

Maximising the performance of NZ export beef

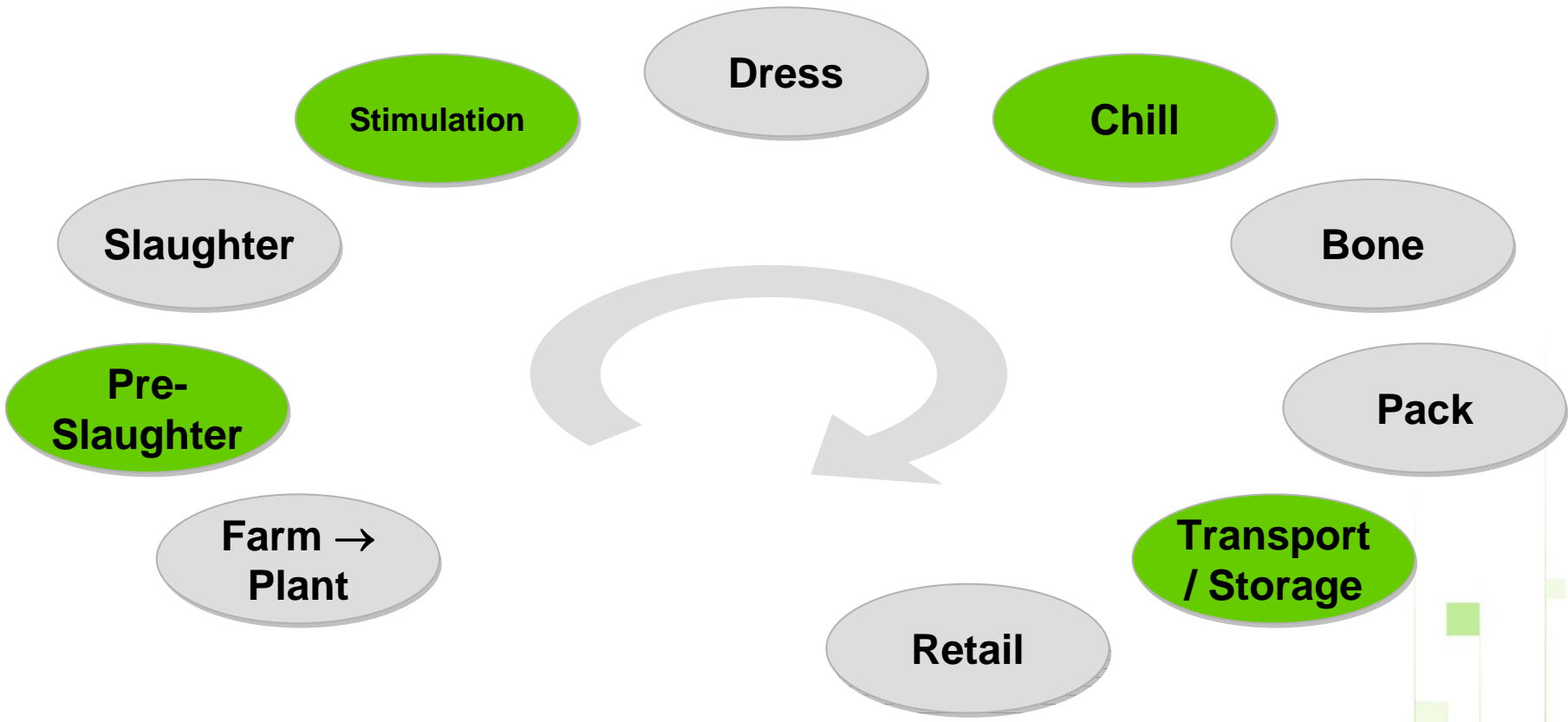
M.M. Farouk and E. Wiklund



Farming, Food and Health. **First**

Te Ahuwhenua, Te Kai me te Whai Ora. Tuatahi

Fit with process

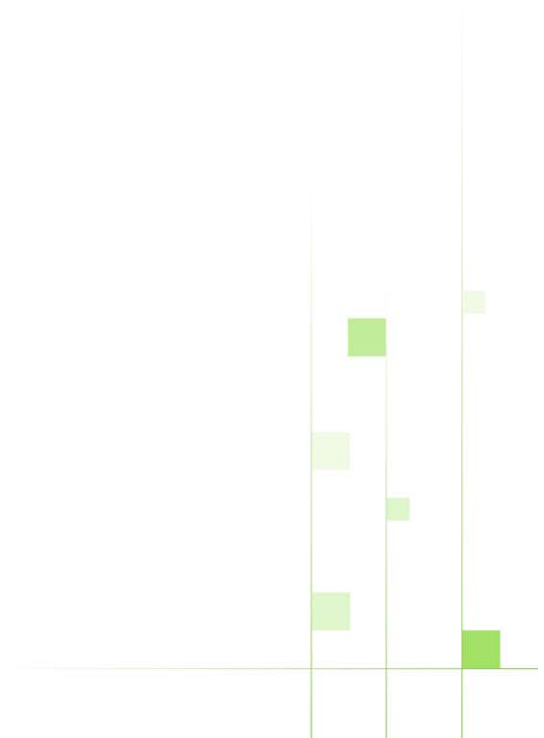




Aim:



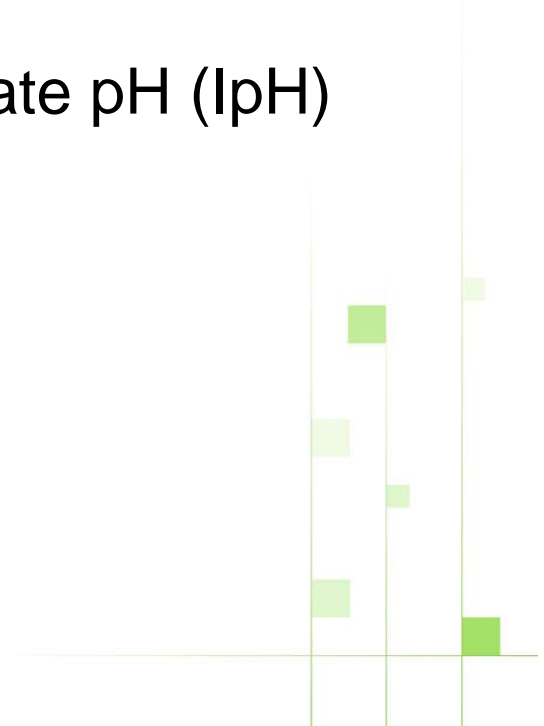
