Characterisation of Meat Quality Attributes in Different Cattle Breeds: Implications for Labelling and Consumer Choice

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AIM OF THE STUDY

The aim of this study was to evaluate the feasibility of identifying objective and measurable quality characteristics of meat through analyses that clearly reference objective standards.

MEAT LABELLING

REGULATION (EU) No 1308/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013

establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922|72, (EEC) No 234/79, (EC) No 1037|2001 and (EC) No

COUNCIL REGULATION (EC) No 820/97 of 21 April 1997

establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products

REGULATION (EU) No 1169/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2011

on the provision of food information to consumers

FACTORS AFFECTING COSTUMERS CHOICE

Extrinsic factors:

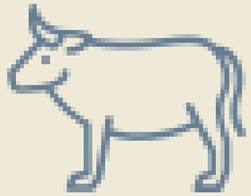
- Commercial quality, quality grade and price
- Brand
- Origin
- Image

Intrinsic factors:

- Appearance
- Eating quality
- Health quality
- Technological and convenience quality attributes

Based on those factors the characteristics we chose to evaluate were

MARBLING



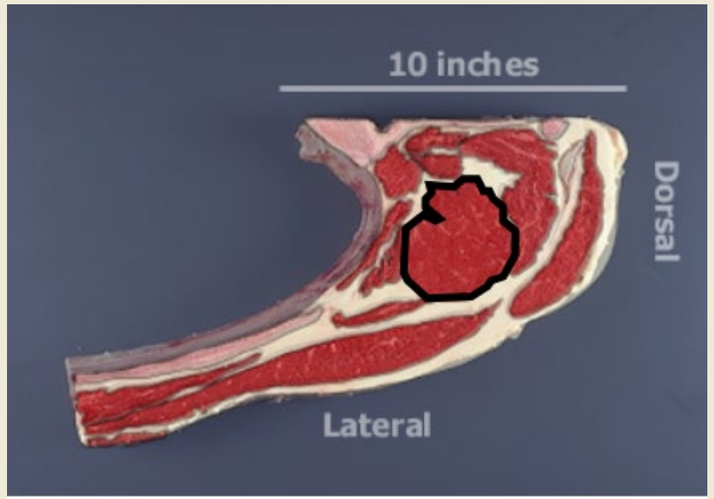
TENDERNESS

COLOR

MATERIALS AND METHODS

- 6 bovine genetic types [German Red Pied, Piemontese, Chianina, Angus, Poland cross breed and Freisian] were used for this study

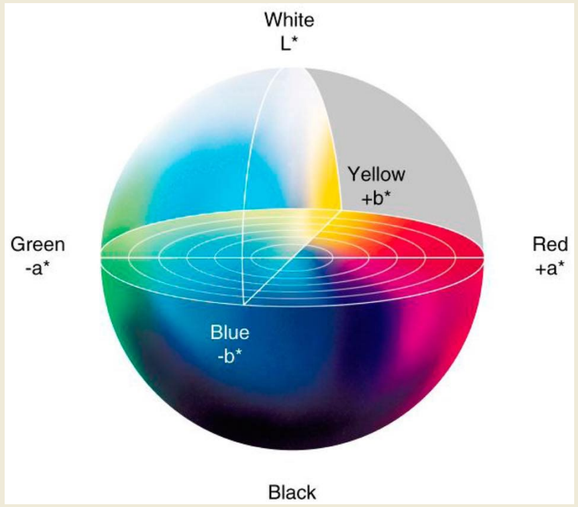
- 7 animals from each genetic types were taken into consideration, all with similar characterisitcs



- *Longissimus thoracis et lumborum* (LTL). Commercial name: entrecôte, or boneless rib

COLOURIMETRIC ANALYSIS

- The «ColourMeter RGB Colourimeter» app was used to measure colour of the samples using an iPhone XS running iOS 13.7.
- The «ColourMeter RGB Colourimeter» app was calibrated using the Minolta CR 200 Chroma Meter
- The evaluation of color was determined using the L*, a*, b* color spaces



MARBLING EVALUATION

- Pictures were taken with a Nikon D850 and then processed using Adobe Photoshop CS 6 (version 13.0 x64) on MacBook Pro Mid 2012.
- A square area of 750x750 pixels has been selected in each image and the number of white pixels was calculated.

