What the Customer Really Wants: Consumer Perceptions of Pork

Caroline Kealey

Director of Meat Science

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Why Do We Produce Meat?

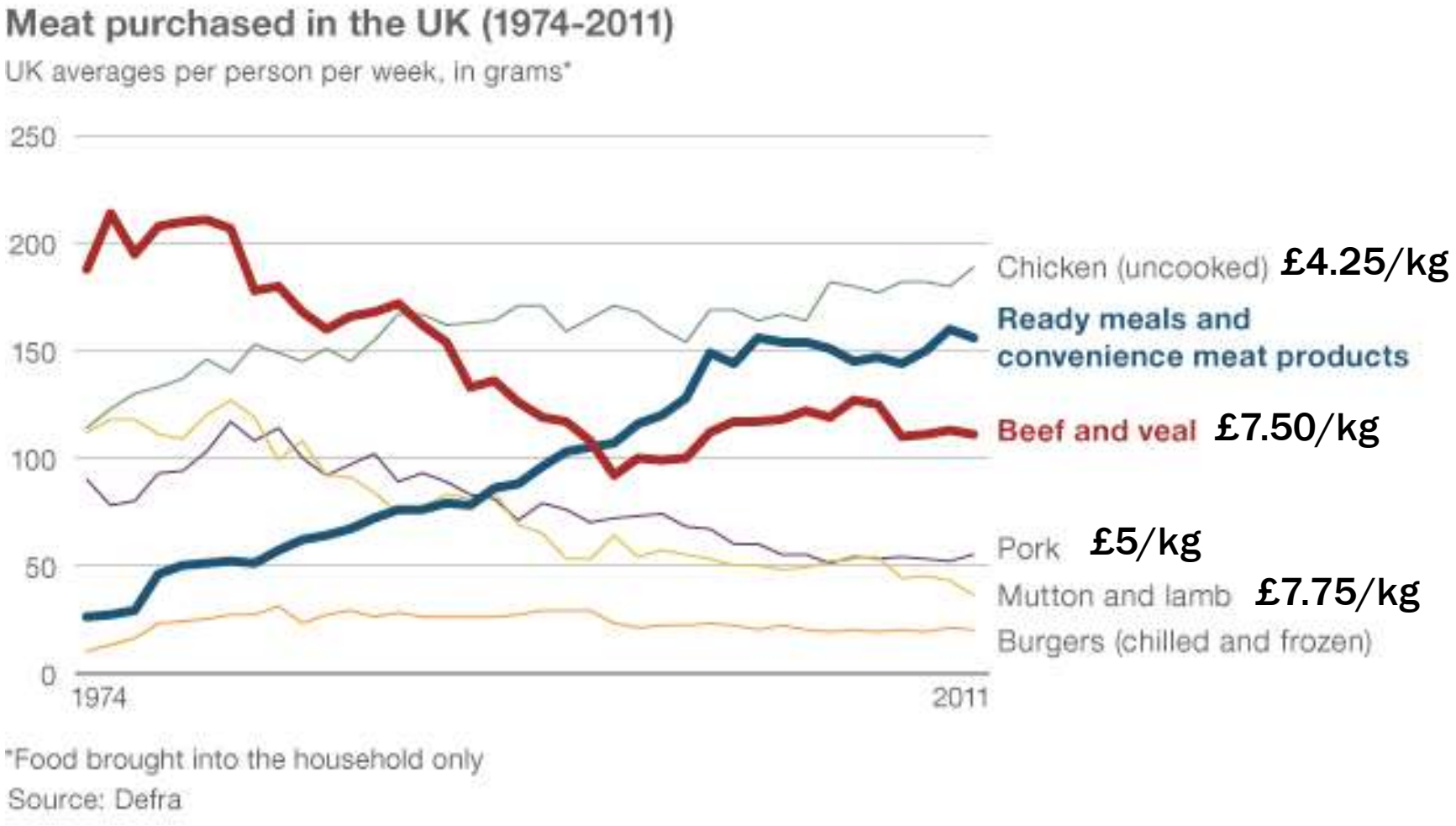
Why Do We Produce Meat?

For the Consumer!

Who is the consumer?

- Male vs. Female
- Young vs. Old
- Western vs. Eastern
  - Boar Taint

Consumer Trends



Who is the UK consumer?

