

## Simple and operational measures for assessment of welfare of finishing pigs on the day of slaughter

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## Background



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Increasing demands for documentation from the market and the EU (EU regulation 1099/2009)

Welfare Quality<sup>®</sup> Protocol (2009)

On-site tools for continuous monitoring





 To investigate the relationship between an overall assessment of welfare based on the WQ® protocol and selected post mortem physiological measures (glucose, lactate, creatine kinase activity, albumin and total protein).



### The day of slaughter



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# Materials and methods - single welfare measures



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- 80 pigs from 4 four herds
- Commercial 3-deck lorries
- Danish commercial abattoir
- 1 hour lairage, 15 pigs/pen
- Automatic race to stunning
- CO<sub>2</sub> stunning in groups
- Sticking 820 pigs/hour

#### Unloading $\rightarrow$ Lairage $\rightarrow$ Race to stunning

## Results – single welfare measures



- $\uparrow$  Slipping in the race  $\rightarrow \uparrow$  Glucose
- $\uparrow$  Slipping in the race  $\rightarrow$   $\uparrow$  Lactate
- $\uparrow$  Skin damage  $\rightarrow$   $\uparrow$  Creatine kinase



-> relevant indicators for assessing welfare on the day of slaughter

Brandt et al., Livestock Science 157, pp 535-544, 2013

# Materials and methods – aggregated welfare assessment



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#### • 480 pigs from 12 herds

<b>0. Home pen</b> Skin damage	<b>1. Pick-up pen</b> Skin damage Duration	<b>2. Loading</b> Handling Turning back Falling	<b>3. Transport</b> Duration of transport Duration of breaks Outdoor temperature	<b>4. Unloading</b> Handling Turning back Falling	<b>5. Lairage</b> Skin damage Duration Aggression	<b>6. Race</b> Slipping Falling Moved by gate	<b>7. Sticking</b> Blood sample	8. Slaughter line Skin damage pH45
Pi	ck-up La	pading T	ransport L	ر Inloading I	_airage	7 Race	Sticking	

# Results - aggregated welfare assessment



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# Results - aggregated welfare assessment



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Stage	LS means	Weight	
Pick-up pen	3.93 <sup>ab</sup>	1.08	
Loading	4.46 <sup>c</sup>	1.22	
Transport	3.65ª	1.00	
Unloading	4.15 <sup>bc</sup>	1.14	
Lairage	3.94 <sup>ab</sup>	1.08	
Race	4.11 <sup>bc</sup>	1.13	

Stage	Measure	LS means	Weight
Loading	Duration	<b>2.7</b> <sup>a</sup>	1.0
	Handling	4.5 <sup>c</sup>	1.7
	Reluctance to move	<b>2.7</b> <sup>a</sup>	1.0
	Turning back	<b>2.8</b> <sup>a</sup>	1.0
	Slipping	3.3 <sup>b</sup>	1.2
	Falling	4.0 <sup>c</sup>	1.5
	Overlapping	3.4 <sup>b</sup>	1.3

Animal Welfare Index (AWI)

Submitted to Animal Welfare

# Results - aggregated welfare assessment



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	Post-mortem measures					
AWI <sub>Stage</sub>	n	Lactate	Glucose	Creatine kinase	T-protein	Albumin
		- fatigue	- fatique	- skin damage	- dehydration	- dehydration
Pick-up	287	NS	NS	NS	positive**	NS
Loading	320	NS	NS	NS	positive*	NS
Transport	311	NS	negative***	NS	NS	NS
Unloading	365	NS	positive***	positive***	negative*	NS
Lairage	279	NS	NS	NS	NS	NS
Race	341	positive*	NS	NS	NS	positive**
<b>AWI<sub>Overall</sub></b>	96	NS	negative*	NS	NS	NS

		Correlations between skin damage score and
	Ν	creatine kinase
Home pen	411	0, NS
Pick-up pen	327	0.34, P < 0.00001
After lairage	377	0.45, P < 0.00001
Post-mortem	361	0.43, P < 0.00001

Submitted to Livestock Science

## Conclusion



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- Fatigue (measured by lactate),
- Damages (measured by creatine kinase),
- Dehydration (measured by either albumin or total protein or both)

**Potential candidates** for the development of a future on-line monitoring of animal welfare on commercial abattoirs to document the level of welfare (e.g. above vs. below a certain threshold).



## Thank you!