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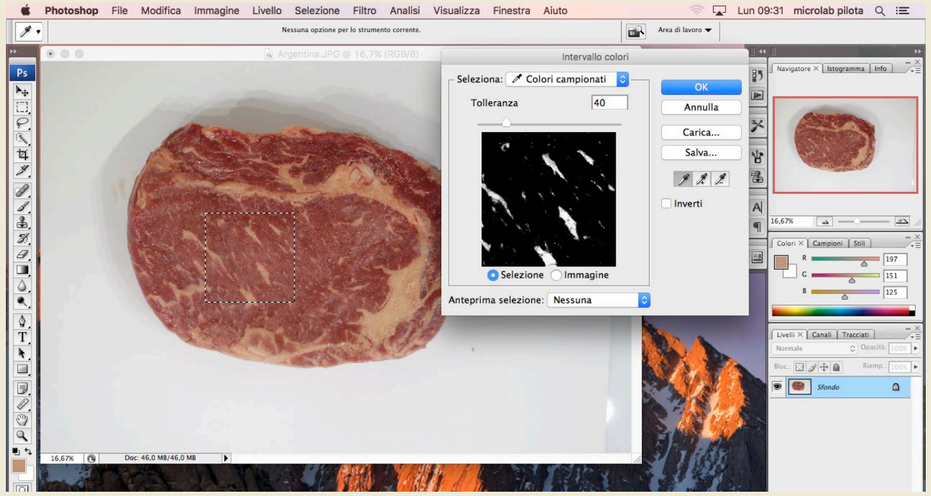
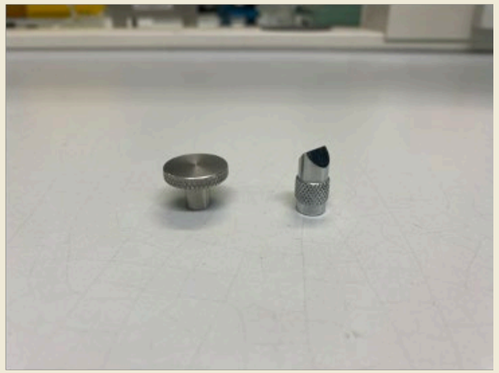


TENDERNESS EVALUATION

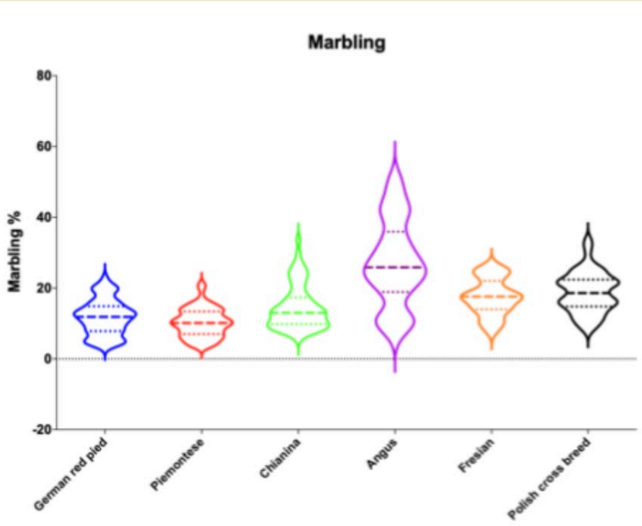
- From each sample were repeated three times per cuts of meat.
- From each slice we got 6 cubes of similar size

TENDERNESS EVALUATION

- With a Sauter FL 100 digital dynamometer 3 of the cubes of each slice were used with a flat head and 3 with the wedge-shaped one