- Price led
- Likes a story

The Value of a Story

Loin Joints

£9.99 /kg v £8.99/kg

Tenderloin

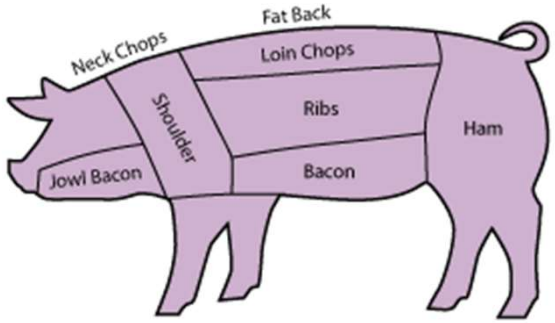
£11.99 /kg v £8.00/kg

Loin Steaks

£11.99 /kg v £11.00/kg

Stuffed Shoulder Joint

£7.49 /kg v £5.45/kg



Leg Joints

£9.99 /kg v £7.49/kg

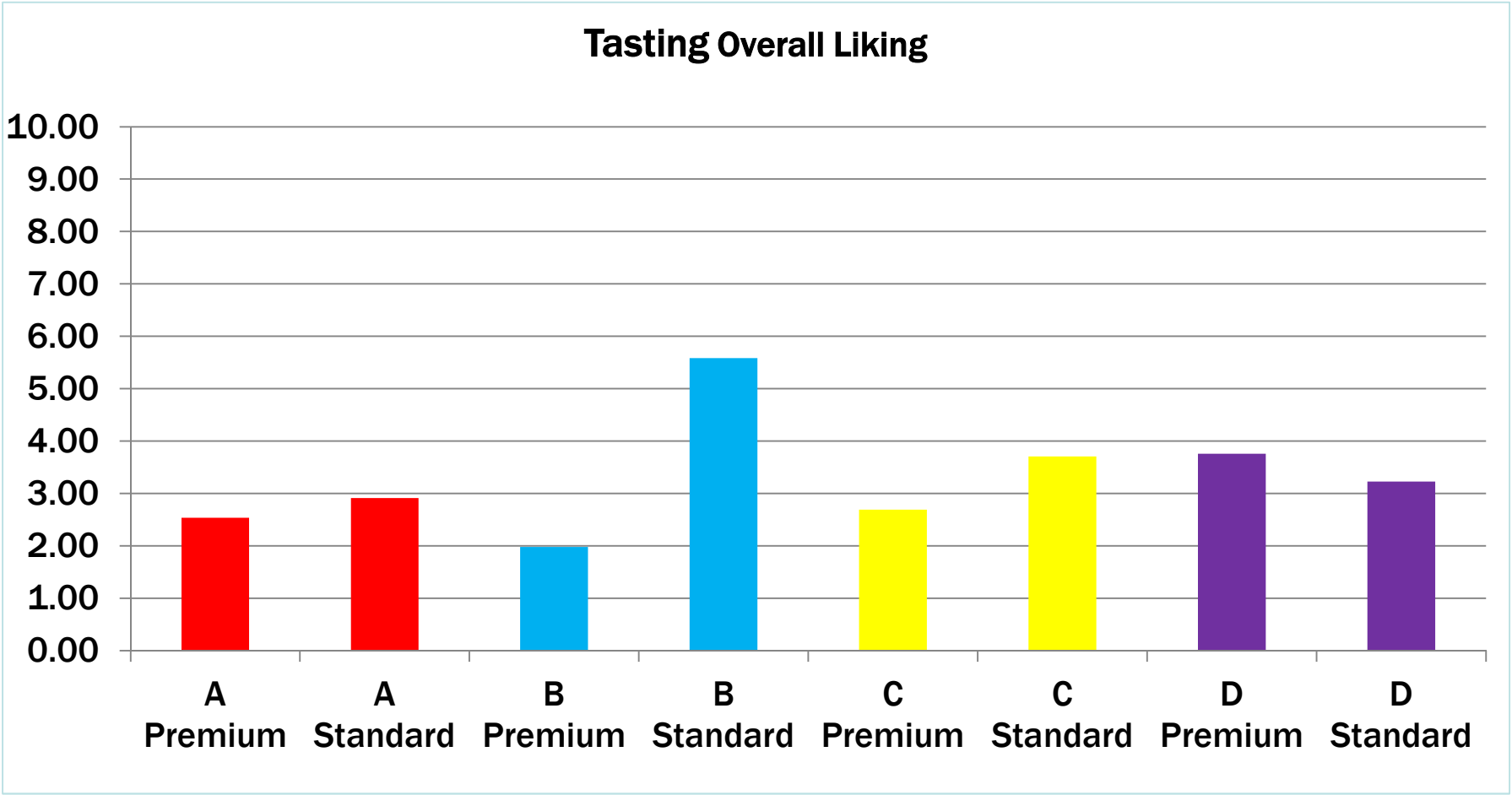
Belly Joint

£6.49 /kg v £5.33/kg

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Premium vs. Standard: Pork



Tenderscot Results

Mirinz/Bite Force		
Supermarket	Standard	Average
Supermarket A	Premium	3.23
Supermarket A	Standard	3.90
Supermarket B	Standard	4.13
Supermarket C	Standard	4.17
Supermarket D	Standard	4.28
Supermarket E	Standard	4.85
Supermarket F	Standard	4.88
Supermarket D	Premium	5.08
Supermarket E	Standard	5.20
Supermarket B	Premium	6.93

Slice Shear Force		
Supermarket	Standard	Average
Supermarket A	Premium	11.93
Supermarket D	Standard	12.83
Supermarket C	Standard	13.90
Supermarket E	Standard	14.16
Supermarket B	Standard	14.24
Supermarket A	Standard	14.54
Supermarket F	Standard	14.55
Supermarket E	Standard	15.24
Supermarket B	Premium	15.33
Supermarket D	Premium	31.73

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Premium pork is no better than standard pork

Farm story is not correlated to eating quality

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Meat Quality vs. Eating Quality

- Meat Quality:
  - Technical Quality
  - Nutritional Quality
  - Hygiene Quality
  - Ethical Quality
  - Eating (Organoleptic) Quality
    - Appearance, Tenderness, Juiciness & Taste

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Organoleptic/Eating Quality

- Colour, exudation loss, marbling, smell, taste, juiciness, tenderness, texture
- Eating Experience
  - Tenderness, Juiciness, Flavour

Correlations

	Texture	Juiciness	Flavour	Acceptability
Texture	1.00			
Juiciness	0.89	1.00		
Flavour	0.72	0.75	1.00	
Acceptability	0.90	0.89	0.87	1.00

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Colour: Point of Purchase Effects

Table 1 – Instrumental color (L*, a*, b* values) and visual color of light, medium and dark pink loin pork chops (Brewer and McKeith, 1999).

