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MEASUREMENTS OF REMISSION IN MUSCULUS LONGISSIMUS DORSI OF PIGS FOR SLAUGHTER

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1. Introduction

The visual determination of meat colour during the meat inspection by veterinary surgeons in Germany - with the foundation of the Meat Hygiene Law - is an important criterion of decision-making concerning the suitability of skeleton muscle meat of our animals for slaughter. Deviations from the physiological meat colour can have their premortal reasons, for example in Ikterus, PSE-condition or in a wrong application of some food stuffs and drugs. Add to this the possibility of insufficient blood drainage. An objective inquiry of meat colour has been possible for a long time by the measurement of remission or reflection. Although this has been considered to be too costly up until this time, it is now considered desirable for the veterinary meat check-up as well as for meat technological and breeding questions in future. The aim of the following paper, is to make a contribution towards this.

2. Materials and Methods

In connection with an extensive field experiment concerning several parameters of meat quality, colour values of the long back muscle of seven to eight month old pigs for slaughter, with a two-halves-weight of 85 to 105 kilograms, were among several factors to be ascertained. Therefore two groups of animals without objection are distinguishable:

group 1: These are 100 fattened hybrids (main part: German Country Breed) from one stock source, whose body halves were examined for the colour of the mentioned muscle immediately at the end of the slaughtering process, that means approximately 45 minutes post mortem.

group 2: In cutlets of 500 fattened hybrids of the same genetic construction from three stock sources meat colour of a fresh cut in the cranial part was required in the dissection part of the slaughterhouse.

All measurements were taken with the portable spectral photometer CM 2002 by Minolta. The $L^*a^*b^*$ - colour system by the CIE (Commission Internationale de l'Eclairage) was chosen with the following parameters:

D65 - CIE- standard light, that conforms with diffuse daylight in it's spectral compound

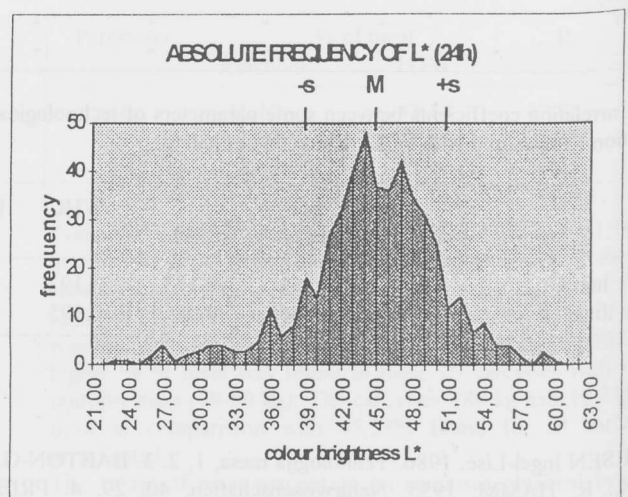
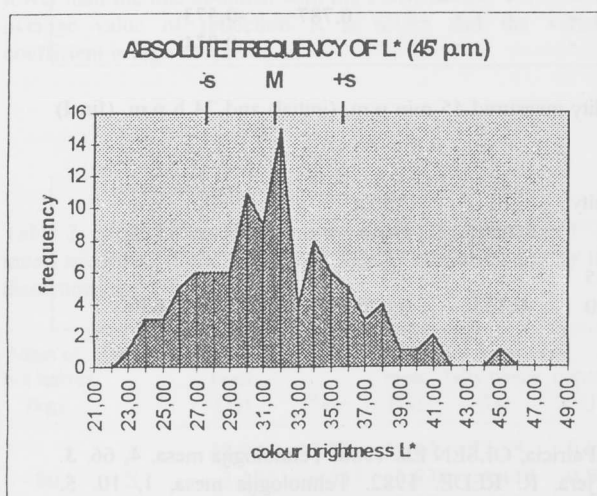
10° - visual field, that conforms with an object of 8.75 cm diameter in a distance of 50 cm

SCE - without the use of a gloss trap

Colour brightness L^* was of our special interest.

