Animal Welfare at Transport and at Slaughter of Livestock and Poultry

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Plan of the talk

- Animal welfare assessment (general principles)
- Assessing animal welfare during transport
- Some welfare problems during transport
- Animal welfare at slaughter
- Concluding remarks
**General principles:**

- AW indicators must be reliable, valid and practical
- Animal based vs. environment based indicators
- There is no AW indicator that can be used on its own
- AW indicators must cover different approaches to welfare
What is animal welfare?

Definition of animal welfare
Duncan and Fraser (1997)

- Feeling-based
- Functioning-based
- Animal’s inherent “nature”
What is animal welfare?

The five freedoms concept

- Freedom from thirst, hunger and malnutrition
- Freedom from discomfort
- Freedom from pain, injury and disease
- Freedom to express normal behaviour
- Freedom from fear and distress

What is animal welfare?
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Animal based AW indicators in transport

- Physiological indicators
- Behavioural indicators
- Lesions
- Meat and carcass quality
- Mortality
Cortisol /corticosterone levels

- Free vs. total glucocorticoids
- Large individual variability
- Biological rhythms
- Effect of sampling on glucocorticoid levels
Acute phase proteins

Disease -> Tissue damage

Monocytes Macrophages

Cytokines

Acute Phase Proteins

↑ Positive    ↓ Negative

Acute phase proteins

Short (3 h) vs. long (20 h) transport

Results:

Cortisol: no differences

APP: long > short

(Saco et al 2003)
Behaviour
Lesions caused by handling

• Rough treatment of animals

• Animals slipping or falling
Lesions caused by other animals

- Fighting or mounting due to mixing.
- Competition for space or other resources (lairage)
<table>
<thead>
<tr>
<th>Skin damage</th>
<th>None</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>PQM</td>
<td>3.95</td>
<td>4.40</td>
<td>4.17</td>
<td>4.08</td>
</tr>
<tr>
<td>PHu</td>
<td>5.64</td>
<td>5.80</td>
<td>5.87</td>
<td>5.86</td>
</tr>
<tr>
<td>Lactate</td>
<td>105.4</td>
<td>119.1</td>
<td>124.9</td>
<td>126.4</td>
</tr>
<tr>
<td>Cortisol</td>
<td>7.6</td>
<td>8.2</td>
<td>8.8</td>
<td>9.5</td>
</tr>
<tr>
<td>CPK</td>
<td>3.7</td>
<td>3.9</td>
<td>4.0</td>
<td>4.2</td>
</tr>
</tbody>
</table>

(Guardia et al 2002)
- Stress before slaughter
- Halothane gen

- Sex
- Breed
- Fasting
- Activity and long-lasting stress
Exercise

Heat stress

Death

Genotype

Other sources of stress

DOA (pigs)
% of deaths during transport and lairage as affected by the halothane gene

- NN: 0.05% mortality
- Nn: 0.25% mortality
- nn: 9% mortality

11-fold reduction in mortality if the gen were eliminated

(Fàbrega et al 2002)
HR of Nn y NN pigs during transport and loading

(Fàbrega et al 2002)
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### Possible causes of poor welfare

<table>
<thead>
<tr>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling</td>
</tr>
<tr>
<td>Mixing</td>
</tr>
<tr>
<td>Novelty</td>
</tr>
<tr>
<td>Movement of the vehicle</td>
</tr>
<tr>
<td>Microclimate</td>
</tr>
<tr>
<td>Lack of food and water</td>
</tr>
</tbody>
</table>
Driving type / Road conditions

· Road conditions
  (accelerations > 7 m/s²)
  Smooth       0,8 ± 0,1
  Rough        15,1 ± 3,2

(p<0,001)

· Animals activity
  Smooth       0,25 ± 0,03
  Rough        0,55 ± 0,03

(p<0,001)
Animal welfare during transport

Glucocorticoids

Proportion of variation

Smooth
Rough

Blood sample

1st 2nd 3rd 4th

Proportion of variation

ns

* ns
Heart rate
Heart rate

Proportion of variation in heart rate

- Smooth
- Rough

Ruiz-de-la-Torre et al 2000
Behavioural measures

Aggressive behaviour

Regrouping is a problem in pigs, but not in lambs

(Arey & Franklin, 1995, Ruiz de la Torre & Manteca, 1999)
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Any process which, when applied to an animal causes immediate loss of consciousness which lasts until death. (Council Directive 93/119/EEC)

AIMS:

- Animal Welfare: Insensibility induction
- Meat Quality
- Operator safety
UNCONSCIOUSNESS

BLEEDING

Stun  Stick
Animal Welfare

Electrical Stunning:
- Current intensity
- Electrode placement
- Application time
- Recovery

Carbon dioxide Stunning:
- $[\text{CO}_2]$ Exposure time
- Recovery
Electrical Stunning

10 FNW (tongs in frontal position, wet skin, no wool)
11 FW (tongs in frontal position, wet skin, wool)
11 FDNW (tongs in frontal position, dry skin, no wool)
10 FDW (tongs in frontal position, dry skin, wool)
12 CNW (tongs in caudal position, wet skin, no wool)
12 CW (tongs in caudal position, wet skin, wool)
12 CDNW (tongs in caudal position, dry skin, no wool)
11 CDW (tongs in caudal position, dry skin, wool)
Instrumentation
Instrumentation
Electrical stunning
Effectiveness

Results and discussion

Proportion of animals stunned (%)

- Frontal Wet No Wool: 100%
- Frontal Wet Wool: 100%
- Frontal Dry No Wool: 81%
- Frontal Dry Wool: 0%
- Caudal Wet No Wool: 83%
- Caudal Wet Wool: 66.6%
- Caudal Dry No Wool: 33.3%
- Caudal Dry Wool: 0%
Animal Welfare

Electrical Stunning:
- Current intensity
- Electrode placement
- Application time
- Recovery

Carbon dioxide Stunning:
- [CO$_2$]
- Exposure time
- Recovery
- Recovery
Animal Reflexes

STUNNING

TIME (s)

- Tonic
- Clonic 1
- Clonic 2

S.B.  C.R.
Results and discussion

S.B. C.R.
Conclusions

- AW can be measured objectively.
- Several measures has to be used, mainly animal-based ones.
- The “human factor” is of major importance in transport and slaughter
- Recommendations have to be tailored to each type of animal
Acknowledgements

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