To improve the performance, quality and consistency of intermediate pH bulls to provide NZ beef processors the tools to transform frozen commodity beef into value added chilled cuts



The Issues

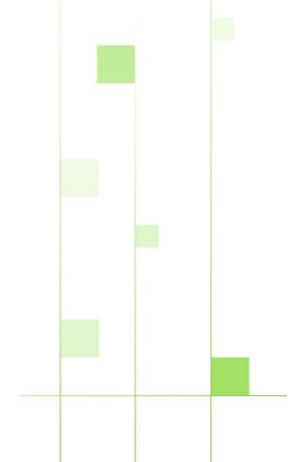
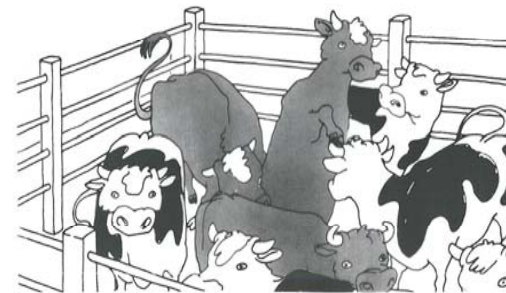
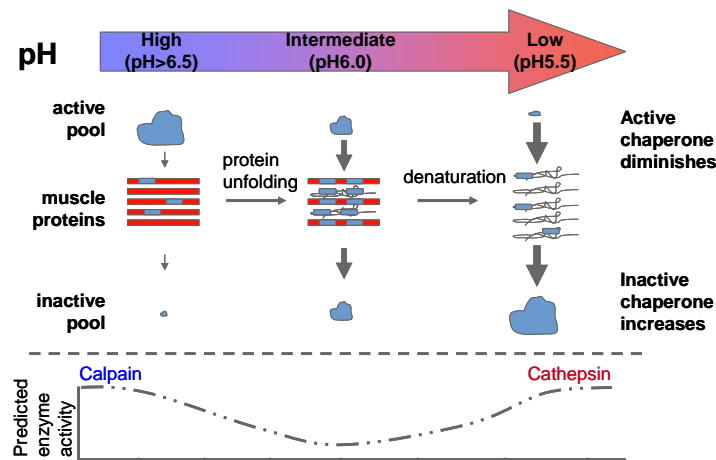


