KATHOLIEKE UNIVERSITEIT LEUVEN

Investigation of the relationship between pH and temperature as PSE indicators of pork

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Introduction

PSE meat = Major quality defect in pig meat

- Good predictor of PSE meat = meat pH
- Muscle pH is related to muscle activity and muscle temperature

Objective

Muscle temperature – meat pH – meat temperature

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Prediction of meat quality
PSE meat

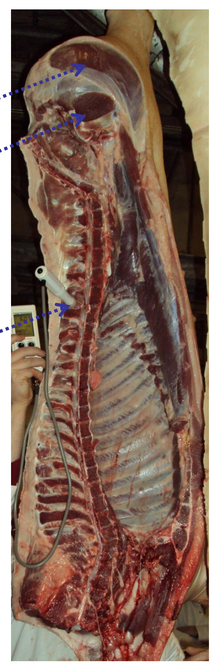
'High stress level, which is accompanied with heat production due to an increased energy metabolism, will increase muscle temperature.'

Materials and methods

PART 1: 824 (N) carcasses measured

I. pH 30 min after slaughter (pH)
   - *M. semimembranosus* (M.S.)
   - *M. adductor* (M.A.)
   - *M. longissimus dorsi* at the last rib (M.L.D)

II. Temperature 30 min after slaughter (Temp)
   - M.S.
   - M.L.D.



PART 2: 536 (N) carcasses measured

I. Rectal temperature lairage ($Temp_L$)
II. Rectal temperature after stunning ($Temp_S$)
III. Environmental temperature ($Temp_E$)
IV. pH M.L.D.
V. Temp M.S.

Results

PART 1

Table 1: Correlations part 1.

Correlations Part 1		
	r-value	P-value
pH M.L.D. - Temp M.S.	-0.29	<0.001
pH M.L.D. - Temp M.L.D.	-0.35	<0.001
pH M.S. - Temp M.L.D.	-0.12	<0.001
pH M.A. - Temp M.L.D.	-0.31	<0.001
pH M.L.D. - pH M.S.	0.19	<0.001
pH M.L.D. - pH M.A.	0.37	<0.001
Temp M.L.D. - Temp M.S	0.59	<0.001

Table 3: Mean and SD (standard deviation) values for each variable.

	Mean	SD
Temp M.L.D. (°C)	39.42	1.04
Temp M.S. (°C)	40.41	0.67
$Temp_L$. (°C)	38.76	0.54
$Temp_S$. (°C)	39.05	0.56
pH M.L.D.	6.16	0.25

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- ✓ Not possible to measure the pH M.L.D and Temp M.L.D at the same time in part 2.
- ✓ Use the pH M.L.D and Temp M.S. in part 2 as a PSE-indicator.

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PART 2

Table 2: Correlations part 2.

Correlations Part 2		
	r-value	P-value
pH M.L.D. - Temp M.S.	-0.24	<0.001
Temp M.S. - $Temp_L$	0.42	<0.001
Temp M.S. - $Temp_S$	0.56	<0.001
$Temp_L$ - $Temp_S$	0.76	<0.001

Table 4: Mean Temp M.S., mean pH and percentage of PSE positive meat ± SD for each measured $Temp_S$ level.

Mean Rectal temperature after stunning			
	< 38.6 °C	**38.6 - 39.4 °C**	**> 39.4 °C**
N	24	217	76
Temp M.S. (°C)	39.93 ± 0.63 [a]	40.51 ± 0.58 [b]	41.29 ± 0.67 [c]
pH	6.19 ± 0.15 [a]	6.17 ± 0.25 [a]	6.12 ± 0.23 [a]
% PSE positive	8.33 [a]	27.27 [b]	30.77 [b]

Percentages without common superscript letter (a, b, c) differ significantly (P<0.005).

Conclusion

- ✓ Rectal temperature increases after stunning: muscle activity & stress
- ✓ Rectal $temperature_{L/S}$ and temperature of the *M. semimembranosus* are also good PSE indicators
- ✓ A higher rectal temperature increases the risk to develop PSE-meat
- ✓ Rectal temperature can be measured during lairage to optimise the lairage time and possibly decrease the risk to develop PSE-meat