3. Results

In both groups there was a normal distribution concerning L^* as shown in the following histograms:



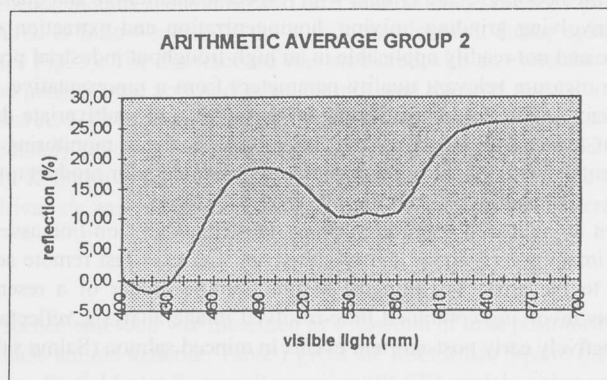
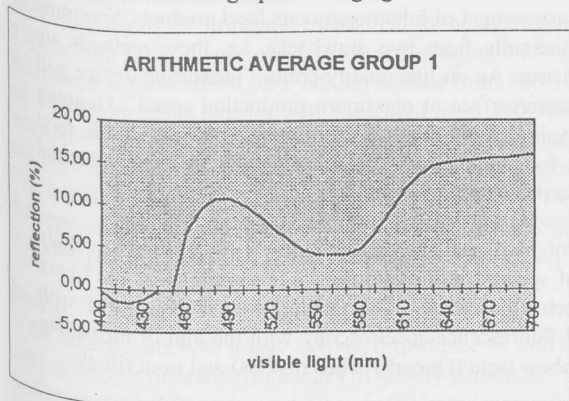
Furthermore the following statistical parameters were calculated:

	L*	a*	b*	L*	a*	b*
n	100	100	100	500	500	500
M	number	100	100	500	500	500
z	arithmetic average	31,59	3,51	14,32	44,48	3,43
s _z	central value (median)	31,49	3,45	14,30	44,75	3,07
s	variance	17,73	6,15	7,44	33,28	6,90
s%	standard deviation	4,21	2,48	2,73	5,77	2,63
s(M)	variation coefficient	13,33	70,55	19,05	12,97	76,66
q1	mistake of arithmetic average	0,42	0,25	0,27	0,26	0,12
q3	upper limit of first quartile	28,76	1,93	12,47	41,87	1,58
Q	upper limit of third quartile	34,13	4,94	16,01	48,08	4,80
	quartile distance	5,37	3,01	3,53	6,21	3,23

group 1: 45' p.m.

group 2: 24h p.m.

Below are the remission graphs belonging to the arithmetic averages of both experiment groups:



4. Summary

Colourimetric determinations can be regarded as suitable and very good reproducible instruments for objective registration of the quality parameter meat colour. In the present field experiment from standard deviating conditions of the bodies of the animals for slaughter as insufficient blood drainage and PSE-condition could be recognised by the colour brightness as well. The differences between the 45-minutes-measurements and those 24 hours after slaughtering were significant, too. The CMA, the Central Marketing association of the German Agriculture, reports in its observations on the quality and examination of pork and beef, that a L*-value measured in *Musculus longissimus dorsi* 24 hours after slaughtering should not exceed 58 units (CMA, 1991). Other authors dealing with this problem, also consider this limit value to be too high and believe 55 units for the cutlet to be more appropriate (Schwägele 1993). Based upon our measurements and the accompanying statistical evaluations the following possible limit values result:

statistical foundation	contained values	upper limit value of L* 45' p.m.	upper limit value of L* 24h p.m.
a) tolerance range (M + s)	68,27%	36	50
b) quartile distance (Q)	50%	34	48

We suggest variant a) for limit value.

5. Literature

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