DETECTION OF CENTRAL-NERVOUS-SYSTEM (CNS) TISSUE ON CATTLE CARCASSES AFTER SUCKING OFF THE SPINAL CORD TISSUE AND SPLITTING

F. Schwägele, M. Moje, K. Troeger, Honikel, K.O.
Federal Centre for Meat Research, D-95326 Kulmbach, Germany

Background

Central-Nervous-System (CNS)-tissue may contain modified Prion Proteins (PrP^{sc}). During the slaughter process of cattle CNS-tissue may contaminate the carcass surface during the splitting of carcasses. Either the removal of CNS before splitting or the Omission of splitting can avoid contamination. The effectiveness of the sucking off the spinal cord with a vacuum cleaner lance probe before splitting the carcass is investigated.

Objectives

CNS-tissue can be detected with an ELISA test on Glial-Fibrillary-Acidic-Protein (GFAP) as a marker for CNS tissue (Schmidt et al., 1988; Lücker et al., 2000). The test is suitable for many species. In a cattle slaughter line it is able to detect the occurence of cattle CNS on the carcass surface if the tissue is not totally removed by sucking off the spinal cord before splitting the carcass with a saw and spilling by the saw action.

Methods

In a commercial slaughter line 100 carcasses were randomly chosen. After dehiding, evisceration and cutting off the head a vacuum-cleaner-lance-like-device is inserted in the spinal cord channel. After that the carcass is split by a rotating saw. Saw and device are cleaned after each carcass. After 40 carcasses the whole setup is exchanged. Behind this position in the line the surface contamination was checked by touching with cotton pads according to the positions in fig. 1.

The contamination with tissue was detected with a sandwich enzyme immunoassay (ELISA test) for GFAP of the Ridascreen® Risk Material Test 10/5 of r-biopharm, Darmstadt, Germany in a 96 hole microtitre plate. The limit of detection of GFAP is about 0.1 % CNS contamination in the sample.

Results and discussion

Table 1 shows that a contamination of the outside position was not occuring. 10 % of the paramedian outside positions, however, near the site of splitting showed positive results.

This is totally different to the interior site of the carcass (table 2). On the lowest point where the head was cut off 34 % of the samples were positive. This is small in comparison to the higher positions starting already in shoulder position. About 80 % of the samples exhibited a contamination of CNS.

This result shows that the used vacuum lance was not able to remove all CNS tissue from the spinal cord. Furthermore the rotating saw even with a continous flow of water spills CNS mainly on the inside of carcass.

An improved vacuum system may improve the situations. A 100 % CNS tissue free carcass surface is however unlikely if the carcasses are split by rotating saws.

table 1. Detection of CNS-tissue at the exterior site of carcass; carried out on 20 carcasses

sampling position (see fig. 1a, b)	CNS detection, % positive samples
shoulder outside (b1)	0
shoulder para median (b2)	10
hind leg outside (b3)	0
hind leg para median (b4)	10

table 2. Detection of CNS-tissue at the interior site of carcass; see fig. 1, each sampling was carried out on 100 carcasses

sampling position	CNS detection, % positive samples
cutting point of head (a1)	34
channel of spinal cord, cranial (a2)	**79**
neck tissue surface (a3)	**82**
channel of spinal cord, caudal (a4)	**80**

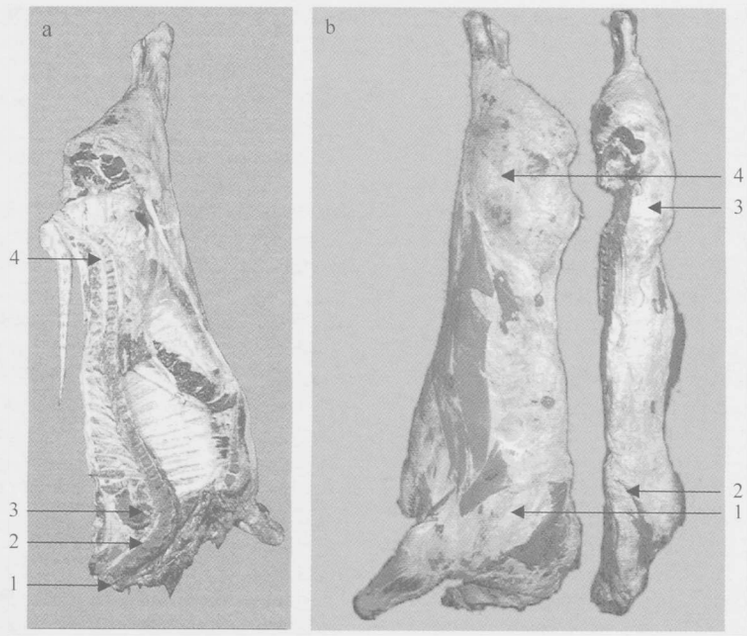

Fig. 1 Positions of sampling for the detection of central nervous system (CNS) tissue on beef carcasses for sandwich – ELISA
a) Interior site of carcass, b) exterior site

References

Lücker, E., Horlacher, E., Eigenbrodt, E. und M. Bülte (2000): Verfahren zum Nachweis von im Hinblick auf BSE unerwünschten Zutaten in Fleischerzeugnissen, Fleischwirtschaft 5, 74-77.

Schmidt, G.R., Hossner, K.L., Yemm, R.S., Gould and J.P. O'Callaghan (1988): An Enzymelinked Immunosorbent Assay for Glial Fibrillary Acidic Protein as an Indicator of the Presence of Brain or Spinal Cord on Meat. J. Food Protect. 62, 394-397