Assessment of the Australian system for the prediction of beef quality (MSA): Which perspectives for the French beef sector? (and in Europe?)

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Meat Standards Australia (MSA)

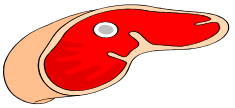
* MSA is a product grading scheme focused on satisfying the consumer

* 4 quality levels assessed by consumers

Not good (not certified)	3 *	4 *	5 *
	MSA 3	MSA 4	MSA 5

The MSA prediction model for cuts

MSA moved from a carcass pathways to a cuts based grading scheme



Reasons

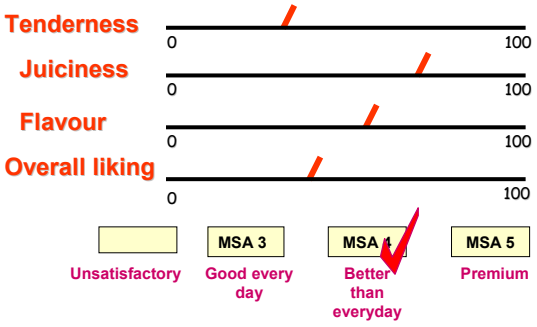
- Improved accuracy for the consumer
- Need to grade a greater proportion of the carcass

Construction of the MSA system

1- Setup of a database

Consumer tests
- > 530 000 samples
- 40 muscles
- 6 cooking methods

Data characterizing animals and sampled meats



Construction of the MSA system

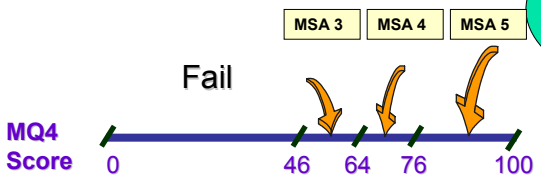
2 - Use of the database

Consumer tests

Data characterizing animals and sampled meats

❑ MQ4 score development

❑ Identification of the factors which explain the MQ4 level



❑ Development of a model to predict the MQ4 score

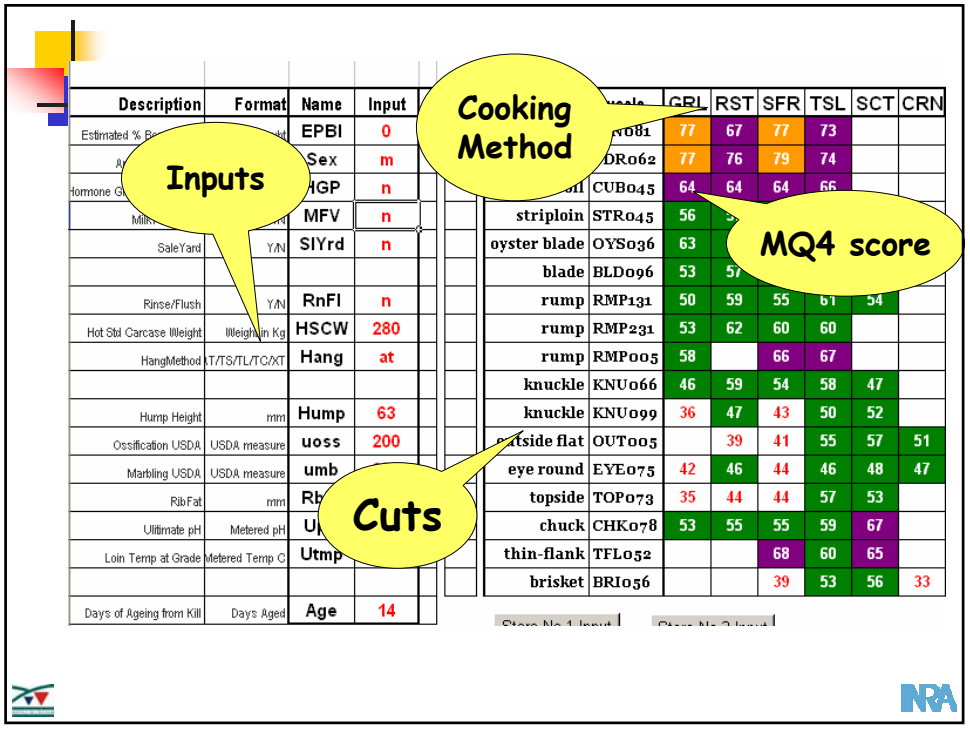
Muscle × Cooking method

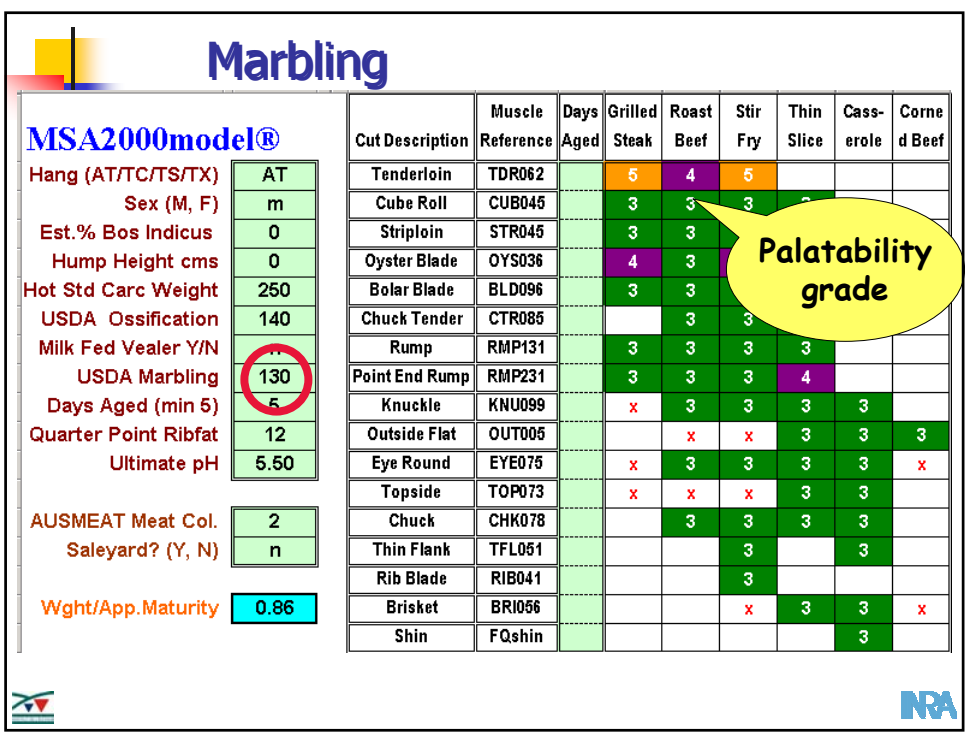
Meat Standards Australia

- **Predictors**
  - Breed (2-10) restricted to
    - Bos indicus content
  - Gender (2)
  - Growth path (10)
    - carcass wt
    - ossification score
    - Milk fed veal
  - Hanging (0-10)
  - Marble score (2-10)
  - Ageing: 5d min (0-6)
  - Cooking method (0-12)
  - Muscle (30)
  - pHu
  - Rib fat

- **Basic criteria**
  - Stress minimization
  - Optimal processing

- **Thresholds (requirement)**
