

Informed Decisions on Grain Quality

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Introduction

- Feed-70% cost of producing a pig
- Cereals – up to 75-80% of pig diets
- Do we buy quality?
- What is quality?
- Are we getting value for money?
- Once bought do we take care of it?
- Do we get the full value of the cereal?

Hectolitre Weight

- Standard measure of cereal quality in Ireland
- Mass / storage volume (density) measure
- Expressed in kg per hectolitre (100 litres)
- **Bushel Weight = HLW x 1.25**
- Low hectolitre weight
 - less starch
 - more fibre
 - more foreign material
 - poorer FCE
 - ADG normally unaffected



Hectolitre Weight

“Rules of Thumb”

- Purchase above:
 - 72 – wheat
 - 60 - barley
- Small differences of 2 - 4 KPH - poor indicators of a difference
- Below 56 for wheat & 50 for barley – ADG also reduced





Hectolitre weight of wheat & performance of finishing pigs

	Hectolitre weight		
Relative performance (%)	74	64	56
ADG	100	101	102
Daily Intake	100	107	110
FCE	100	107	108

(Parker 1991)



Pricing low HLW wheat for pig diets

- Wheat

- HLW 63-68 ~ 93% price of 72 HLW
- HLW 56-62 ~ 90% price of 72 HLW

- Barley

- HLW 50-56 ~ 90% price of 60 HLW



Better predictors of feeding value

- HLW - Poor predictor of DE / pig performance
- Chemical characteristics more accurate
- Accuracy of prediction for wheat (R²%)
 - Xylose = 61
 - NSP = 54
 - CP & NDF = 75
 - CP & CF = 67
- Accuracy of prediction for barley (R²%)
 - ADF = 85



Provider of NIR Calibrations for Feed Grain Analysis



PORK COOPERATIVE RESEARCH

Are you using all the available energy from the grain you feed?

AusScan provides the answer!

Pig nutritionists and feed suppliers can now measure grain DE using NIR technology developed by the Australian pig industry. Rapid analysis NIR technology provides a low cost and accurate method of determining the DE content of grains. Make sure you access this latest technology and the feed cost savings it offers.

If you are not regularly getting your grain analysed for DE, you are WASTING MONEY! Without knowing the DE content, your nutritionist is relying upon book values. Grain can vary by 3-4 MJ DE/kg-; unless you test the grain you don't know if it is high or low DE!

You may be losing up to \$20 for every tonne of grain your operation uses!! This equates to \$85/sow/year.





Wheats fed to finishing pigs

Quality	High	Good	Poor
Origin ¹	Britain	Ireland	Ireland
HLW (Kg/hl)	74.2	73.3	67.0
Price (%)	100	100	93

¹ Wheats harvested after a bad summer

(Lawlor and Lynch, 1999)



Effect of wheat quality on finisher pig performance

	High	Good	Poor
Feed Intake (g/day)	2055 ^a	2086 ^a	2276 ^b
Daily gain (g/day)	727 ^a	667 ^b	703 ^{a,b}
FCE	2.94 ^a	3.22 ^b	3.28 ^b

(Lawlor and Lynch, 1999)

When we look at the analysis

	Table	High	Good	Poor
Origin	-	GB	IRL	IRL
HLW (Kg/hl)	-	74.2	73.3	67.0
Crude protein (%)	13.0	11.6	10.3	10.6
Fibre (%)	2.10	2.15	2.52	3.09
DE (MJ / Kg) *	13.8	14.2	13.7	13.5
Y & M count (10 ⁴ /g)	-	4.5	38	65

(Lawlor and Lynch, 1999)



Lessons learned

- Margin over feed differential between HQ and GQ
= **€6.93 / pig**
- Value of predicted DE
 - Could predict poor performance of the GQ vs HQ
 - But not the poor performance of the GQ vs PQ
- The yeast and mould count may help
- However – mould presence \neq mycotoxin present
- Place for NIRS
- Book values ??



Drying

- Grain temp. should not exceed 70⁰C
- Damage ↑ where exposure time is high
- Protein is denatured ⇒ reduced ADG
- 104⁰C for 30 mins ↓ available lys by 7%
- Vitamin levels may also be reduced

Fineness of Grind

- Grinding
 - Reduces particle size
 - ↑ surface area for digestive enzymes
- Optimum – 650-750 microns
- Whole or partial seeds in feed
 - hole in screen
 - 5-8% deterioration in FCE
- Below 600-700 microns
 - Gastric ulcers
 - Bridging – out of feed events
 - ↑ processing costs





Other

- Breeding for feeding?
- ↓ crude protein content



Summary

- Hectolitre weight – poor predictor of nutritive value
- Better predictors available
- NIRS cost effective and quick
- Choosing the wrong batch is costly?
- Don't exceed a grain temperature of 70°C
- Buy clean, screened grain at <14-15% moisture
- Store in sanitised dry bins and maintain cool
- Aim for average particle size of 650 to 750 microns



Sprouted Grain

- Warm prolonged harvests
- Starch lost to sprouts – DE ↓
- DE drops 0.3-0.4% for every 1% increase in sprouted grain
- Only above 30% sprouted grain will reduce ADG



Outline

- Introduction
- Hectolitre weight
- Better predictors
- Drying Temperature
- Mycotoxin Contamination
- Fineness of grind
- Summary



Mycotoxin Contamination

- Secondary metabolites of mould growth
- ADG, FCE & Fertility
- Immunosuppressive
- Weather damaged grain
- Mould \neq mycotoxin – must test
- Good sampling
- Clean, dry, and store correctly
- Binders help if present at low levels