



OIE Regional seminar on animal welfare during long distance transport

(Chapter 7.3 of the OIE terrestrial Animal Health Code)

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9. ANIMAL WELFARE AND MEAT QUALITY

MEAT QUALITY



ANIMAL WELFARE AND MEAT QUALITY

After stunning and bleeding of the animal, muscles do not suddenly terminate all their living functions and become meat.

A number physical and chemical changes take place over a period of several hours or even days in the process of conversion of muscles to the product called “meat”.

It is a gradual degradative process.

CONVERSION OF MUSCLES TO MEAT

- An important part of a muscle is glycogen which belongs to biochemical group of sugars and it is a source of energy

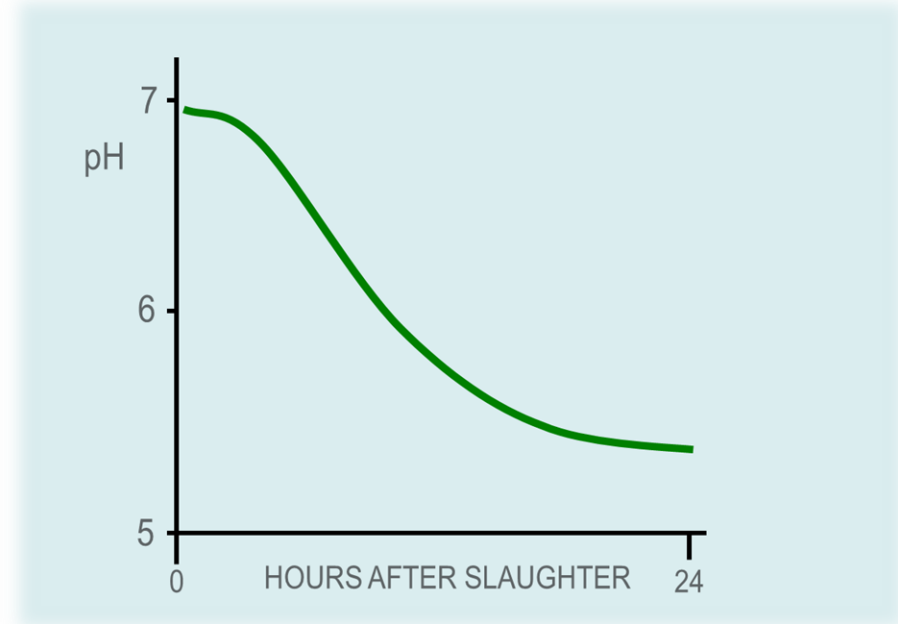


- After death of an animal glycogen is metabolised into lactic acid which “digests” or “converts” muscles into the product we call “meat”.

CONVERSION OF MUSCLES TO MEAT

During the 24 hours after death of an animal the following occurs:

- breaking up of the glycogen to the lactic acid
- Increasing acidity of the muscles from pH 7 to pH 5.6
- Changing of colour of the muscles to bright red



ANIMAL WELFARE AND MEAT QUALITY

Transport is stressful for farm animals:

- altered normal routine of feeding and drinking and resting
- novel environments,
- sometimes mixed with unfamiliar animals
- closely confined
- noise and vibration
- possibly extreme temperatures

ANIMAL WELFARE AND MEAT QUALITY

- **Acute stress**

intensive and short term
(panic, rough handling etc..)



- **Chronic stress**

long term



CHRONIC STRESS AND MEAT QUALITY

In situations where, before stunning and slaughter, animals are exposed to long term chronic stress:

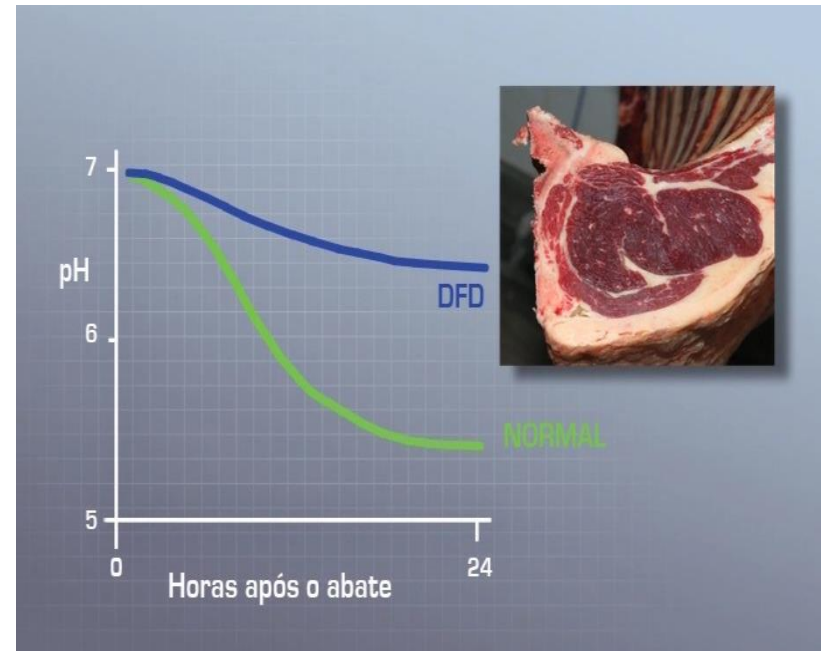
- **physical** - long distance transport
- **physiological** – hunger and thirst
- **behavioural** - constant fights between mixed
- or by combination all above

glycogen in animal body is dramatically decreasing and results in biochemical changes of the meat.

DFD – DRY FIRM DARK MEAT

- Insufficient level of glycogen (decreased by 70%) causes:
 - Insufficient level of lactic acid
 - Acidity changes
 - Insufficient amount of glycogen – “sugar” results in low lactate and low growth of useful lactobacilli
 - Free niche supports increased growth of putrid or putrescent bacteria utilising meat protein for their growth
 - Formation of DRY FIRM and DARK meat – DFD meat

Due to poor shelf life and eating quality DFD meat is always used as to processed products