  - ~~Ossification score (<300*)~~
  - Ultimate pH<5.7/colour
  - Rib fat > 3mm


Inputs
Cooking Method
MQ4 score
Cuts
Description
Format
Name
Input
Days of Ageing from Kill
Days Aged
Age
14
GRL
RST
SFR
TSL
SCT
CRN
striploin STR045 56
oyster blade OYS036 63
blade BLD096 53
rump RMP131 50 59 55
rump RMP231 53 62 60 60
rump RMP005 58 66 67
knuckle KNU066 46 59 54 58 47
knuckle KNU099 36 47 43 50 52
eye round EYE075 42 46 44 46 48 47
topside TOP073 35 44 44 57 53
chuck CHK078 53 55 55 59 67
thin-flank TFL052 68 60 65
brisket BRI056 39 53 56 33


Marbling
MSA2000model®
Hang (AT/TC/TS/TX) AT
Sex (M, F) m
Est.% Bos Indicus 0
Hump Height cms 0
Hot Std Carc Weight 250
USDA Ossification 140
Milk Fed Vealer Y/N
USDA Marbling 130
Days Aged (min 5) 5
Quarter Point Ribfat 12
Ultimate pH 5.50
AUSMEAT Meat Col. 2
Saleyard? (Y, N) n
Wght/App.Maturity 0.86
Palatability grade
Cut Description | Muscle Reference | Days Aged | Grilled Steak | Roast Beef | Stir Fry | Thin Slice | Cass-erole | Corned Beef
Tenderloin TDR062 5 4 5
Cube Roll CUB045 3 3 3
Striploin STR045 3 3
Oyster Blade OYS036 4 3
Bolar Blade BLD096 3 3
Chuck Tender CTR085 3 3
Rump RMP131 3 3 3 3
Point End Rump RMP231 3 3 3 4
Knuckle KNU099 x 3 3 3 3
Outside Flat OUT005 x x 3 3 3
Eye Round EYE075 x 3 3 3 3 x
Topside TOP073 x x x 3 3
Chuck CHK078 3 3 3 3
Thin Flank TFL051 3 3
Rib Blade RIB041 3
Brisket BRI056 x 3 3 x
Shin FQshin 3

Marbling

MSA2000model®

Hang (AT/TC/TS/TX)	AT
Sex (M, F)	m
Est.% Bos Indicus	0
Hump Height cms	0
Hot Std Carc Weight	250
USDA Ossification	140
Milk Fed Vealer Y/N	N
USDA Marbling	300
Days Aged (min 5)	[illegible]
Quarter Point Ribfat	12
Ultimate pH	5.50
AUSMEAT Meat Col.	2
Saleyard? (Y, N)	n
Wght/App.Maturity	0.86

