

Grain Treatment Programme Operator Training

Cooney Grain, Gorey, Co. Wexford.







- 1. Pre Harvest Preparations
- 2. Grain Storage
 - a) What is it
 - b) What are the Risks
 - c) Understanding the Risks
 - d) Moisture/ Temperature Relationship
 - e) Consequences of Bad Storage

3. Grain Treatment Programme

- a) Liquid Preservative
- b) Application and Application Systems
- c) Aeration and Ventilation
- d) On Going Monitoring
- 4. Summary



Pre Harvest Preparations







Risk Assessment

HACCP Principles

Minimise/Eliminate Risks









Pre Harvest Preparations

- Repairs Buildings, Equipment, Pipes/Ducts
- ✓ Cleaning Bins, Stores, All Equipment.
- ✓ Disinfection All areas.
- Calibration Moisture Meters, Liquid Application, Intake Equipment
- ✓ Training H&S, Operating Procedures
- ✓ Supplies Liquid, Spare Parts, Recording,



Grain Storage







Grain Storage - definition

Stored Grain is a Dynamic Ecosystem

in which

Living Organisms (Grain, Moulds, Mites, Insects)

interact with

Non Living Environment (Temperature, Moisture, Oxygen)





Grain Storage - what are the Risks?

- Heating
- Condensation
- Mould
- Bacteria
- Insects & Mites
- Birds & Rodents





Grain Storage - understanding the Risks

- Heating Respiration, Activity of other organisms
- Condensation Moisture due to air temperature changes - causes "crusting", damage to buildings
- Moulds live and grow on the grain, degradation, produce Mycotoxins
- Bacteria live and grow on the grain, degradation, produce Toxins
- Insects & Mites eat the grain, cause heating, allergens
- Birds & Rodents eat the grain, cause damage, spread disease.





Grain Storage - Issues to consider

- Late Cut Grain V. High Moisture. Ends up at the peak of the pile
- Carry over of Dust/Chaff at the end of the conveyor/store
- Resistance to airflow air takes path of least resistance
- Crust forming in top layer Happens when warm air rising in the pile condenses when it meets cold air at or just below the surface of the grain
- Warm air rising from the grain must be removed from the space above the grain otherwise it will condense.
- Can aerate when raining?





Grain Storage - Moisture/Temperature Relationship







Grain Storage - Consequences if unsafe





Grain Treatment Programme







Grain Treatment Programme - What is it?

3 Stages

- Application of a Liquid Preservative (MycoCURB ES Liquid/MouldMaster)
- Aeration & Ventilation
- Monitoring during Storage





Grain Treatment Programme - Why is it done?

Mould Reduction and Inhibition

RAPID TREATMENT AFTER HARVESTING LEADS TO LARGE **INITIAL** REDUCTION IN TOTAL MOULD COUNT

		Moisture	ТМС
Sample 1	Green Grain A	17,0	49,000
	Treated Grain A	16,3	1,400
Sample 2	Green Grain B	17,0	31,000
-	Treated Grain B	17,5	600
Sample 3	Green Grain C	23,7	550,000
-	Treated Grain C	22,4	200





Grain Treatment Programme - Why is it done?

Mould Inhibition throughout Storage

GRAIN QUALITY TRENDS 2001 - 2011

2001-2011 GRAIN QUALITY ANALYSIS (CFU/G)

QUALITY COMPARISON OF AERATED, DRIED AND ADESCO TREATED GRAIN



Source: Adesco Database





Grain Treatment Programme - Liquid Preservative

MycoCURB ES Liquid/ MouldMaster Liquid

- Mould Inhibitor & Active against Mites
- High Level of Active Ingredients >75%
- Contains 2% Surfactant
- Safe for Operators and Equipment
- High Efficacy at low application rates
- Broad Spectrum Usage
- Low Volatility





Grain Treatment Programme - Liquid Application

- Equipment Throughput check (Winter vs. Spring Barley)
- Application Equipment Service & Calibration Report
- Operator Training Correct settings
- Moisture Measurement Separate Piles
- Sensors, Controls & Alarms working
- Good Mixing
- Recording Sample record sheet review





Grain Treatment Programme - Liquid Application

1 objective







Grain Treatment Programme - Liquid Application



Distribution



Control

Mixing





Grain Treatment Programme - Application Chart

Application rates for Adesco grain preservation

More Powerful. More Flexible.