COLOR			
Characteristic	**Light**	**Medium**	**Dark**
L* (lightness)	57.0[a]	51.5[b]	38.0[c]
a* (redness)	8.9[c]	11.1[a]	10.3[b]
b* (yellowness)	18.4[a]	19.4[a]	13.7[b]
Wet appearance1	2.3[c]	2.6[b]	2.8[a]
Pink color[2]	1.9[c]	2.7[b]	4.7[a]
Acceptability[3]	2.9[b]	3.2[a]	3.2[a]

[1] 1 = very wet, 5 = very dry
[2] 1 = very light, 5 = very dark
[3] 1 = very unacceptable appearance, 5 = very acceptable appearance
[abc] Means with different superscript letters are different ($p<0.05$).

Marbling: Point of Purchase Effects

- Darker Meat = More favourable
- Higher Marbling = Less favourable

Table 4 – Appearance of chops in each purchase intent category (Brewer et al., 1999a).

	PURCHASE INTENT				
Characteristic	Wouldn't Buy	Probably Wouldn't Buy	Might Buy	Probably Would Buy	Would Buy
Color[1]	2.7^{c}	3.0^{bc}	3.3^{b}	3.4^{a}	3.3^{ab}
Lean Appearance[2]	3.6^{ab}	3.8^{a}	3.1^{bc}	2.7^{c}	2.9^{c}
Appearance Acceptability[3]	2.2^{d}	2.3^{d}	3.3^{c}	3.8^{b}	4.2^{a}

[1] 1=very light, 5=dark
[2] 1=very lean, 5=highly marbled
[3] 1=very unacceptable, 5=very unacceptable
^{abcd} Means with different superscript letters are different ($p<0.05$).

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

~~Educated Industry Experts~~

PBRT

Tasting Results

Do those “in the know” follow the “general” consumer?

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

What were the samples?

1. British Retailer Standard Pork

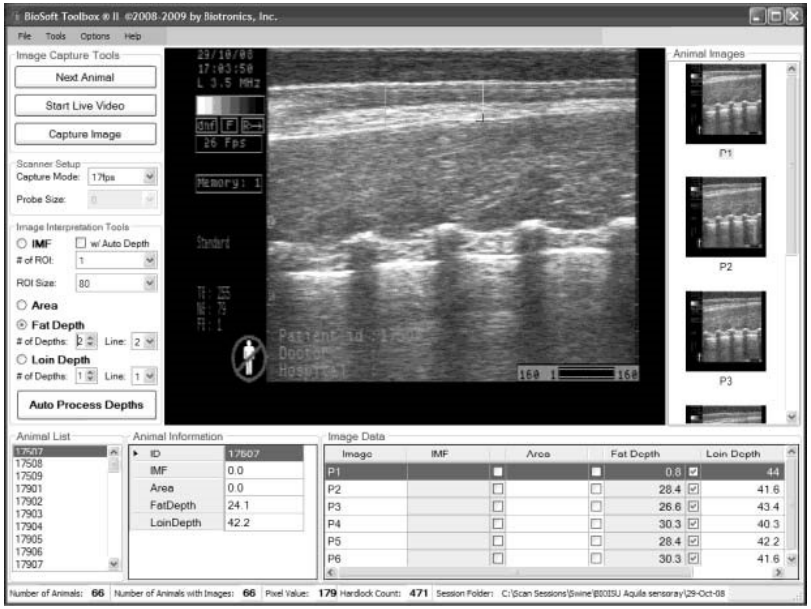
2. Specialised UK Producer: Standard

3. Specialised UK Producer: 7 Day Dry Aged

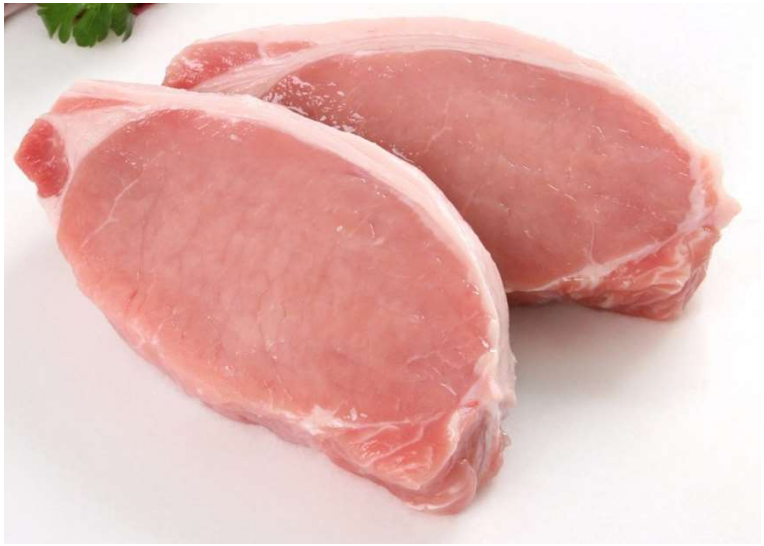
What were the samples?

