

## High Moisture Corn> A Natural Food for Livestock

### A Kernel of CORN

**Endosperm** - The main **food storage of the seed** from which the embryo draws its food supplies in the early stages of germination.

Accounts for about 82% of the kernels dry weight and is **the source of energy** for the germinating seed.

**Enzymes** secreted during germination **degrade the starch** hydrolytically to provide (sugar) energy. This process will not **occur in a cracked kernel of corn**.

**Pericarp**..is the outer covering that **protects the kernel** and preserves the nutrient value inside. **It resists** water and water vapour—and is undesirable to insects and **microorganisms (mold spores)**. **Keeping the kernel intact during storage** in an oxygen limiting environment can **effectively reduce** the availability of a food source and the **conditions favourable for mold growth** in high moisture shelled corn

**The Germ** is the only living part of the corn kernel. The germ **contains the essential genetic information,enzymes**, vitamins and minerals for the kernel to grow into a corn plant. About 25% of the germ is corn oil-the most valuable part of the kernel, which is high in polyunsaturated fats and has a mild taste.



### Limiting Oxygen is Key

With whole stored High Moisture Shelled Corn the intact grain physically protect the nitrogen and energy resources of the seed through the use of the cellulose cover on the outside of the seed. **Molds(spores)** can respire successfully at oxygen concentrations as low as 4%.Therefore,their proliferation and growth can be controlled by providing oxygen-free storage.

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### The Option for Storage

**The extent of contamination** by molds is largely **determined by the temperature of the grain and the availability of water and oxygen** .Lacey 1988

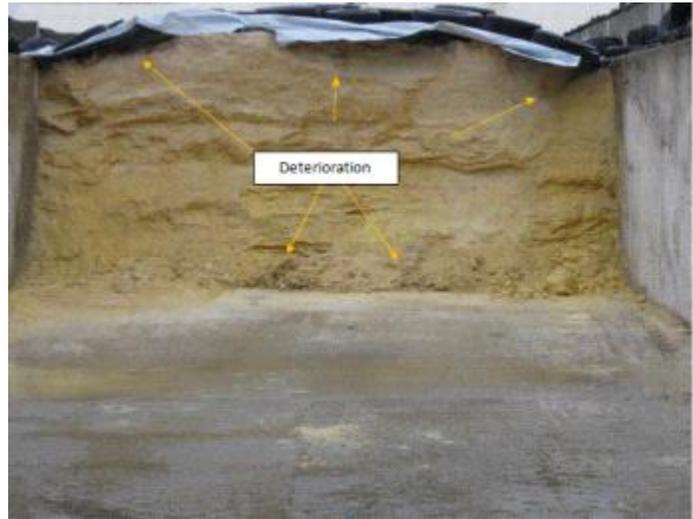
Intact grain physically protects the nitrogen and energy sources from microorganisms (mold spores) through the use of a cellulose covering(**pericarp**).



## The Impact on Health and Production

### **Air exclusion and heating**

Though little energy is lost when soluble sugars are fermented to lactic acid and ethanol, more energy is lost when acetic and butyric acids are produced. In addition, **energy is lost from the surface and face of a trench silo** as ethanol and volatile acids are exposed and evaporate. Also, **when yeasts have access to oxygen**, silage yeasts oxidize lactate to carbon dioxide, **This reduces the feed value of the product** and causing the product to heat. Lactobacillus buchneri through increasing acetic acid content of silages, will inhibit yeasts and decrease the loss associated with lactate oxidation and silage heating.



**Surface Spoilage.** In areas of a silo **where high moisture corn is exposed to oxygen molds will grow that can produce mycotoxins.** Certain **mycotoxins\* decrease feed intake and cause digestive and metabolic disturbances.** \* See **ENVIRONMENT : FEED SAFETY = Mycotoxins A Silent Loss in Profits**

**Water also can seep into trench silos** diluting acids. This extends fermentation time and causes greater heat production and spoilage. **Cattle producers who do not discard** spoiled feed but instead dilute it with good feed **are likely to find that both feed intake and milk production are reduced.**

(Personal communication from **Dr. Fred Owens -Pioneer International**)

## Advantages of Whole Corn stored in a Harvestore Oxygen-Limiting Silo At Greiden Farms it's Results That Count

Attention to detail in **feed management plays a significant role** in achieving the dairy's high end level of production.

**Cees Haanstra states** that their own on-farm experience has clearly indicated that **high moisture corn stored whole in their Oxygen – Limiting Harvestore Structure is superior to corn ground into a bunker.**



**The difference is significant** in dollars and cents through higher milk production. **An average of 1litre/cow/day.** Levels of **mycotoxins were less as well** in the Harvestore System