

ABC Hansen NEWS

November 2004

Value adding to maize – part 2.

Our previous article on value adding to maize seems to have met with a lot of interest, therefore this follow-up. We are currently undertaking a pre-feasibility study on implementing some of these projects in South Africa.

A group of maize growers have indicated a firm interest to establish a value adding company. This is frankly to my mind the only way to work into the maize stocks, allowing farmers to grow sufficient maize to make a living and utilize their land properly, (weather, Government, criminals and other pests and adversities permitting) and ensure life over the longer term for the non-subsidized South African and African commercial farmers. The days are long gone when "waiting for direction from government" or some other organization solved anything. Farmers can do it themselves. We'll keep you posted on developments as we go along.

How Ethanol is Made – Courtesy the "Renewable Fuels Association"

The production of ethanol or ethyl alcohol from starch or sugar-based feed stocks is among man's earliest ventures into value-added processing. While the basic steps remain the same, the process has been considerably refined in recent years, leading to a very efficient process. There are two production processes: wet milling and dry milling. The main difference between the two is in the initial treatment of the grain. (We'll only discuss dry milling further).

In dry milling, the entire corn kernel or other starchy grain is first ground into flour, which is referred to in the industry as "meal" and processed without separating out the various component parts of the grain. The meal is slurried with water to form a "mash." Enzymes are added to the mash to convert the starch to dextrose, a simple sugar. Ammonia is added for pH control and as a nutrient to the yeast.

The mash is processed in a high-temperature cooker to reduce bacteria levels ahead of fermentation. The mash is cooled and transferred to fermenters where yeast is added and the conversion of sugar to ethanol and carbon dioxide (CO2) begins. The fermentation process generally takes about 40 to 50 hours. During this part of the process, the mash is agitated and kept cool to facilitate the activity of the yeast. After fermentation, the resulting "beer" is transferred to distillation columns where the ethanol is separated from the remaining "stillage." The ethanol is concentrated to 190 proof using conventional distillation and then is dehydrated to approximately 200 proof in a molecular sieve system. The anhydrous ethanol is then blended with about 5% denaturant (such as natural gasoline) to render it undrinkable and thus not subject to beverage alcohol tax. It is then ready for shipment to gasoline terminals or retailers. The stillage is sent through a centrifuge that separates the coarse grain from the solubles. The solubles are then concentrated to about 30% solids by evaporation, resulting in Condensed Distillers Solubles (CDS) or "syrup." The coarse grain and the syrup are then dried together to produce dried distillers grains with solubles (DDGS), a high quality, nutritious livestock feed. The CO2 released during fermentation is captured and sold for use in carbonating soft drinks and beverages and the manufacture of dry ice.