- British Retailer Standard Pork
  - Red Tractor and Danish
  - Not dedicated supply chain
- Specialised UK Producer
  - Breeding selection on IMF
  - Dry-Aged - Easy improvement via process

Selection for IMF



Which Was Which?



- British Retailer
  - MAP = Cherry Red Colour
  - Leg, Shoulder and LD
  - Heavily trimmed
- Specialised UK Producer
  - Vacuum Pack = No Bloom
  - LD Only
  - Rind off – No trim
- 0.4 Redness change detectable

Which Would They Have Purchased?

	Retailer Standard	Specialised Standard	Specialised Dry-Aged
Colour	7.04	4.22	5.29
Fat	5.29	5.31	4.89
Marbling	5.84	4.04	5.67
Overall Liking	5.96	4.76	5.58

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Would it have been the right choice?

NO

Would it have been the right choice?

	Retailer Standard	Specialised Standard	Specialised Dry-Aged
Flavour	4.19	5.40	5.62
Tenderness	4.21	5.57	5.71
Moistness	3.81	4.95	5.38
Overall Liking	4.21	5.40	5.74

The (Lack of) Power of Their Senses

Actual	Suggestions
Musk	Wood, Potato, Fousty, Vinegar, Teenage boy's room!
Cedarwood	Sawdust, Banana
Skatole	Pig Farm, Curry

The Problem?

- Point of purchase decision
  - Price £$€
  - You buy with your eyes
    - Modified Atmosphere Pack vs. Vacuum Pack
    - Consumers prefer the “cherry red” colouring
      - Expected?

- And PBRT are supposed to be educated about pork!

Conclusions

- Perception isn't always right
- Consumer feedback can be somewhat confusing
- Knowledge doesn’t always result in expected outcomes.

The consumer can be educated

- Beef knowledge there.
  - Marbling
  - Aging
  - Vacuum Pack

MAP vs Vacuum

80% O_2, 20% CO_2

- Most commonly used packaging system
  - Bright Red Colour
  - +7 days shelf life
- Negatively effects eating quality
  - Lipid & protein oxidation
  - Toughening