- Changing face of NZ agriculture
- More dairying, increased bull production
- Increased high and intermediate pH meats
- Sustained toughness and lack of consistency of intermediate pH meats
- Reasons for the toughness of intermediate pH (IpH) meat not yet known



The hypothesis:

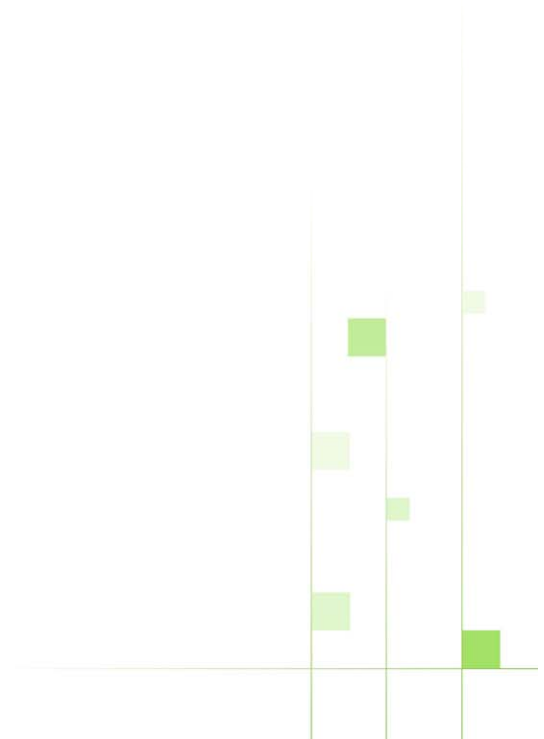
- Chaperone proteins especially small heat shock proteins (sHSP) play an important role in the toughness of intermediate pH meats
- The dynamic relationship between post-mortem structural changes and waterholding ability of meat is an important quality issue next to toughness in IpH meats