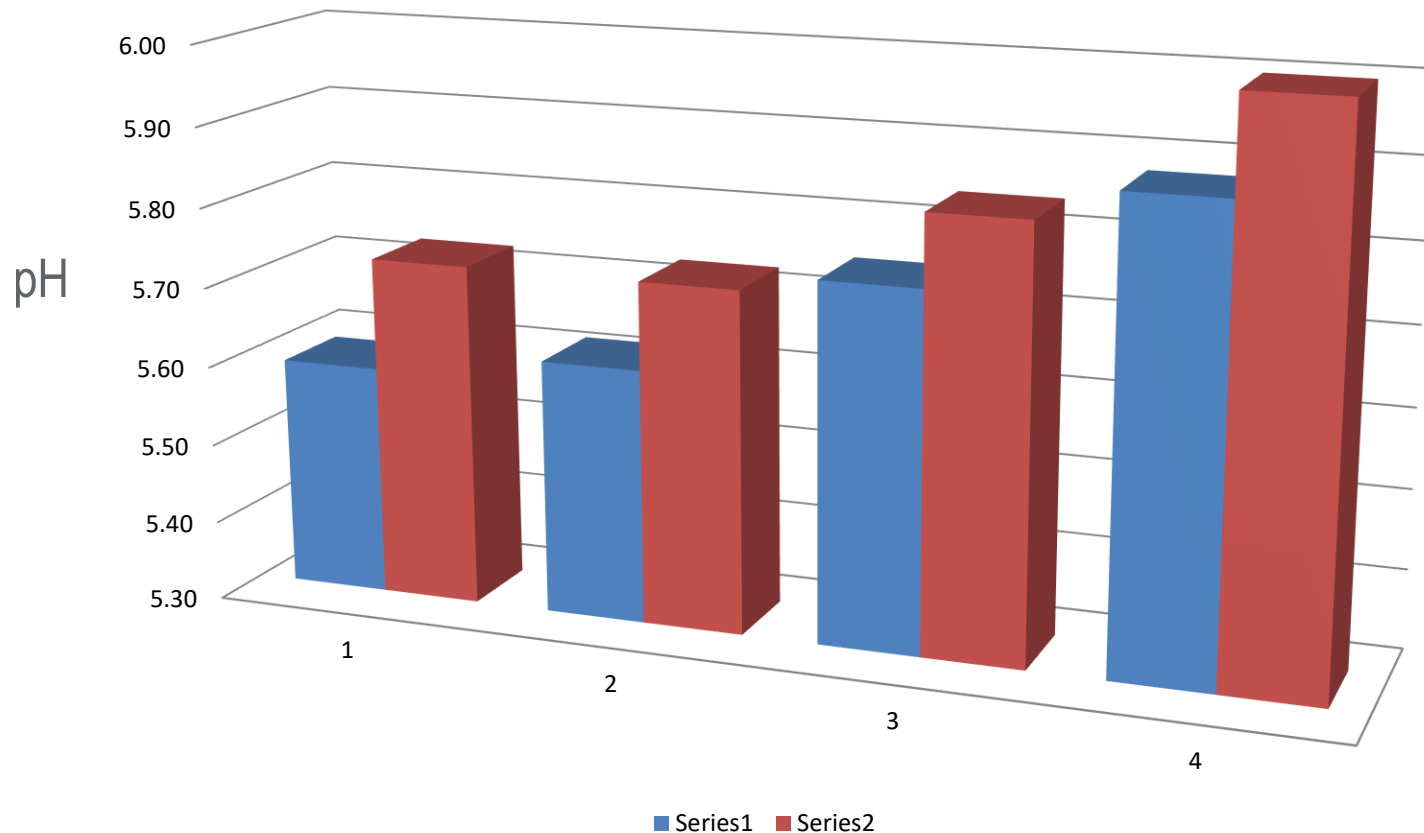


DFD MEAT

Colour	Glycogen (in time of slaughter)	Glycogen 24 h. after slaughter	Production of Lactic acid	pH
Normal	1,0%	0,1%	high	5,6
Dark DFD	0,3 %	0,1%	low	6,0 - 6,5