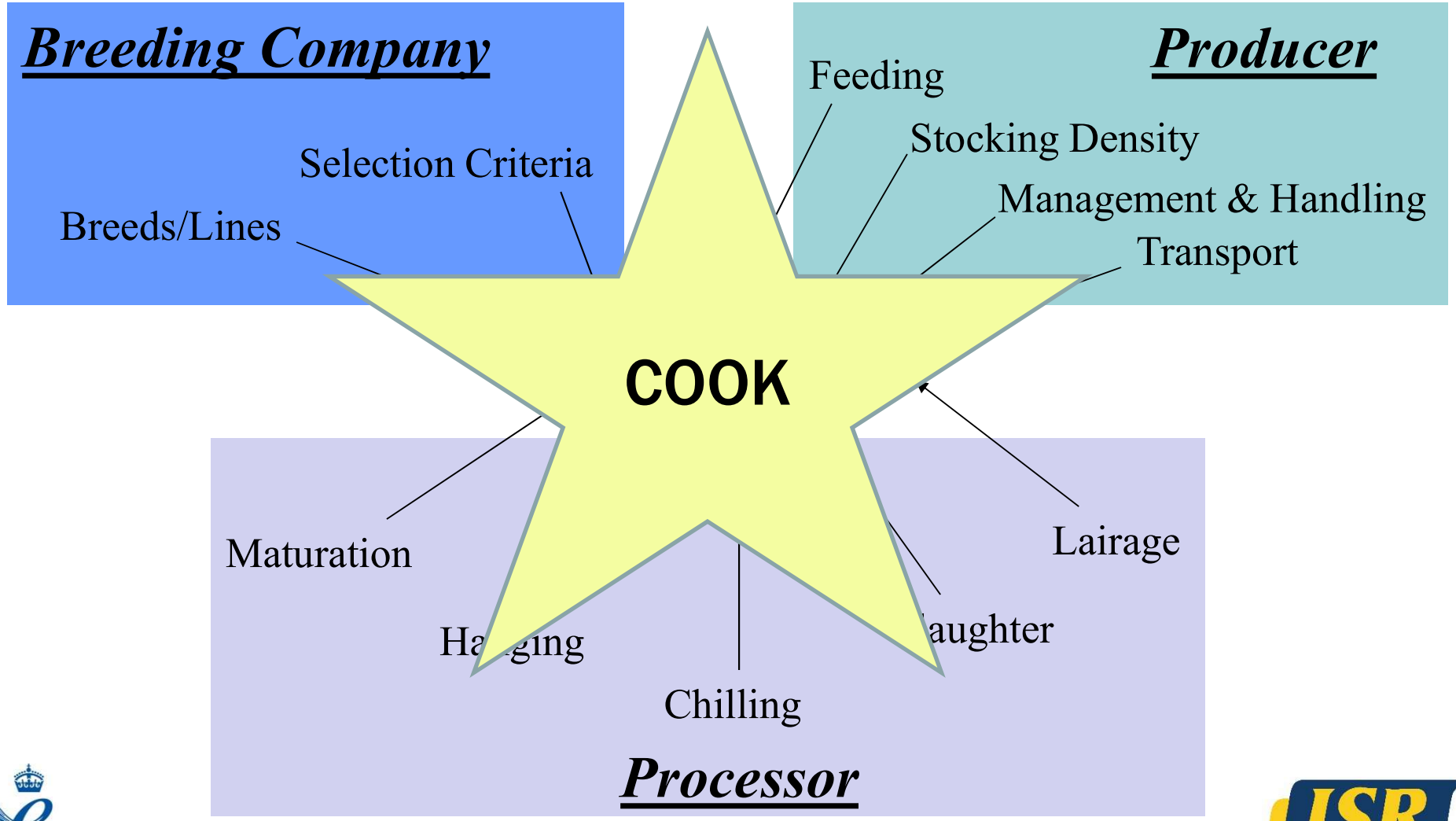
Vacuum

- Vacuum packed loins v MAP cuts stored 10-14 days
  - Less discoloration
  - Lower two-toning
  - Increased appearance scores
    - Colour stability
- Higher quality retail cuts

Eating quality is benefitted by vacuum packaging

So…Where to Start?

Who controls eating quality?



Where to Start?

- What are the easy wins?
- Implement what we know
- Is it measurable?

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS
Powered by Topigs Norsvin

Eating Quality

- Taste
  - Tenderness
  - Juiciness
  - Flavour

Correlations

	Texture	Juiciness	Flavour	Acceptability
Texture	1.00			
Juiciness	0.89	1.00		
Flavour	0.72	0.75	1.00	
Acceptability	0.90	0.89	0.87	1.00

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Easy wins

Genetics

- **See next presentation!!!**

Why is Marbling (IMF) important?

- Juiciness & tenderness perception interrelated in humans
  - IMF breaks up muscle structure = ↑ Tenderness
