



Te Pou Oranga Kai O Aotearoa

Testing Livestock Feeds for Ruminant Protein

Terry Ryan

Content

- **Background**
- **NZ testing programme**
- **Conclusions**

BSE Transmission

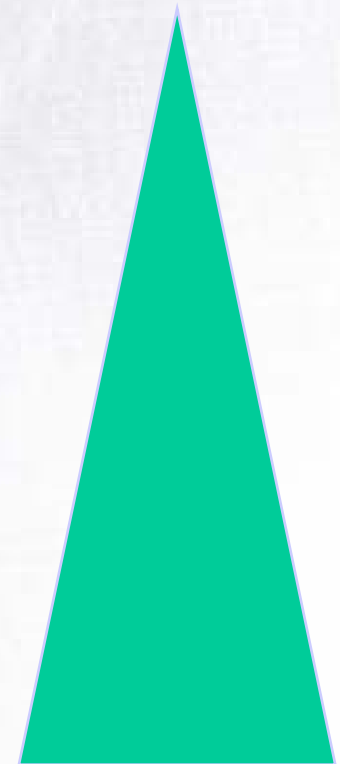
- Contaminated feed the key
- New Zealand
 - Entry
 - Spread within
- Infective dose very small
 - 0.01 to 0.1 g



Feed Controls

Feed Controls - Scope

- **The Agent (Prions ?)**
 - Specified Risk Materials (SRMs)
 - Ruminant Protein
 - Mammalian Protein
 - Animal Protein
 - Vertebrate Protein



Feed Controls - Scope

- Ruminant **NZ, Canada**
- Mammalian **USA**
- Animal
- Vertebrate **EU, Australia**

Dedicated Production Lines : EU & USA

Feed Controls - Scope

- **Why the difference ?**
 - **BSE status**
 - **Ability to validate the feed ban**
 - **Risk aversion**

Feed Tests for MBM

- **Microscopic Analysis Test (MAT)**
 - Muscle & bone fragments
- **Immunoassay**
 - Muscle antigen complexes
- **Polymerase chain reaction (PCR)**
 - DNA
- **Others**
 - HPLC, NIR

Microscopy

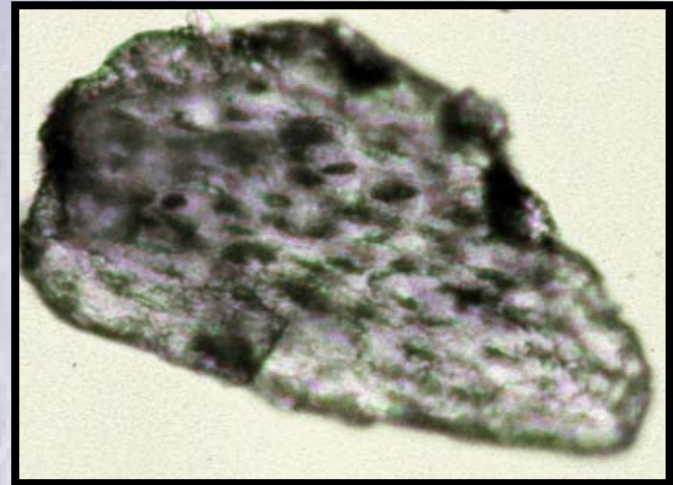
- **International Standard**
 - **EU Directive 98/88**
- **Limit of detection**
 - **0.1% w/w**
- **Scope**
 - **Terrestrial animal bone, muscle**
- **Used**
 - **EU, USA**
- **NZ\$ 140 / sample**



