



## AFTER THE TRANSPORT OF CATTLE ON THE QUALITY OF MEAT

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### Abstract

The subjects of this paper are the influence of beef transportation time on the quality of beef meat and appearance of the DFD meat. Total of 20 beef from two farms on different distances were tested. The beef from the farm A were 20 km from the butchery, and the beef from the farm B 70 km. The average body mass of beef 520 kg. The influence of the beef transportation time and rest time on the quality of meat was examined by determination of pH- value of meat 45 minutes and 24 hours after slaughter. In beef from farm, a occurrence of DFD was 10% and from farm B 28%. On the bas of the obtained results, appearance of DFD meat was established, which indicates that transportation time had influence to this occurrence.

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**Key words:** beef meat, transportation pH. DFD

### INTRODUCTION

The cattle that are to be slaughtered are transported from their place of breed to the slaughterhouse by vehicles. Today most frequently used vehicles to transport the cattle are specially built trucks with a trailer for transporting the cattle. During the transport, many factors could influence bigger or minor consequences - physical thrill, psychological fatigue, loss of body mass and injuries (Dvorak, 1989; R. Rede, Lj. Petrovic, 1997).

The physical thrill of the animal occurs because of the change of environment, unfamiliar people, change of environment's temperature, the treatment of the cattle and mingling with other animals (B.Djinleski, 1985).

The cattle that are to be slaughtered are physically fatigued because of their movement to their place of loading, the pushing up with other animals, restraining balance during the breaking of the vehicle. The cultural breeds of cattle and pigs are most susceptible to this since they are raised in conditions of intensive breeding and their organism is not used to thrill and physical strain. Under the influence of these factors, these animals suffer from stress (Stojanovski, 2009).

During the transport the cattle could incur mechanical injuries. As a result of the overcrowded vehicle or the misplacement of the animals, they can often fall during the driving or the breaking of vehicle, thus inducing muscle straining, displacement of the ankles, infractions i.e. partial or total fractures of the bones ( K. Velkova Jorgova, K. Vasilev, St. Atanasov Dancev 1997).

According to many authors the best measure of the influence of the transport on the quality of the meat is the measuring of the pH 45 minutes and 24 hours after the slaughtering of the cattle and the occurrence of the so called dark form dry (DFD) meat (Rahelič et.al. 1965).. **The dark, form and dry meat appearance does** not imply to the whole body, but rather to some muscles or even parts of the muscles. They more frequently appear in cattle, while much more seldom in pigs and lambs( Lj. Petrovič et.al . 1988).

The aim of this study is to investigate the impact of the transport of large ruminant animals on the quality of their meat by measuring the pH 45 minutes and 24 hours after the slaughtering.

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## **MATERIAL AND METHOD**

We had used a total of 20 cattle from Simmental breed that had been transported to the slaughterhouse from two different farms. Farm A was on a distance of 20 km, while farm B was 70 km away. The animals had been transported from the farms to the slaughterhouse by a special truck for cattle. After the unloading, the live mass of the cattle had been measured to determine the transport waste. The average live mass of the cattle had been 520 kg.

The slaughtering and primary processing was conducted in accordance to all sanitary and veterinarian demands that are inaugurated in Republic of Macedonia for the procedure of slaughtering and primary processing of cattle. 45 minutes and 24 hours after the slaughtering the measuring of pH was performed by a special field pH meter from German production, Lu-Co. The pH was measured on the large back muscle (*Musculus Longissimus Dorsi*<sup>1</sup>).

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<sup>1</sup> A dorsal muscle on the back. It lies on top of the vertebra surface. Stretches along the collar, chest and flank part of the spine.



## RESULTS AND DISCUSSION

The transport waste of the cattle drove in from Farm A was 0.3%, while from Farm B it was 0.5%. The measurements of pH after 45 minutes and 24 hours of slaughtering showed results as in Table 1.

**Table 1**

pH values measured on cattle 45 minutes and 24 hours after slaughtering

| Farm A cattle                       |                                   | Farm B cattle                       |                                     |
|-------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
| pH after 45 minutes of slaughtering | pH after 24 hours of slaughtering | pH after 45 minutes of slaughtering | pH after 45 minutes of slaughtering |
| 6.35                                | 5.72                              | 6.42                                | 6.10                                |
| 6.29                                | 5.58                              | 6.34                                | 5.72                                |
| 6.12                                | 5.52                              | 6.28                                | 5.82                                |
| 6.41                                | 6.22                              | 6.42                                | 6.11                                |
| 6.18                                | 5.59                              | 6.35                                | 6.01                                |
| 6.48                                | 5.43                              | 6.34                                | 5.81                                |
| 6.38                                | 5.62                              | 6.28                                | 5.72                                |
| 6.35                                | 5.45                              | 6.36                                | 5.54                                |
| 6.22                                | 5.64                              | 6.29                                | 5.52                                |
| 6.19                                | 5.54                              | 6.44                                | 5.58                                |
| <b>6.30</b>                         | <b>5.63</b>                       | <b>6.35</b>                         | <b>5.79</b>                         |

The table shows that a  $pH_s > 6.0$  is more present at the cattle from Farm B which is 70 km from the slaughterhouse than at cattle from Farm A which is 20 km away. If we accept that a  $pH > 6.0$  is a certain parameter for the occurrence of dark, firm and dry meat then we should acknowledge its more frequent presence at the cattle from Farm B (28%) compared to the cattle from Farm A (10%).

The achieved results are in correlation with the results from Rahelich and cap. that researched the variations of pH in *Musculus Gracilus* and *Musculus Longissimus Dorsi* up to 48 hours post mortem.

The dark, firm and dry meat appears as a result of the tightly dissolved water and looks dry and even sticky. Its color is darker than the one of the normal beef meat. This meat is darker due to higher absence of liquids in the intercellular space thus reflecting less light i.e. more of the light is absorbed in the depths of the miofilaments. The most significant characteristic of the dark, firm and dry (DFD) meat is the presence of a dark color on its surface (the myoglobine does not oxidates into oxymyoglobine).

The statistical processing of data showed no existence of statistically important deviations between the groups where pH was tested 45 minutes and 24 hours after slaughtering ( $p > 0.05$ ).

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## CONCLUSIONS

All previously said facts lead to the conclusion that the length of transport of cattle for slaughtering has an impact on the quality of the meat. The impact of transport on the quality of the meat is best determined by the measurement of pH 45 minutes and 24 hours after the slaughtering. The cattle transported from Farm A to the slaughterhouse showed 10% occurrence of DFD, while the cattle transported from Farm B showed 28% occurrence.

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