  - IMF causes salivation during eating = ↑ Succulence

- Fat = Flavour
  - Flavour develops from reactions in fat during cooking

- As IMF increases Overall Eating Acceptability increases

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Production

- Temple Grandin (1994)
  - 50% Producer
    - Genetics
    - Systems
    - Nutrition
  - 50% Processor/Packer
    - Post farm gate handling
    - Slaughter process
    - PM Temp profile
    - Aging
    - Packaging

Good Welfare = Good Eating Quality

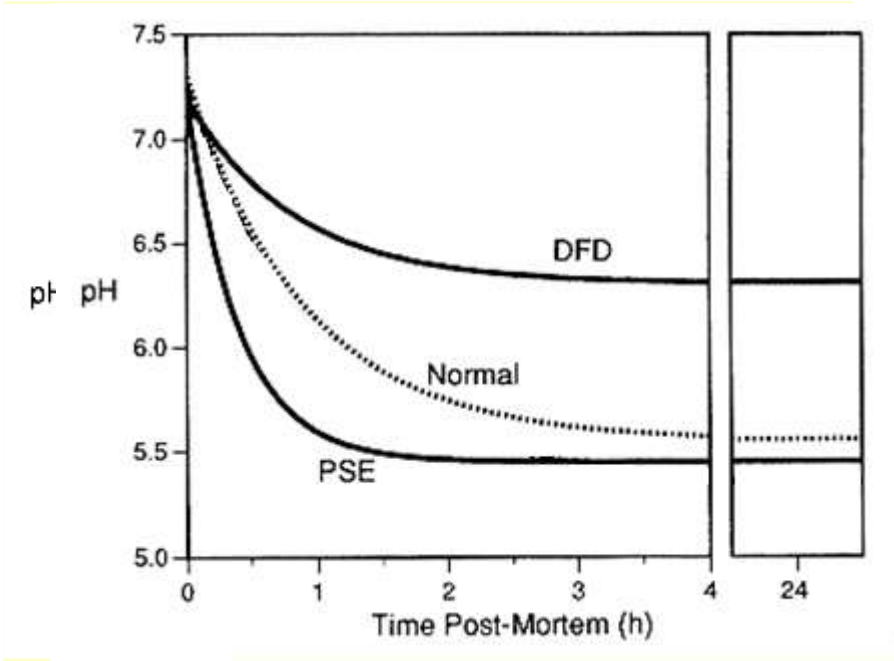
- Good animal welfare is good business
  - Based on facts
    - Not feelings
- Must be measurable
  - Examples
    - pH
    - Blood lactate levels, Cortisol
    - Lung lesions

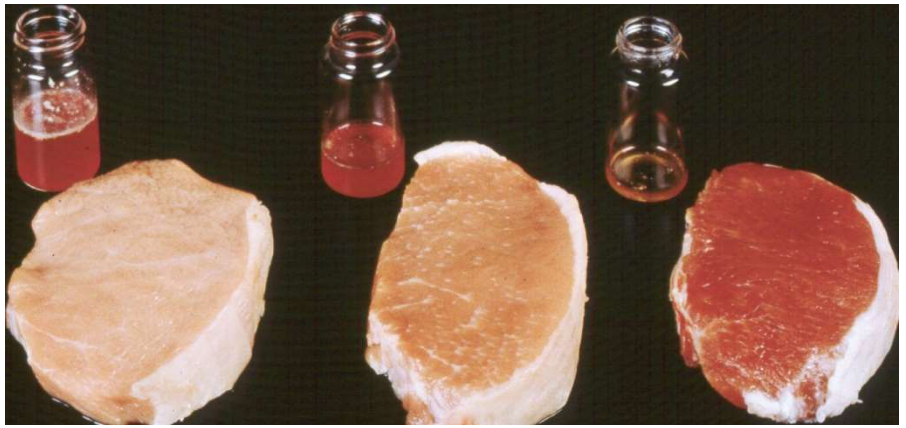
THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Welfare, WHC & pH

	PSE	Normal	DFD
pH_{45}	<6.0	6.4	6.4
pH_u	<5.3	5.5	>=6.0





Farm story is not correlated to eating quality

However, welfare is correlated to eating quality!