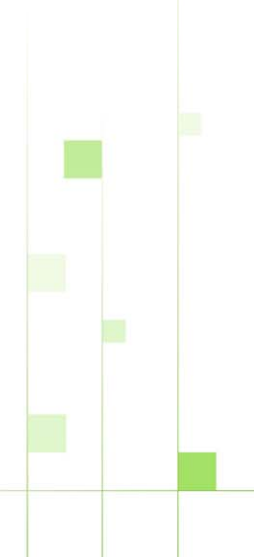
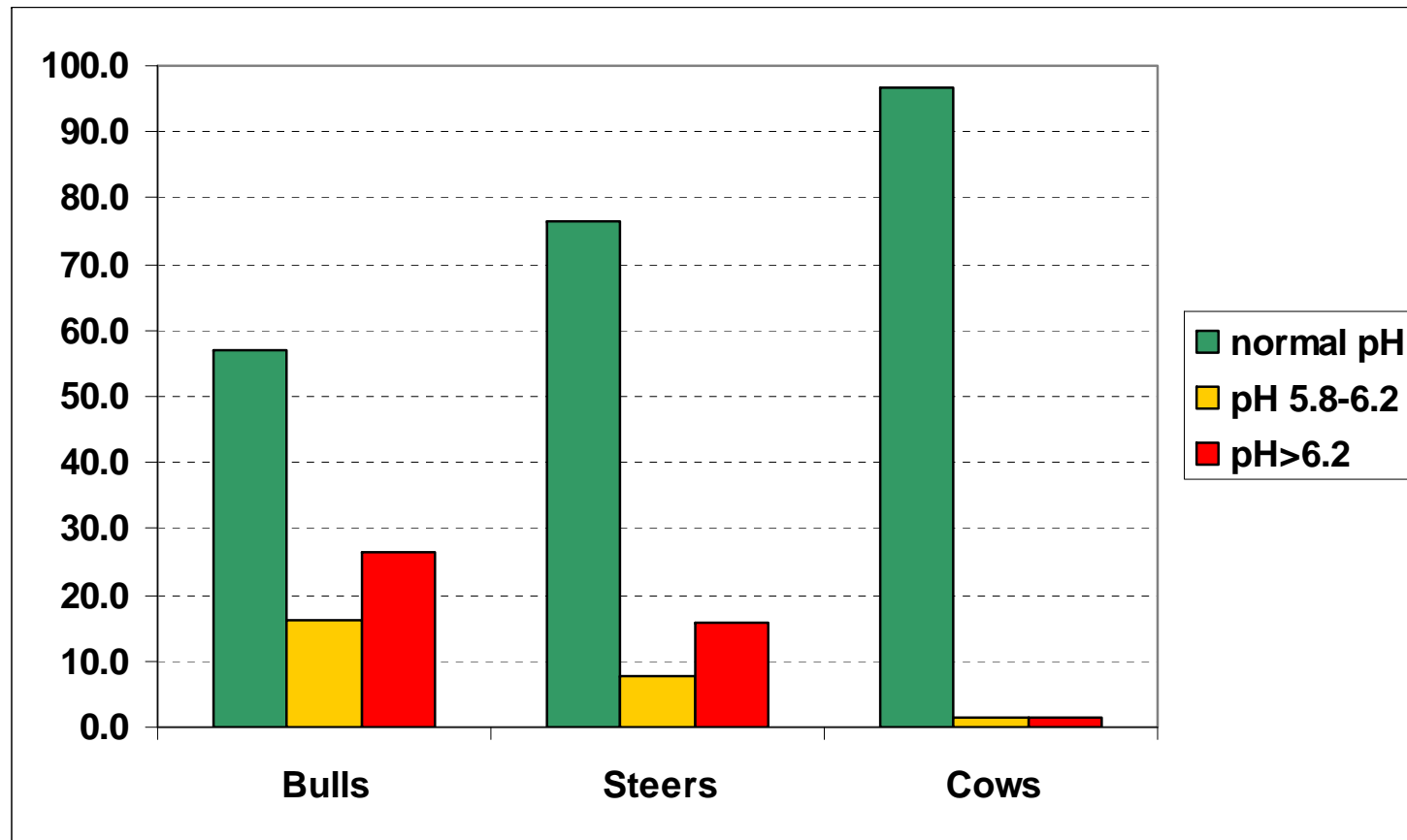
2007/2008 Outcomes



- Bull beef pH survey
- Waterholding in chilled bull beef
- Eating quality of conditioned-thawed vs chilled-never-frozen meat



Normal, intermediate and high pH in beef (%) (n=750)

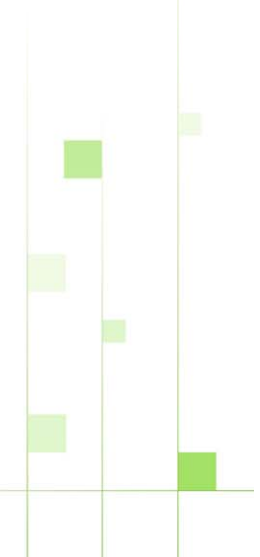


Moisture loss in bull beef during chilled storage					
Storage time	Purge	Honikel	Centrifuge	Cook loss	Total loss
Force	Vacuum	Gravity	Centrifugal	Heat	
0	0.0	4.8	5.3	28.9	34.0
1	1.7	3.6	11.8	26.0	31.6
3	2.6	2.5	6.8	31.4	36.8
6	3.1	2.0	6.0	29.4	34.7
9	3.6	1.7	4.3	29.1	35.0
	p<0.001	p<0.001	p<0.001	NS	NS