Cut Description	Muscle Reference	Days Aged	Grilled Steak	Roast Beef	Stir Fry	Thin Slice	Cass-erole	Corned Beef
Tenderloin	TDR062		5	5	5			
Cube Roll	CUB045		4	4	4	4		
Striploin	STR045		[illegible]	[illegible]	[illegible]	[illegible]		
Oyster Blade	OYS036		4	4	4	4		
Bolar Blade	BLD096		3	3	3	4	3	
Chuck Tender	CTR085			3	3	3	3	
Rump	RMP131		3	[illegible]	[illegible]	3		
Point End Rump	RMP231		[illegible]	4	4	4		
Knuckle	KNU099		x	[illegible]	[illegible]	3	3	
Outside Flat	OUT005			x	3	3	3	3
Eye Round	EYE075		x	3	3	3	3	x
Topside	TOP073		x	3	3	3	3	
Chuck	CHK078			3	3	3	4	
Thin Flank	TFL051				3		3	
Rib Blade	RIB041				3			
Brisket	BRI056				x	3	3	x
Shin	FQshin						3	

Predictors of palatability

Criteria adapted to the Australian context

Negative impact on MQ4

- % Bos Indicus
- Hormonal growth promoters implants
- Sale yard

40 % of australian herd

No interest for France

Negative impact on MQ4

Ossification index OSS
Indicator of physiological maturity

Influence of age on the sensory qualities of the meat: YES in France
Because modifications of the intrinsic characteristics of the muscle

Predictors of palatability

Thresholds (exclusion)

Thickness of subcutaneous fat < 3 mm — Equivalent to fatness

ultimate pH > 5,7

Colour > 4 (Scale from 0 to 7) — Associated to meat with a high pH

~~**Ossification index > 300**~~ (Scale from 100 to 600) — ~~Which means age > 42 months~~

No young bulls, ~~steers and heifers only (cull cows excluded)~~

Initially not adapted to France

Now, more adapted to France and interest to bring bulls

Predictors of palatability

… Other criteria before slaughtering

Sex

Steers > heifers
+ 2 MQ4 units

Positive impact on MQ4

Growth rate

***MSA Recommandation**:*
ADG from 0.5 to 1.5 kg/d during 30 days before slaughtering is required. Finishing in feedlot is recommended.

Relation "Average Daily Gain" and tenderness: YES in France

The French studies concerning the influence of growth rate confirm its benefit effect on sensory qualities of meat.

Predictors of palatability

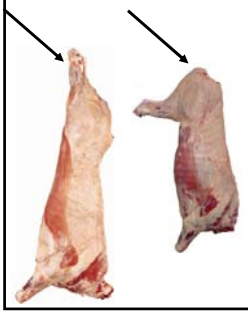
… Other criteria after slaughtering

Marbling

Positive impact on MQ4

Not well adapted to France
But interest to include intramuscular fat

Hanging of carcasses



- Achilles hang and tenderstretched
- Tenderstretching improves the eating quality of many cuts in the hindquarter

Ageing time

Requirement of MSA:
minimum 5 days, up to 42 days

French recommendation *> 7 days*

Body 1L
MSA
Release Date 22-Jul-00
Rump

Cook	Grade	Until	Then
Grill	MSA 3	19 Aug	4
Roast	MSA 4		

Est xxxx Plant xxxx Kill 20000717 Body No: 1L

Interaction Muscle × Cooking method × Time of ageing

Confirmed in France

Opinion of French experts in Meat Science

- MSA is a scientific, rigorous and coherent approach
- MSA is based on true observations, not pre-established ideas nor traditional and subjective ideas
- MSA is innovator, because based on the consumer and on cuts
- MSA is relevant, and based on segmentation by the quality
- MSA is credible (authorities, consumers)
- MSA is opened, does not lock into the Truth

System to be meditated !

Opinion of French experts in Meat Science

- A system not so used as his promoters sometimes would like to say it
- Sometimes diverted (serves as guarantee of supply carcass)
- In a country where did not nevertheless pre-exist multiple quality signs …

A system with no future ? **or** **A new system which is growing ?**

In conclusions

A good system which may be used everywhere.

- Testing has been undertaken in Japan, Korean, Ireland, United States
- Interest from and for European countries

BUT

No extreme lean breeds tested in Australia (as pure breeds) and no bulls as in France.

Challenges (everywhere)

- Beef Industry conservative - takes time
- Need processors (abattoirs), retail and food service involved early
- They need individual engagement
- MSA was not popular when it competed with existing brands: Now used to underpin brands = MSA now often not visible to the consumer in Australia
- Still some of the most powerful tools are not being heavily used: Cuts - cuts grading still not being fully utilized