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Our piglets are weaned at four to eight weeks, and are kept in their family groups until slaughter – a pig that is kept with the piglets it recognises is much less likely to fight. The pigs live outdoors (with each family having its own shelter), and have constant access to food to avoid the stress and competition associated with set meal times. They live on a natural diet of homegrown cereal, with a protein content of around 12% to ensure they grow slowly and steadily. They reach slaughter at around 24 weeks, while a more intensively reared animal can be killed at around 17.

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Production System

- Optimisation of production system essential.
- Interrupted growth produces the toughest meat.

	Fast	Slow	Interrupted	
Drip (%)	4.3	4.4	5.1	**
Lightness (L*)	54.1	54.5	55.6	**
Toughness (Kg)	4.4	5.2	5.4	***

Research carried out for BPEX by Leeds Uni, Geo Adams & Bristol Uni

Animals that don’t meet their growth potential give poorer eating quality

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Working Together

Pre-Slaughter Fasting

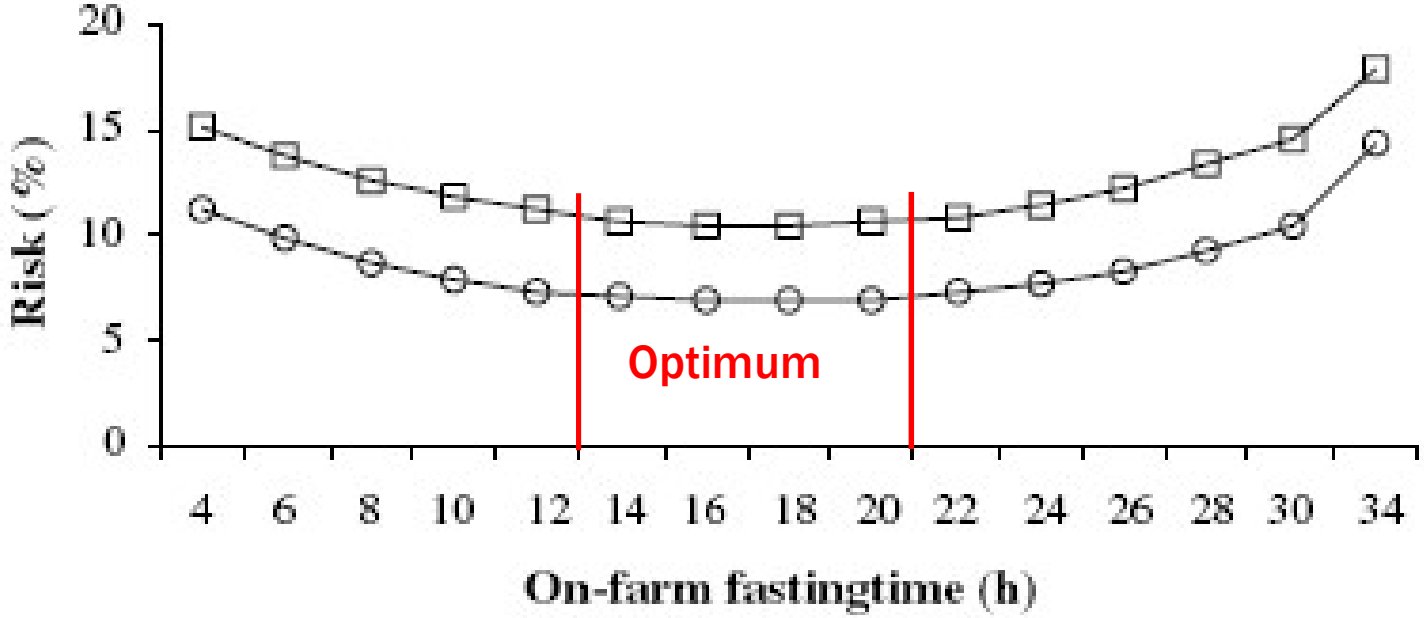
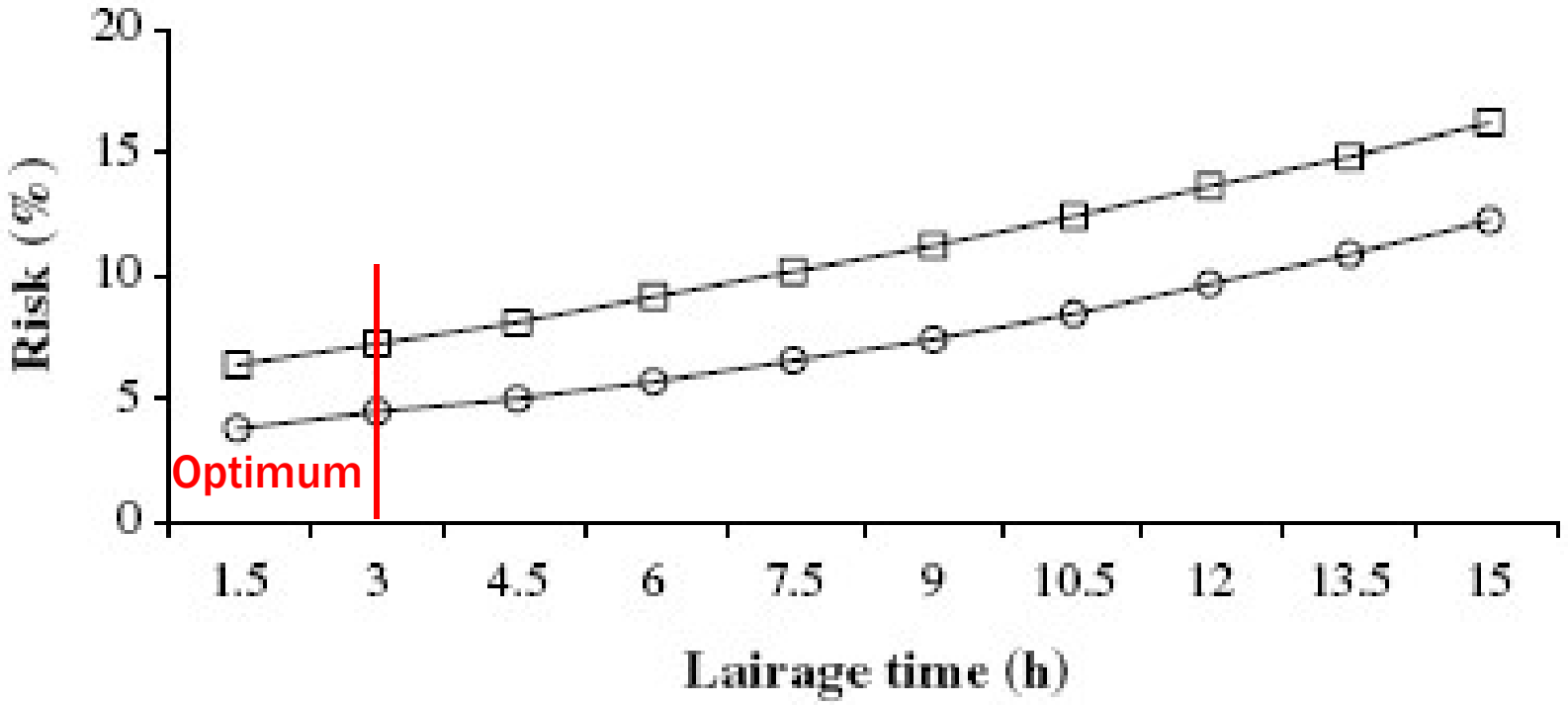