Storage and distribution

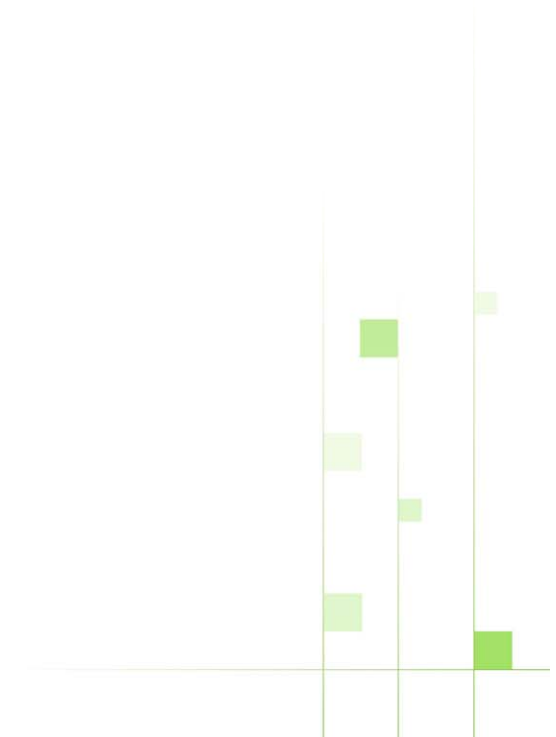
Retail display

Cooking



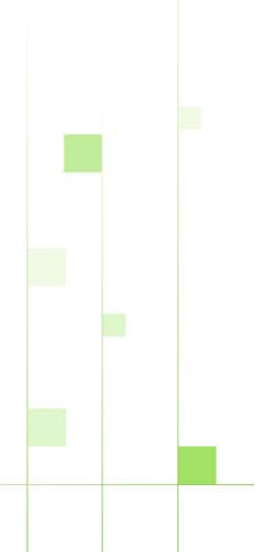
Total loss – *Rigor loss + Purge loss + Drip loss (Honikel) + Cook loss*