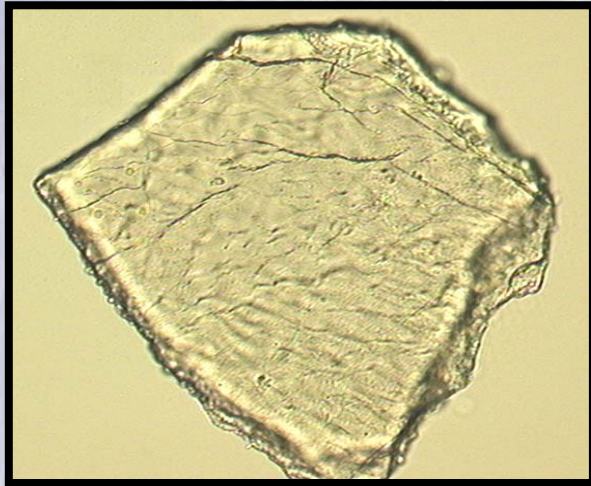
Ruminants
Non-Ruminants
Birds



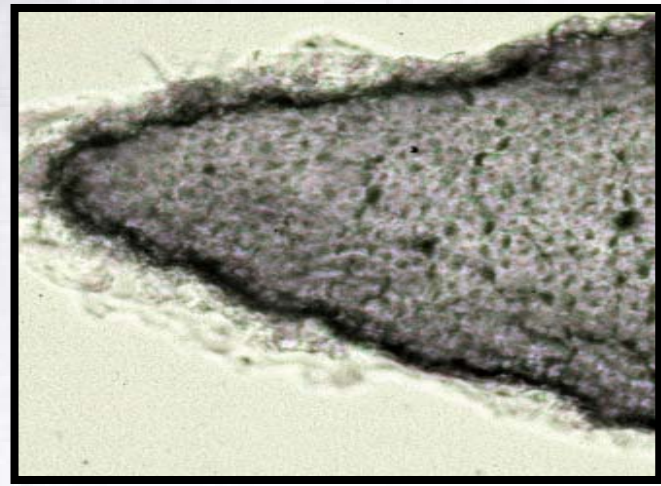
Avian Bone



Animal Bone



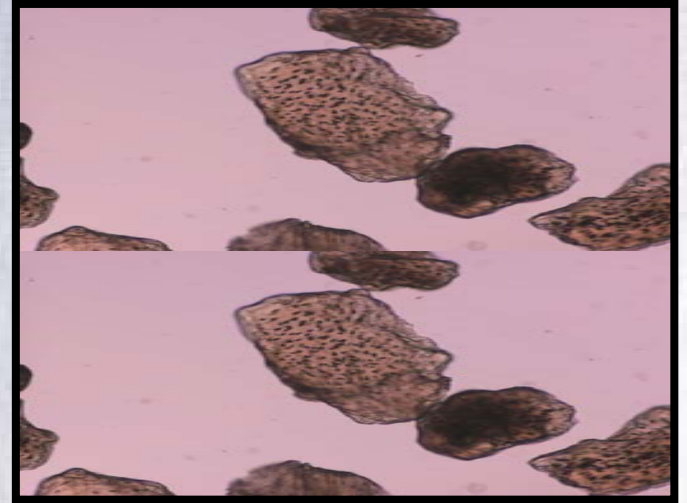
Fish Bone



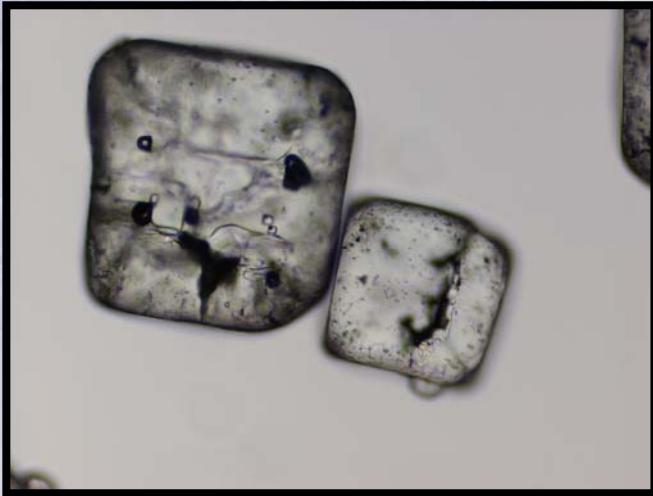
Pea Pulp



Muscle



Terrestrial Bone



Salt



Soya

Immunoassay

- **Assay system**
 - **ELISA strip test**
 - **Electrophoresis**
- **Limit of detection**
 - **0.1% to 1% w/w**
- **NZ\$ 75 / sample**

ELISA Strip Test

Test Strip

1% Control



Neogen® Evaluation

			Ruminant Protein Positive		Total
			Positive	Negative	
Neogen Final	Positive	Count	9	4	13
		% within Ruminant Protein Positive	100.0%	14.3%	35.1%
	Negative	Count	0	24	24
		% within Ruminant Protein Positive	.0%	85.7%	64.9%
Total		Count	9	28	37
		% within Ruminant Protein Positive	100.0%	100.0%	100.0%

PCR

- Assay
 - Species (bovine, ovine, etc)
 - Ruminant
- May combine with DNA sequencing
- Limit of detection
 - 0.01% to 0.5% w/w
- NZ\$ 300 to 400 / sample

Accuracy

	True +	True -	Comment
Strip Test	Good (1%)	Moderate	
Microscopy	Good (0.1%)	Good (Poultry)	EU Standard
PCR	Good (0.01 to 0.5%)	Good (Milk)	Lab Differences

NZ Testing Procedure

- **Screen**
 - **Immuno-assay**
- **Confirmatory**
 - **Microscopy & PCR**
- **Outcome**
 - **Negative**
 - **Suspect**
 - **Positive**

NZ Testing

- **Random & Targeted Components**
 - With follow-up
- **Random**
 - 3/202 (1.5%)
- **Targeted**
 - 15/94 (16%)
- **Final third all negative**

NZ Testing

- **Key Issues**
 - **Renderers**
 - **with mixed lines**
 - **Labeling**
 - **non-ruminant feeds**
 - **Imports**
 - **all negative**

Conclusions

- **Testing**
 - **Not a simple solution**
 - **Denatured product**
 - **Experience**
 - **Technology**
 - **Influence of adopted regulatory control**
 - **Limit of Detection versus Infective Dose**

Conclusions

- **NZ Experience**
 - **Identify problems**
 - **Some renders**
 - **Labeling issues**
 - **Clarify a complex area**
 - **Future**
 - **Verify processing systems**
 - **Good Manufacturing Practice**
 - **Product testing**

Acknowledgements

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