Fig. 1. Risk of moderate (□) and serious (○) DFD meat by on-farm fasting time.

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Lairage


20
15
10
5
0
Risk (%)
Optimum
1.5
3
4.5
6
7.5
9
10.5
12
13.5
15
Lairage time (h)

Post Farm Gate Optimisation

- Fasting pigs
  - Lower Risk of DFD meat
    - Not wasting money on gut fill
- Load pigs on time, keep to delivery slot
- Avoid overnight lairage at all costs

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

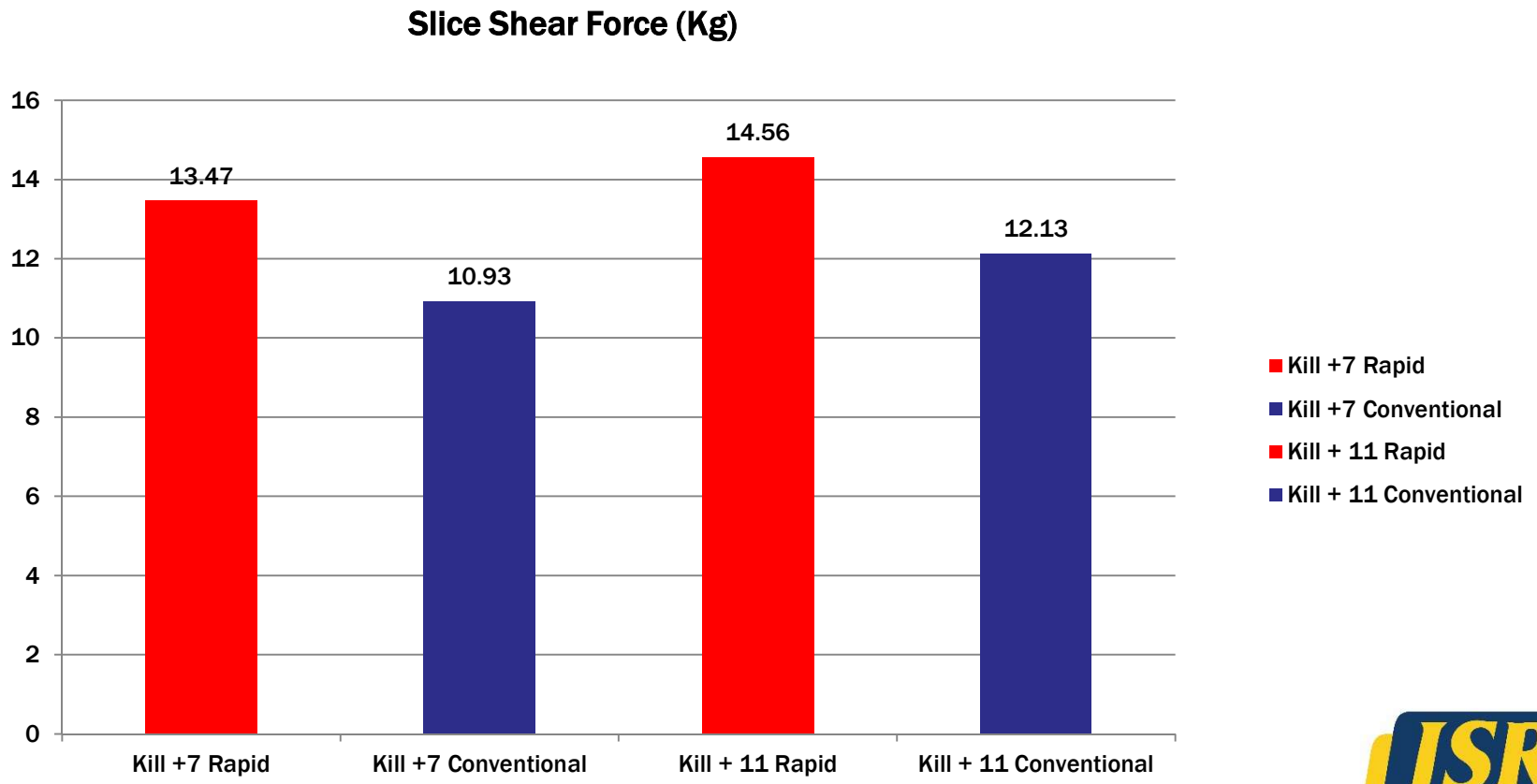
Changes needed on the slaughter line

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Chill Rate Effects

- If not implemented correctly
  - Muscle temperature <10°C prior to pH6
    - Cold Shortening



THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

Incorrect implementation of blast chilling negatively effects eating quality

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

The uncontrollable factor

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS Powered by Topigs Norsvin

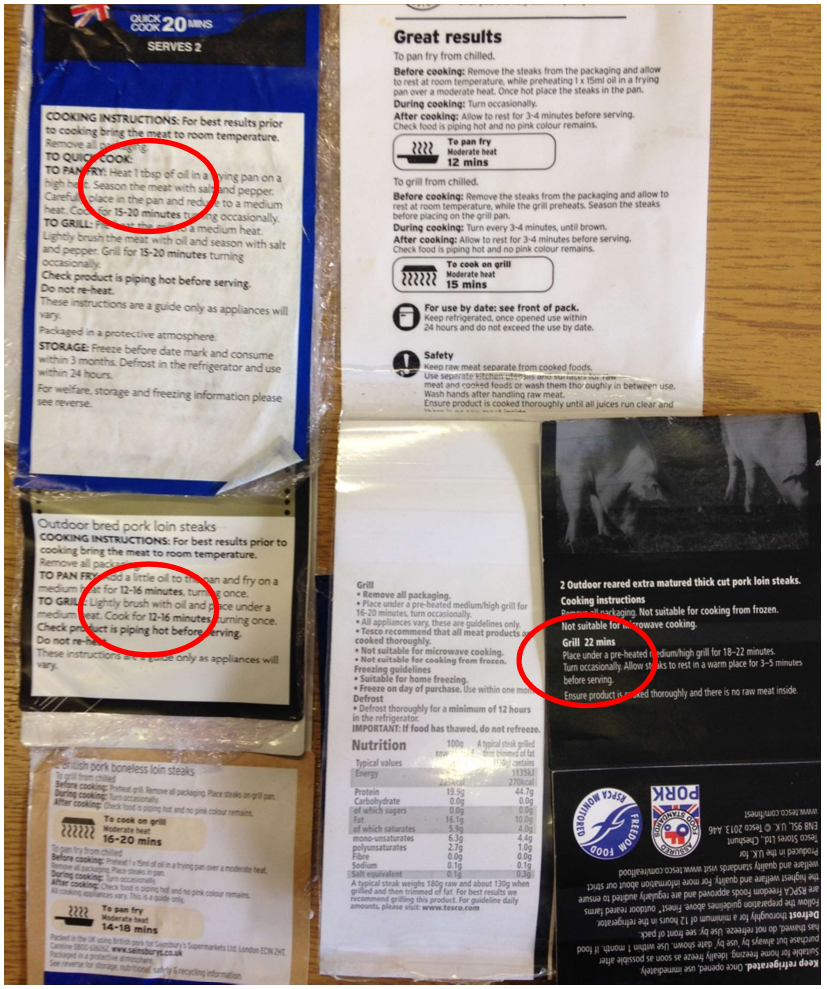
The Cook

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS
Powered by Topigs Norsvin

Where is it going wrong?

- "Worms"
  - Hep E?
- Follow the instructions…
  - Grill or Fry?
  - Moderate Heat…
  - Grill – 12 – 22min
  - Fry – 12 – 20min



THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2012

JSR GENETICS
Powered by Topigs Norsvin

Without a consumer we don't have an industry.

It all starts with educating the consumer

Thank You