and coordination of this activity. Programming the transport of fatty pigs is an action with zootechnical, veterinary and economic implications, and for a good success, a series of measures to be carried out must be designed:

- determining the number of animals to be inflow at the processing unit;
- number of shipments to be carried out;
- modalities of transport;
- procurement of transport documents;
- the conclusion of contracts between manufacturers and transporters, processors.

To improve the management of the transport of swine to the slaughterhouse, we propose that the means of transport to be equipped with the following equipment (systems), in order to create optimum conditions for obtaining a quality carcass and meat: (Figure 2)

- watering systems;
- cooling systems;
- air temperature and air monitoring systems;
- alert alarm systems;
- warning systems for rest pauses, when transport is made on long distances.

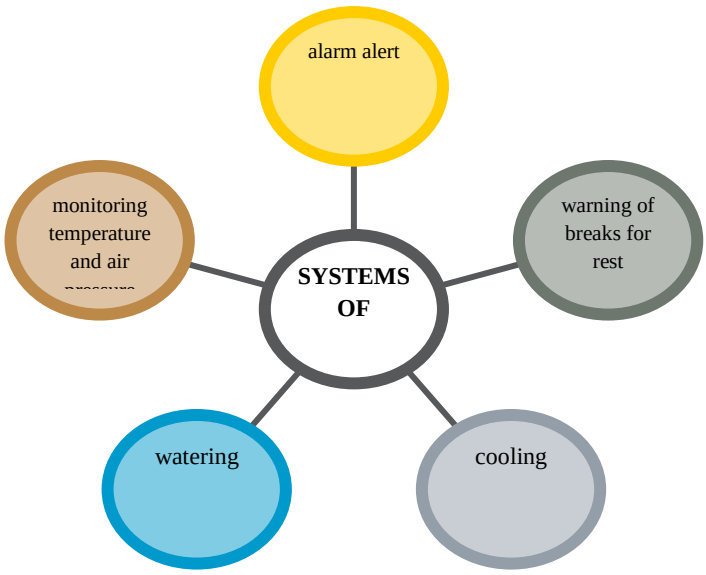

Figure 2. Measures to improve the management of pigs transport to the laughterhouse

At the debarkation of pigs at the slaughterhouse, several measures are required to be implemented, with the main purpose to:

- reduce economic losses by obtaining low-quality meat;
- reduce outputs from the flock by death;
- get quality carcasses and meat.

We propose some measures to improve transport management to obtain quality carcasses:

- stress avoidance at debarkation;
- avoiding the accumulation of lactic acid in the muscles, by reducing the distances to the resting rooms;
- the location of resting areas in quiet areas away from the technological flow to ensure animal welfare;
- ensuring the animal rest for at least 2-12 hours until slaughter;
- water and temperature optimization for comfort until slaughtering;
- the accommodation of fattening pigs in boxes on lots and farms;
- animal surveillance to avoid altercations.

In order to improve the welfare of fed pigs subjected to transport, we propose some solutions for obtaining quality carcasses:

- the use of specialized trials on animal categories;
- equipping trailers with compartments;
- outsourcing the transport, using for inflow to slaughterhouse a modern logistic;
- reducing the effects of climatic conditions by improving the design, reducing tremors' abrasions and injuries and color, to reflect the sun's rays;
- inflowing animals to the slaughterhouse at night or in the morning with high temperatures;
- the use of some gentles systems for embarking and debarkation of pigs to avoid carcasses damage.

In order to obtain quality carcasses, we propose to be implemented in processing units' management measures on the technological flow of pig carcasses.

In the first two stages, of the technological process of slaughtering, preparing the swine for slaughtering and suppressing life, we propose some management measures, which besides those known and implemented in the authorized slaughterhouses, will contribute to obtaining quality carcasses and meat:

- observance of rest time, minimum 6 hours in winter and 16 hours in summer, for pigs for slaughtering, to reduce the amount of lactic acid in the muscles and the disappearance of the fatigue state during transport;
- keeping the diet for at least 24 hours, in order to empty the digestive tract, and to properly process the internal organs.

a) Interruption watering 4 with hours before suppressing the life of swine, to minimize the need for technological water on the head of slaughtered animal. The proportion of water is reduced from the meat, which results in the absorption of a large amount of water by the meat;

b) There are no significant differences regarding the water content of the meat, depending on the weight at the slaughtering to more than 150 kg, because fat accumulates in the meat and increases the proportion of the dry matter, which reduces its mildew and succulence;

c) Meat obtained from animals slaughtered at high weights is not suitable for unprocessed consumption due to the thickness of the

muscle fibers and the lower degree of marrow and perception.

d) Modification of the ratio of polyunsaturated and saturated fatty acids;

- necessary sanitary-veterinary control, to check the health status of animals before suppressing their lives;
- animal hygiene by slow passage on wash lanes, through stunning and bleeding, to prevent contamination and to obtain hygienic carcasses;
- the bleeding recommended by us is on horizontal for 7 minutes rather than vertically because: it reduces stunning time; bleeding is more complete; reduces installation time for early stiffness; do not occur fractures; are minimized skin puncture bleeding.

Bleeding should be performed in a short time after stunning for a maximum of 15 seconds.