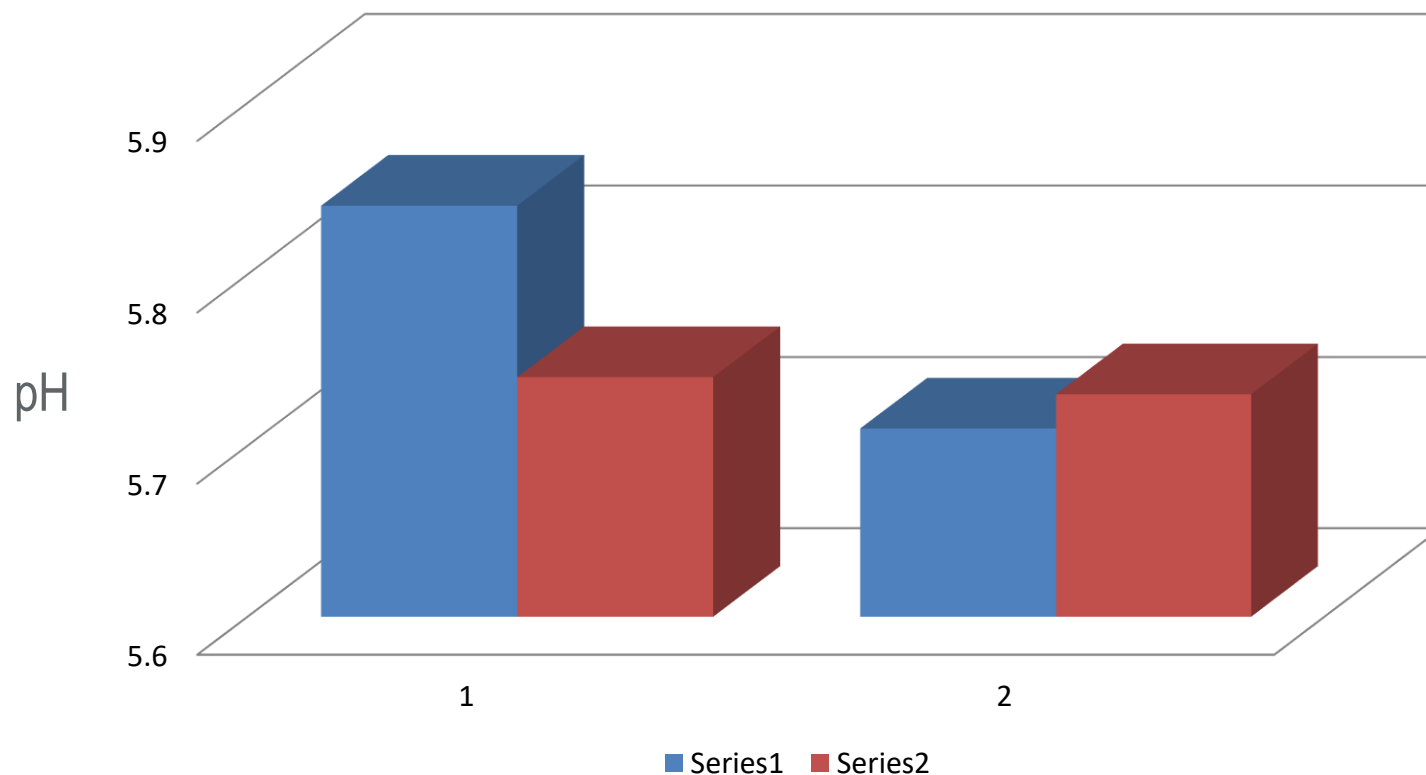


CHANGE IN MEAT pH RELATIVE TO THE DISTANCE CATTLE ARE TRANSPORTED



Brazilian research - Tseimazides, (2007)

RESULTS OF TRAINING OF DRIVERS

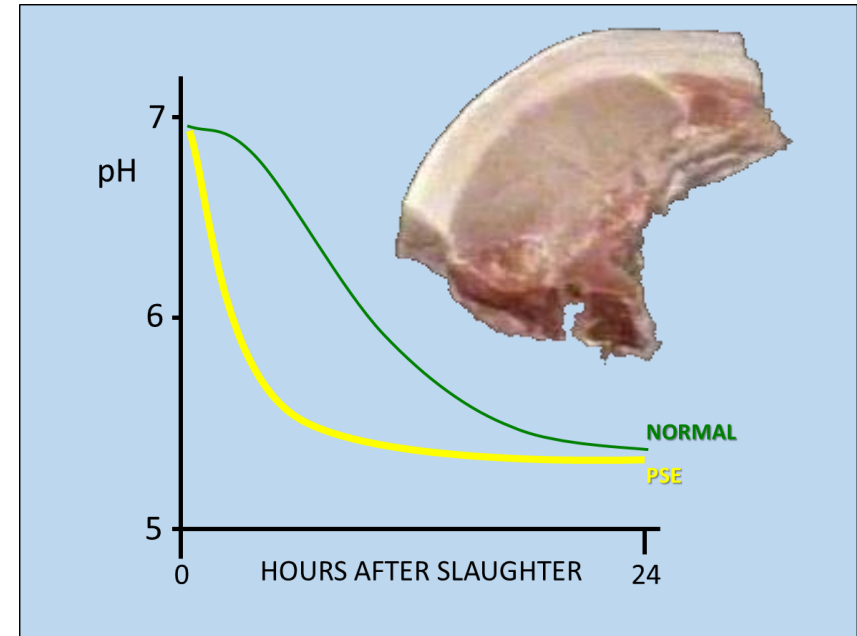


Tseimazides, (2007)