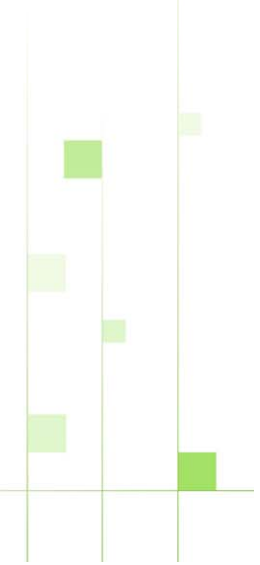
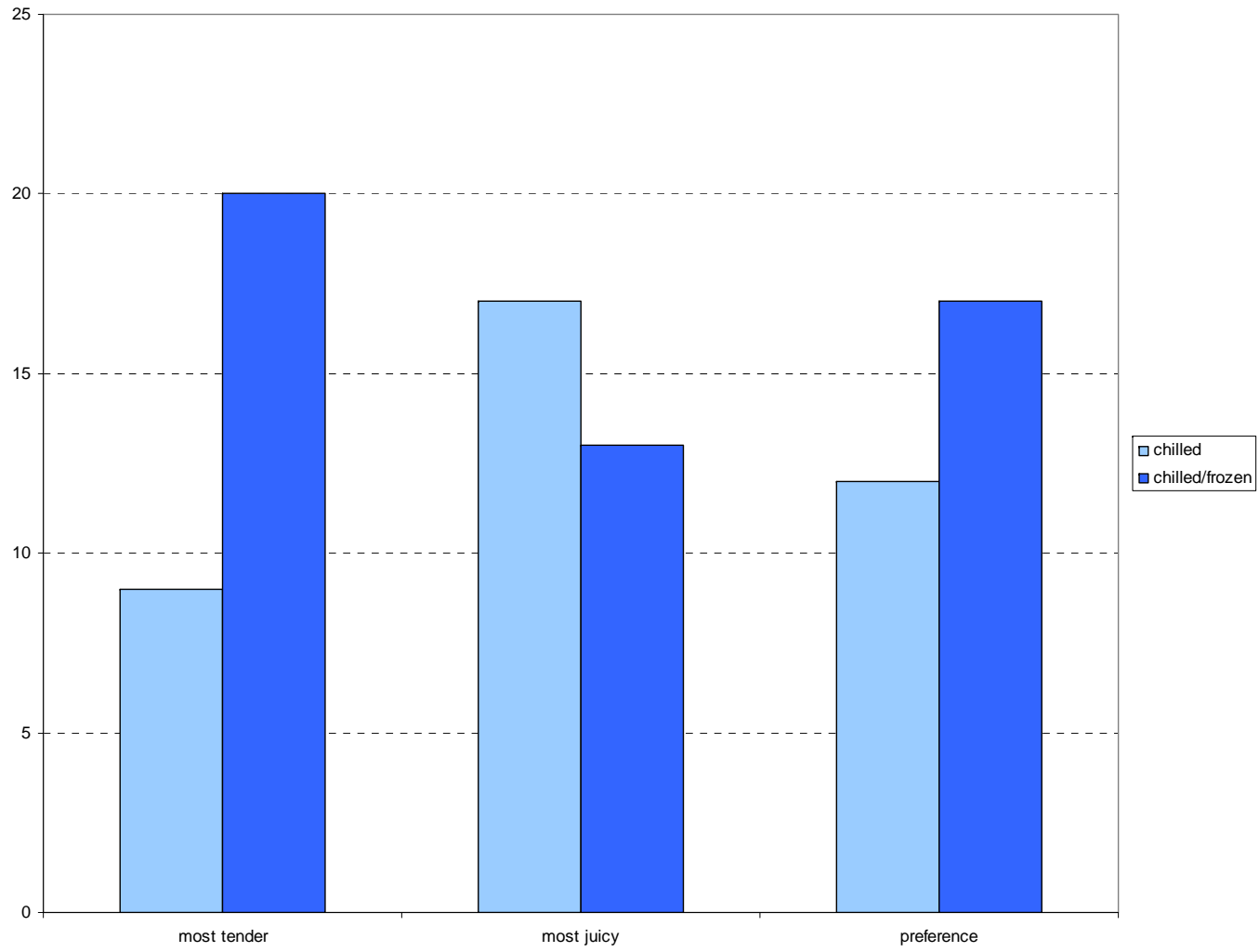
Effect of rigor temperature on total moisture loss (%) in bull beef		
Storage time	15	35
0	30.3	37.8
1	31.3	32.0
3	35.6	38.0
6	32.6	36.9
9	32.4	37.5
Grand mean	32.4	36.4
Significance	p<0.001	



Effect of chilled vs chilled-frozen storage on lamb quality					
Treatment/attributes	pH	Purge, %	Cook loss, %	Total loss, %	Shearforce, kgF
Chilled	5.69	7.52	27.40	34.92	2.81
Chilled-frozen-thawed	5.69	6.21	26.06	32.27	2.92
SED	0.00	0.63	0.98	1.22	0.17
<i>p</i> -value	0.99	0.04	0.18	0.04	0.50

- Experiments replicated twice at different times
- To be repeated using beef, venison and different muscles
- Intermediate in value to chilled and frozen meat suitable for HR outlets





2008/2009 Outcomes



- Final results of Bull beef pH survey
- Rapid method of quantifying sHSP in bull beef
- Rapid method of determining structural changes in beef
- Rapid objective method of determining texture and juiciness of meat
- Confirmation of the quality of conditioned-thawed vs chilled-never-frozen bull beef, lamb and venison
- How to produce thawed bull beef with chilled-never-frozen meat eating quality