H

Adesco MycoCURB® ES is proven at up to 24% moisture

MOISTURE%	MycoCURB® ES kilos/tonne*				
(UP TO)	Up to 4 months	4 to 12 months			
15%	0.50	1.00			
16%	1.00	2.00			
17%	2.00	3.00			
18%	3.00	4.00			
19%	3.75	4.75			
20%	4.50	5.50			
21%	5.50	6.50			
22%	6.50	7.50			
23%	7.50	8.50			
24%	9.00	10.00			
24% AND ABOVE	NOT RECOMMENDED	NOT RECOMMENDED			

*Individual usage rates should be discussed with your Adesco Representative.





Application System Service and Calibration







Grain Treatment Programme - Record Sheet

GRAIN TREATMENT DAILY RECORD SHEET					INTAKE RATE						
LIQUID PRODUCT				BARLEY (TPH) W		WHEA	WHEAT (TPH)		BEANS(TPH)		
Date	Time Grain Moisture %	Grain	App Rate/	Pump	Product Meter Reading		Grain	Calculated			
		tonne	Setting	Start	Finish	Usage	Treated (Tonnes)	Av. Rate/ Tonne			
Comments / Signature							Product Opening Stock (T)				
								Product Closing Stock (T)			
Adesco Training	& Development	o									



Aeration and Ventilation







Aeration & Ventilation - Moisture/Temperature Relationship







Aeration & Ventilation - Cooling Fronts

Cooling targets







Aeration & Ventilation

Aeration - Essential to reduce grain temperature to prevent insect growth.

Some common insects need temperatures above 21°C to breed - other less common ones can breed down at 12°C

Grain Temperature Reduction 1st Target < 15°C after 2-4 weeks 2nd Target < 10°C after 4-6 weeks





Aeration & Ventilation







Grain Treatment - Aeration & Ventilation







Aeration - Good design is ESSENTIAL

- Amount of air required /tonne
- Air Speed
- Type of Fan
- Fan Capacity
- Duct/Pipe Capacity
- Duct/Pipe Spacing
- Height of grain
- Method of Filling





Aeration & Ventilation - Design







Aeration & Ventilation - Operation

Aeration - Good Operation is VITAL

- Start Early- Cover ducts, Block Pipes
- Air/Grain Temperature Difference at Least 4° C
- Don't let temperature of the grain go above 25° C
- Remember Targets

1st Target - Grain Temp. <15°C after 2 - 4 weeks 2nd Target - Grain Temp. <10°C after 4 - 6 weeks

- Aerating at Night
- Differential Control
- > Air Extraction





Aeration & Ventilation - Operation

Ventilation

- Warm air rising from the grain must be removed from the space above the grain otherwise condensation will occur on roof sheeting etc.
- \succ Extraction fan capacity = to aeration fan(s) capacity.
- Try and keep the air temperature in the roof space above the grain the same as the outside air temperature.
- Need open area at opposite end of the store to let air in when running ventilation fan (especially if Aeration fans are not running)





Aeration & Ventilation - Ongoing monitoring

- Monitor Grain Temperatures- Daily, Weekly, Bi Weekly, Monthly
- Temperature Probes- Positioning Important in sloped pile
- Visual Inspection- Temperature Probing
- Remember Targets

1st Target - Grain Temp. <15°C after 2 - 4 weeks
2nd Target - Grain Temp. <10°C after 4 - 6 weeks
➢ Records





Advantage Programme - Monitoring During Storage



Summary

competitive by nature

Grain Treatment Programme - Summary

- Get ready for the harvest in time Repairs, Cleaning, Supplies Calibrations, Training
- Apply the liquid Accurate, Consistent and Uniform
- Record what has happened Grain in , Moistures, Liquid used etc
- Start Aeration Early
- Monitor Temperatures Regularly and Record
- Achieve Target Temperatures
- Aerate and Ventilate
- Adesco will support you

Grain Treatment - Summary

- > Ask for help (early) if you sense a problem.
- Adesco will visit to support during and after harvest.
- Adesco will take temperatures and inspect the grain.
- Adesco will take samples and analyse for Moistures, Mould Counts, Enterobacteria etc. - FREE of CHARGE