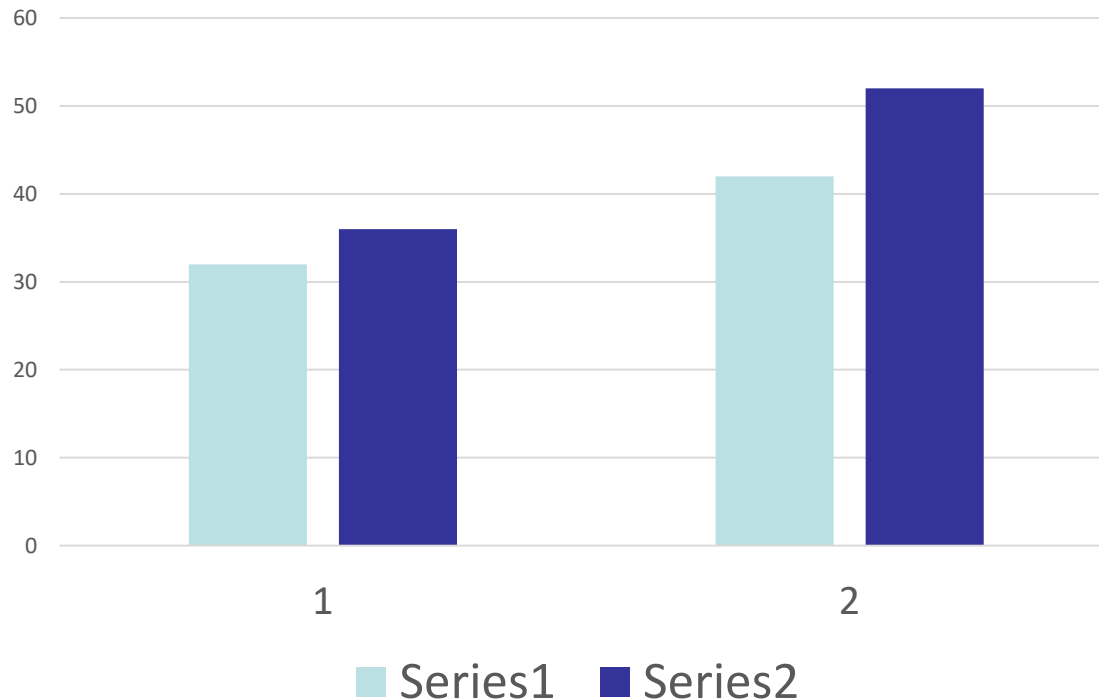
ACUTE STRESS AND QUALITY OF MEAT

PSE MEAT

- Acute (intensive and short term) pre slaughter stress (e.g. panic, rough handling, etc.) results in:
 - fight or flight reaction
 - Increasing of metabolism
 - Increasing of the body temperature
 - Utilisation of the body glycogen and its fast breaking up into the lactic acid
 - Quick decreasing of pH after the slaughter pH from 7 to 5,1
 - Decreased water holding capacity of muscle cells
 - Pale , Soft and Exudative meat PSE



MIXING OF ANIMALS AND MEAT QUALITY



OTHER EFFECTS OF TRANSPORT & HANDLING

Handling of animals to:

- assemble them,
- move them,
- load them, then
- unload them for moving from/to feedlots, holding pens, markets and to lairage and slaughter

exposes animals to many opportunities for bumping fighting and bruising.

POSSIBLE CAUSES:

1. Unsuitable facilities

- Poor floors
- Steep ramps
- Sharp corners
- Narrow races and gateways

2. Poor handling

- Beating animals
- Rushing animals
- Mixing different groups, sizes and sexes

3. Poor Transport Practices

- Inappropriate driving (Michael Schumaker!)