RESULTS AND DISCUSSION



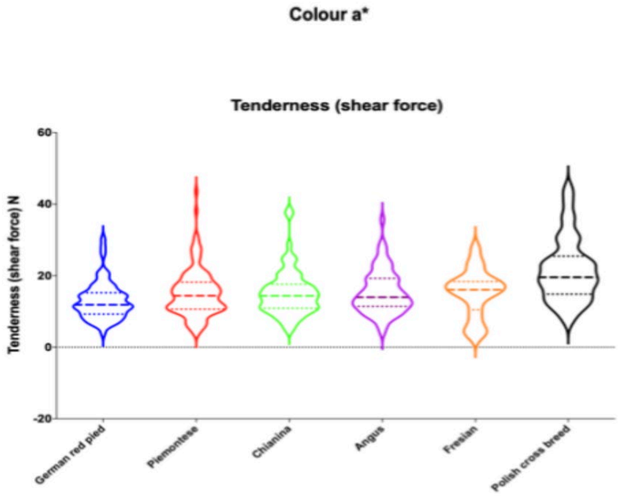
s of colourimetric, tenderness, marbling and total lipids evaluations, expressed as mean, standard deviation (sd), minimum

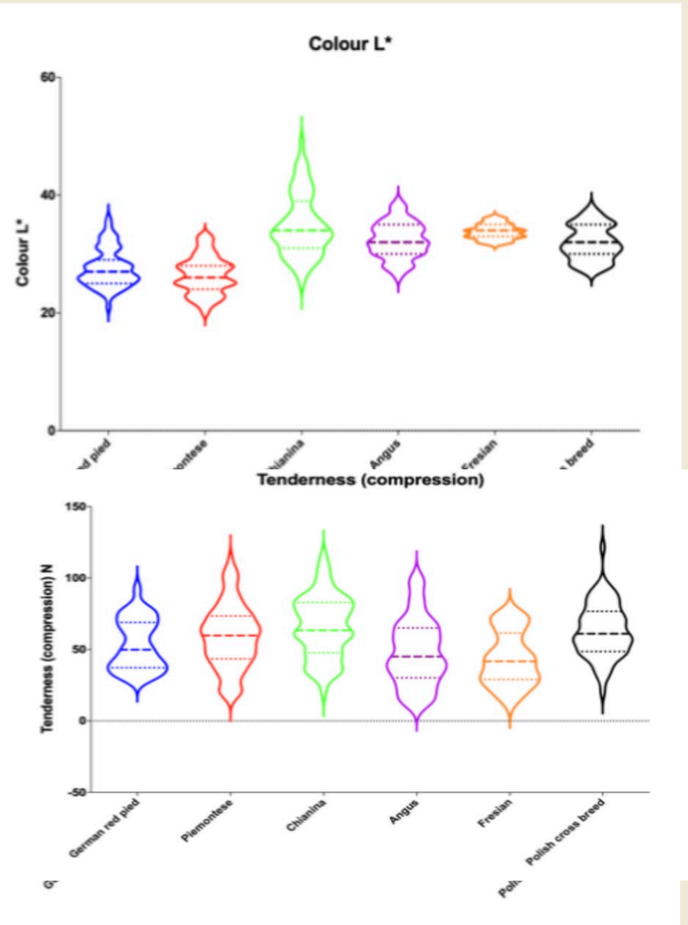
	*L**				*a**				*b**			
	media	sd	min	max	media	sd	min	max	media	sd	min	ma
	32,33 [b]	3,05	26,00	39,00	9,46 [a]	1,35	16,00	23,00	7,54	2,04	14,00	23,0
	34,79	5,30	25,00	49,00	26,64	3,02	20,00	37,00	23,49	3,24	17,00	30,0
l Pied	27,64 [a]	3,24	21,00	36,00	19,71 [a]	2,30	14,00	25,00	17,54 [a]	2,61	14,00	25,0
	26,39 [a]	3,18	20,00	33,00	19,55 [a]	1,93	15,00	24,00	15,79 [a]	2,48	11,00	21,0
breed	31,89 [a]	2,95	27,00	38,00	21,37 [b]	2,11	18,00	27,00	18,92	2,33	14,00	23,0
	33,78	1,26	32,00	36,00	22,44 [b]	2,04	20,00	25,00	21,00	1,94	18,00	25,0

