WELBEEF: production of management guidelines for the pre-slaughter of calves to improve welfare and reduce the incidence of DFD and petechiae

Summary

At the sector meeting in April 2018 (4th Meeting of the calves working group) attended by various representatives of the fattening cattle sector, the project chose factors in pre-slaughter and the reduction of petechiae and DFD in meat as a priority. Meat quality may be negatively affected by pre-slaughter conditions. Pre-slaughter involves all the changes in conditions and activities that take place prior to slaughter, including changes in environmental temperature, the loading and unloading of calves on the farm and at the slaughterhouse, their transportation, mixing of animals, the waiting time at the slaughterhouse, the type of slaughter, etc. Many studies show that the stress that animals experience during these changes of conditions and activity varies depending on their duration and intensity, and increases the negative effects on meat. Stress and physical activity deplete muscle glycogen, leading to an increase in pH that changes in the physical appearance of the meat, leading to meat that is DFD. The WELBEEF project therefore aims to improve and evaluate pre-slaughter practices that are closely related to animal welfare (**WEL**fare) and which have a direct impact on the quality of meat and the carcass (**BEEF**).

Objectives

The ultimate aim of the WELBEEF project is to produce a management guide for the pre-slaughter of fattening calves in order to improve animal welfare and reduce the incidence of DFD meats and petechiae, i.e. to improve the quality of meat and its shelf life. A series of specific objectives were established to achieve this goal, based on three phases that include some of the pre-slaughter factors:

a) determine the effect of heat stress and assess pre-slaughter heat reduction strategies on the farm

b) assess the effect of pre-slaughter waiting time for short and long transportation times and the effect of the breed

c) Study human-animal interaction in the handling between the waiting corrals in the slaughterhouse and the time of slaughter.

Description of the actions carried out in the project

Phase 1. Heat stress reduction strategies:

Activity 1.1. Identify how heat stress affects the behaviour and welfare of calves being slaughtered on the farm and evaluate heat dissipation systems

Phase 2. Human-animal pre-slaughter interaction:

Activity 2.1. Assessment of risk factors in pre-slaughter management

Activity 2.2. Degree of human-animal interaction during slaughter

Stage 3. Slaughterhouse waiting time based on transportation times and breed:

Activity 3.1. Slaughterhouse waiting time and long-distance transport

Activity 3.2. Slaughterhouse waiting time and short-distance transport

Final results and practical recommendations

Phase 1. Heat stress reduction strategies:

- The use of blade fans installed between two corrals on the farm reduces the calves' growth, increases feed consumption, and increases the length of time the animals stand under the fans. The layout of the fans for this study was not a good strategy to improve the production, comfort and animal welfare of the calves.
- Although in terms of production there was a decline in growth among calves housed in sheds with fans, the pH of the carcasses was lower in this group of animals.
- The use of fans reduced the level of dirt in the corrals, and reduced the moisture content of the manure. Using fans could therefore be a strategy to reduce the use of straw and lengthen the time between stall cleaning days by farm staff.

Phase 2. Human-animal pre-slaughter interaction:

- We created a protocol for electrical stunning so that with an amperage higher than 1.5 A and a frequency of 50 Hz applied for 3 seconds, the stunning is long enough for the animals to undergo religious slaughter, and the onset of normal rhythmic breathing does not take place.

Stage 3. Slaughterhouse waiting time based on transportation times and breed:

- The slaughterhouse waiting time has a fairly limited effect on meat quality parameters such as pH, colour, colour stability in MAP, and microbiological contamination after both short and long transportation from the farm to the slaughterhouse.
- The animals' behaviour during the waiting time varies depending transportation time between the farm and the slaughterhouse. With short transportation times, the calves' activity declines over time, while with long transportation times they begin to become more active after 3 hours' waiting, which may be related to the longer period of time the animals go without eating.
- The breed of the animals has an impact on meat quality parameters. Crossed calves are more likely to have DFD carcasses, and their backs are less bright and more prone to red and yellow colouring.

Conclusions

After assessing some pre-slaughter practices closely linked to animal welfare with direct consequences for the quality of meat and carcass, the WELBEEF project can conclude that:

1) We need to improve the strategies at farm level to improve animal welfare without having any negative effects on production.

2) Electric stunning in calves could be a method for improving animal welfare before religious slaughter.

3) Reducing or extending the slaughterhouse waiting time has no effect on the carcass or beef quality.

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Subject area(s) of application

☐	Agricultural production system
☐	Agricultural practice
☐	Agricultural equipment and machinery
☒	Livestock farming and animal welfare
☐	Vegetable production and horticulture
☐	Landscape / Territorial management
☐	Pest and disease control
☐	Fertilisation and nutrient management
☐	Soil management
☐	Genetic resources
☐	Forestry
☐	Water management
☒	Climate and Climate Change
☐	Energy management
☐	Waste and by-product management
☐	Biodiversity and environmental management
☒	Food quality/processing and nutrition
☐	Supply chain, marketing and consumption
☐	Competitiveness and agricultural and forestry diversification
☐	General

Geographical area(s) of application

PROVINCE(S):
GENERAL: can be applied to all provinces with cattle livestock farming

REGION(S):
GENERAL: can be applied to all regions with cattle livestock farming

Dissemination of the project: publications, seminars, multimedia, etc. (State links)

EFFECT OF VENTILATION ON PRODUCTION PARAMETERS, ANIMAL ACTIVITY, AND CARCASS AND MEAT QUALITY IN FATTENING CALVES. *AIDA (2021),* XIX Seminar on **Animal Production, 255.**

https://www.aida-itea.org/aida-itea/files/jornadas/2021/comunicaciones/2021_SBA_05.pdf

209 - **THE EFFECT OF WAITING TIME AT THE LAIRAGE OF SLAUGHTERHOUSE OF HOLSTEIN BULLS AFTER A SHORT TRANSPORT ON ANIMAL BEHAVIOR, CARCASS QUALITY AND MEAT QUALITY. 2021** *ASAS-CSAS-SSASAS Annual Meeting & Trade Show*

https://www.eventscribe.net/2021/ASASAnnual/SearchByPresentation.asp?pfp=12MinuteTalksTitle

More information on the project

PROJECT DATES	TOTAL BUDGET
Starting date: July 2019	Total budget: €206,493.51
End date: September 2021	DARP funding: €84,389.61
Current status: Executed	EU funding: €63,662.34
	Own funding: €58,441.56

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Order ARP/133/2017 of 21 June, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ARP/1282/2018, of 8 June, announcing the call for the grant.

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