DIRECT LOSSES

BRUISES AND FRACTURES



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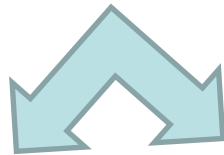


ECONOMICAL LOSSES



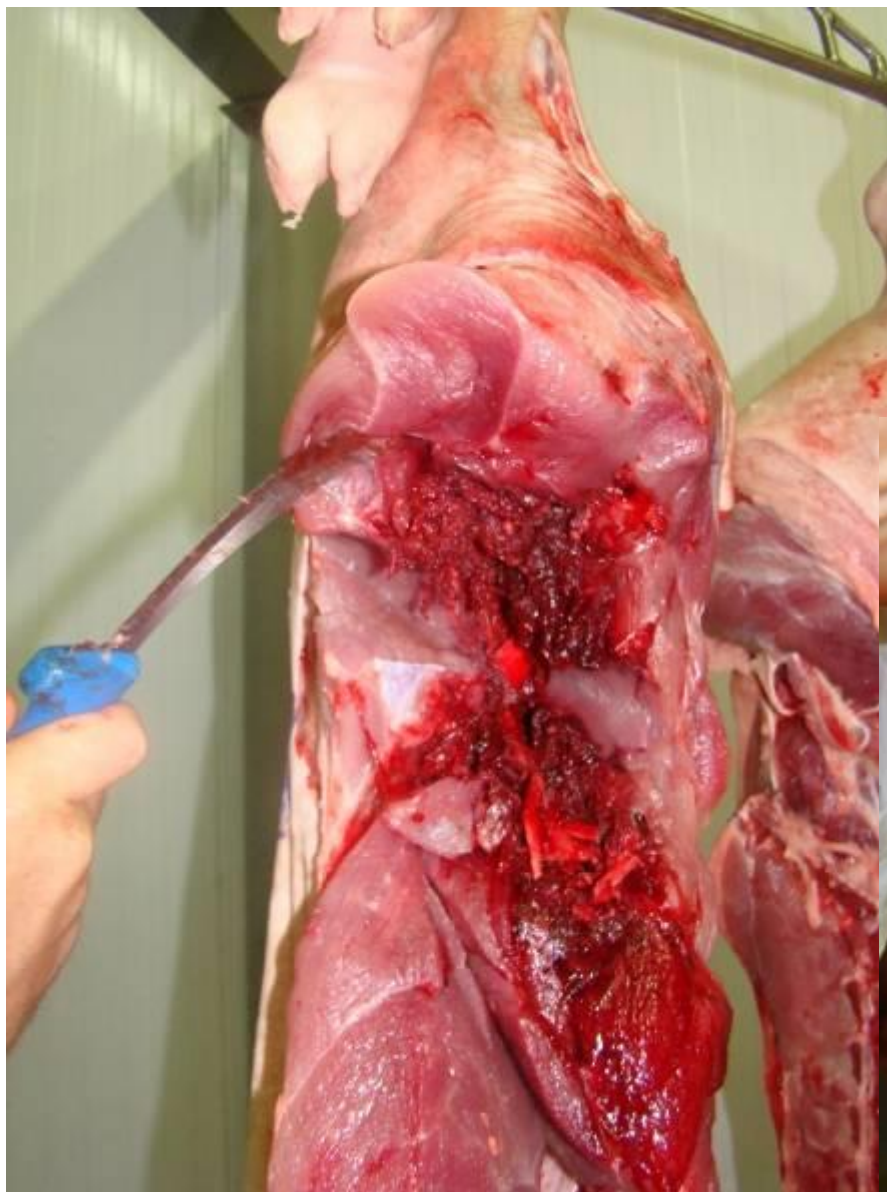


Fotos: Osmar Dalla Costa



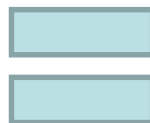
Fotos: Osmar Dalla Costa

Injury caused by the gap
between the ramp and the
truck.









SOURCE: National Pork Producers Council (USA).





Foto: Osmar Dalla Costa











DIRECT LOSSES DEAD on ARRIVAL (DOA)



VIDEO RECAPITULATION





**FOR ANIMALS IT IS NOT IMPORTANT
WHAT YOU THINK BUT WHAT YOU DO**

WHO WINS ????



Thank you for your attention



WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future