	tenderness (compression)[1]				tenderness (shear force)[1]			
	media	sd	min	max	media	sd	min	max
	48,04 [c]	23,30	11,90	99,				
	66,18 [a]	21,61	20,70	115,				
l Pied	55,55 [b]	17,77	27,85	93,				
	59,23 [c]	22,17	15,65	1				
breed	68,33 [a]	18,71	20,55	1				
	43,44 [c]	18,75	14,60					

	marbling[2]		
	media	sd	min
Angus	27,01	12,09	6,12
Chianina	14,80 [b]	6,28	5,69
German Red Pied	11,80 [a]	4,96	3,74
Piemontese	10,23 [a]	4,05	3,00
Polish cross breed	18,83 [b]	5,75	7,93
Friesian	17,51 [b]	5,18	8,13

*L**, *a**, *b**: colourimetric coordinates; [1]tenderness expre
expressed as a % of the total weight of the sample. Diffe

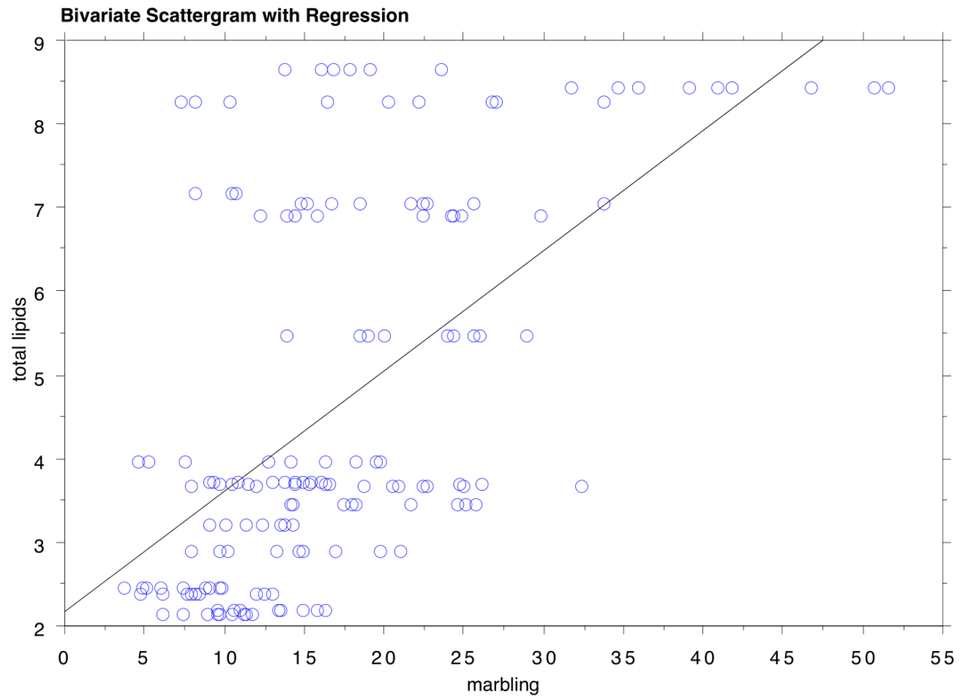




RESULTS AND DISCUSSION

Figure 13 On the top left we have Friesian meat, on the top right we have German Red Pied meat, on the lower left we have Polish meat, on th lower right we have Piemontese meat

RESULTS AND DISCUSSION



total lipids = 2.176 + .144 * marbling; R^2 = .34

RESULTS AS INFOGRAPHICS

Genetic type	Color	Tenderness	Marbling
Angus			
Chianina			
German Red Pied			
Piemontese			
Polond cross bred			
Friesian			

CONCLUSION

- The provision of optional information on product labels serves as a crucial tool for consumer protection, ensuring transparency, and enabling informed choices.

- The findings of our study underscore the significant variability in key attributes of beef derived from different cattle breeds, including variations in color, marbling, and tenderness. As such, our research has enabled the formulation of a comprehensive grading scale for these distinct characteristics.

THANK YOU!