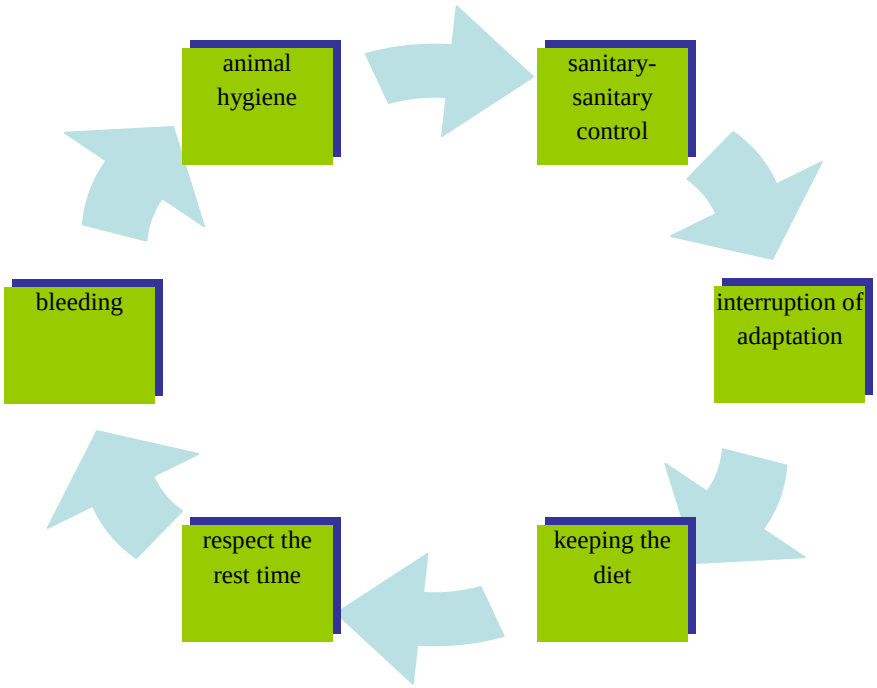

Figure 3. Measures to improve management in the stages of preparing and suppressing the life of the pigs

In the initial processing stage, must be strictly the recommended rules regarding:

- scalding times;
- water temperature;
- scorch;
- scraping;
- washing.

In the case of carcass processing, the main operations to be performed are:

- evisceration, by cutting the body on the abdominal line, for the separate recovery of the viscera. We recommend vertically eviscerating and recovering the viscera in individual dumbbells so that they can be examined and could be preserved their integrity. We propose that the deadline from suppressing life until evisceration and harvesting of viscera to not exceed 35 minutes;

- splitting the carcass is made on the vertebral column from top to bottom. We recommend mechanical splitting on the edge of the medulla in a straight line, to give the

vertebrae a glossy appearance and no scraps of bone and leave the spinal cord intact;

- trimming the carcass has the purpose of removing blood clots and impurities and collecting the marrow and kidneys;

- the sanitary veterinary examination is carried out throughout the cutting process and is aimed at: inspection of the carcass and meat quality by palpation, sensory and laboratory tests.

- classification and marking of carcasses;

- weighing and charging, refrigerating, on the conveyer, for a period of 6 hours until it is introduced into the refrigeration tunnel;

- analysis of cutting results.

To improve the hygienic quality of swine meat, we propose implementing the following managerial measures

Hygienic quality of meat from swine is related to its load of germs and depends on a number of factors that are not well managed throughout the meat production pathway. This factors are:

1. The factors to which the swine are subjected during the growing and exploitation period:

a). the quality of fodder administered;
b) the quality of the drinking water;
c) the body hygiene;
d) the quality of the transport;
e). ante-mortem activities.

In order to improve the factors that depend on the animal, we propose to be implemented some management measures that will contribute to improving the hygienic quality of swine meat:

- hygiene of the skin of the animals by washing with water;
- reducing transport stress;
- ensuring optimal physiological conditions for animals before slaughtering;

2. Factors involved in the technological flow of obtaining swine carcasses:

a) slaughtering technology,
b). the equipment's hygiene and their quality;
c). the hygiene from the technological flow;
d). the workers hygiene.

Since microorganisms develop differently, preventive measures are required, which to reduce the incidence of contamination on the technological flow of the carcasses:

- ante-mortem measures to prepare animals for slaughtering in compliance with nutritional and hydric conditions, rest, body hygiene;
- preparation of the technological flow: hygiene and decontamination, training of workers, verification of their state of health, use of work equipment;
- technical equipment of the premises with contaminated machinery, hooks for organs, individual strollers for the digestive tract;
- separation on the flowing stream, of dirty, clean and avoidance intersection;
- cleaning of carcasses by washing, to remove impurities and germs;
- post-mortem measures for storing and keeping swine carcasses complying with the maturing conditions of the meat, which vary depending on the preservation temperature.

For proper maturation of meat, we recommend that some management measures to be implemented:

• bleeding of the swine should be as complete and horizontal as possible;
• avoiding dead times on the technological flow and minimizing the prolonged

hanging of carcasses on the conveyer to avoid muscle contraction;

• obtaining carcasses, and avoiding cold water washing, which causes muscle contraction;

• controlling the pH of the meat;

• temperature control on the technological flow of the carcasses until it is introduced into the storage tunnels;

• extending the time of introducing the meat into tunnels with at least 6 hours from their final processing;

• moving carcasses on the conveyer via ventilated areas for cooling before storage.

CONCLUSIONS

In order to improve the management of the transport of fattening swine to the slaughterhouse, programs for the organization, coordination and monitoring of this activity will be implemented because this action has major implications of zootechnical, veterinary and economic nature.

In order to obtain quality carcasses, we propose to be implemented management measures in processing units on the technological flow of pig carcasses. Within the first two stages of the technological process of slaughtering, preparing the pigs for slaughtering and suppressing life, we propose some management measures, which besides those known and implemented in the authorized slaughterhouses will contribute to obtaining quality carcasses and meat: water temperature; scorch; scraping; washing. In order to improve the hygienic quality of swine meat, we propose the implementation of management measures related to the germ load throughout the whole meat production line.

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