Opinion of the Scientific Committee on Veterinary Measures relating to Public Health - Safety of slaughter practices and methods : risk of spread of BSE infectivity through cross contamination of different tissues by using pneumatic stunning during the slaughtering process of ruminants - 17 February 1998

SLAUGHTER OF RUMINANTS USE OF PNEUMATIC STUNNING WITH AIR INJECTION

Terms of Reference:

The Committee was asked to provide an opinion on the safety of slaughter practices and methods with special reference to the risk of spread of BSE infectivity from the central nervous system (CNS) through cross contamination of different tissues by using pneumatic stunning with air injection during the slaughtering process of cattle. The Committee extended its evaluation to the slaughtering process of ruminants in this respect, because of the potential risk of infection of small ruminants with the BSE agent.

Background:

Slaughter of animals reared for food must be carried out in a way which causes no unnecessary pain or suffering. The humane killing of animals is a two stage process. First the animal must be effectively stunned which renders it insensitive to pain and renders it unconscious until death follows by exsanguination from severance of the major blood vessels of the neck. The captive bolt is a stunner and not a killer which requires the stun to be followed immediately by bleeding and, or, pithing.

Mechanical stunning is by a captive bolt, which is either non-penetrative or penetrative propelled by an explosive charge or by compressed air. There is a wide variety of captive bolt stunners available. Non-penetrative stunners have a "mushroom-headed" bolt which impacts with the skull but does not enter the brain, causing the stun due to concussive forces alone. Penetrative stunners cause insensibility due to the concussive blow to the skull, and the physical damage resulting from the entry of the bolt into the brain.

There is in addition a model of penetrative stunner which provides a blast of air through the centre of the bolt following entry into the brain which is intended to also "pith" the animal immediately after the stun. It is this pneumatic stunner with air injection which is the subject of this report.

Consideration:

Although there is only limited quantitative information about the actual use of pneumatic stunners with air injection, the Committee considered that they are not commonly used in the EU. However, since the BSE infectivity is by far the highest in the CNS of ruminants less than 1 gram of infected brain can infect a cow by the oral route the risk of introduction of CNS material into other tissues by the use of pneumatic stunning with air injection, should be seriously considered.

When, following the use of a penetrating captive bolt, and insertion of a pithing rod, which has been seeded with labelled *E. coli* organisms, has been used, these labelled organisms were later recovered from deep muscle (Mackey, B.M. and Derrick, C.M. (1979)).

Penetrating captive bolts are available, which can be used satisfactorily, without the need for air injection.

The use of an injection of high pressure air into the brain produces a significant blow back of brain tissue. This produces a smearing of the head of the animal with liquefied brain. The use of this stunner again, following an initial effective

stun, leads to a massive quantity of liquefied brain exiting from the original bolt hole, thus heavily exposing abattoir workers to this material. Furthermore, it is reported that the operators and the slaughter premises very quickly become contaminated with this material.

Concern was expressed after it was shown that the injection of high pressure air into the brain lead to the finding of fragments of brain tissue in, for example, the lungs (Garland & others 1996). Since the heart is still beating following the discharge of the pneumatic stunner, and actual brain tissue damage is the intention of the equipment used, there will be rupture of blood vessels within the cranium which will allow the spread of potentially infectious material (Mackey and Derrick 1979, Garland 1997).

It is therefore not unlikely that brain material will enter the blood circulation as a result of this procedure. Following entry into the venous circulation and passing through the right side of the heart the first organs in which the brain tissue would lodge would be the lungs. It is possible that this would not stop all the brain tissue and particles would then enter the arterial circulation from the left side of the heart with possible distribution to any part of the carcass (Mackey, B.M. and Derrick, C.M. (1979)).

Summarising conclusion:

The Committee considered that the use of pneumatic stunning with air injection, to render cattle insensitive to pain at slaughter, may well increase the risk of dissiminating potentially BSE infected CNS tissue throughout the body. Whether or not this would allow the introduction of sufficient amounts of material to actually transmit the BSE agent is not known at present. In addition there is concern about the dissimination of other pathogens. Furthermore, it has been shown that this procedure may result in the contamination of slaughter premises with CNS material.

Although the published information about this tissue is limited, the Committee consider it wrong at present, with the ready availability of effective alternatives, to use pneumatic stunners with air injection in the slaughtering process of ruminants. It recommends further studies to determine the possible risk of such procedures in relation to the dissemination of the BSE and other infective agents.