



Cow Calf Technical Bulletin

Evaluating CCDS as a Feed for Beef Cows

Corn Condensed Distiller's Solubles (CCDS) is a high-volume, low dry-matter byproduct of the ethanol industry. Often termed "syrup" in the country, it is obtained by partially drying the thin stillage that remains after ethyl alcohol is distilled from yeast-driven fermentation of corn.

While a significant portion of the CCDS produced in a plant may be added back to the spent grains, resulting in DDGS (Dried Distillers Grains plus Solubles), it has also been fed directly to cattle. The decision to include CCDS in a herd nutrition program should be based on:

- **Nutritional content,**
- **Nutritional fit,**
- **Total costs, and**
- **Potential concerns.**

■ Nutrient Content

Simply put, the value of a feedstuff is determined by the nutrients it supplies, its fit in the total diet, and the presence of any anti-quality factors. CCDS contains several important nutrients that can be utilized by the cow, but successful feeding requires a rational approach to its use and appreciation for potential concerns.

A recent review¹ cited the following average values (dry matter basis) for CCDS from ethanol production: 35.5% dry matter; 23.8% crude protein, with 65% of that considered UIP, or "by-pass" protein; 1.72% phosphorus; and, an estimated NEg of .87 mcal/lb. Two points should be kept in mind when evaluating these numbers. First is the dramatic difference between "dry matter" and "as-fed" concentrations in a product like this. When adjusted for the moisture content, these values are just 8.4% CP, 0.61% phosphorus, and .31 mcal NEg/lb. The other issue is variability. From the ethanol production perspective, CCDS is a waste stream that doesn't carry enough value to justify direct quality control. The dry matter and nutritional content will vary, sometimes significantly, between plants and even between days at the same plant. This can be a two-sided problem: not accounting for higher than average quality can result in unnecessary feed expense, while a load that is extremely low in, for example, protein, may not meet the herd's needs as expected.



► Nutritional Fit

In a typical beef cow diet, the primary supplemental need (beyond minerals) is crude protein. A shortage of ammonia and other nitrogenous compounds in the rumen will limit microbial growth and fermentation, which in turn limits animal intake and the nutrient yield from the roughage portion of the diet. When this need is addressed by a protein supplement, the results can be dramatic. Published values are often in the range of a 40% increase in intake of low-quality forages, and (or) a several percentage point increase in digestibility. However, this “protein effect” is best achieved with highly degradable CP sources, and with supplements that are greater than 20-25% protein,

Alternately, lower-protein supplements are typically fed to directly supply energy, and lesser amounts of other nutrients. Once intake of a supplement exceeds roughly 4 pounds per day, this feed will begin to substitute for some forage. This may be viewed as a positive or negative, depending on the situation.



CCDS is not a “protein supplement,” and cannot be considered an equivalent option to those feeds and products when evaluating feeding choices. When available, “syrup” should be considered as an addition to, or partial substitution for, the roughage or energy feeds being used.

As with most feedstuffs, there are nutritional limits to the amount of CCDS that can go into a balanced diet. **Key considerations** include:

- ✓ **Protein:Energy Ratio**
- ✓ **Protein Degradability**
- ✓ **Fat Content**
- ✓ **Phosphorus Levels**
- ✓ **Sulfur Content.**

The degradability issue is discussed above; when there is a need for protein in the rumen, it is inefficient and energetically costly to try and meet that requirement with by-pass protein. The fat content of CCDS (published values range from less than 5 to more than 20% of DM) is of minimal concern when the byproduct is fed at fairly low levels. However, any time a beef cow diet exceeds 5% total fat, fiber digestion is compromised...potentially to the point that the animal’s overall plane of nutrition is noticeably reduced. The phosphorus in CCDS is a highly valuable nutrient -- as long as the animals have a need for it. But when fed above the level needed to meet the phosphorus

requirement, it can become an environmental concern via excretion of the excess. Sulfur is also an essential dietary mineral. But in practice, it is much more common to be concerned about too much rather than too little in the diet. Sulfur will complex with several key trace minerals, and

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can essentially create a deficiency of those elements in the animal. Extreme excesses of sulfur are linked to polioencephalomalacia, a potentially deadly condition that has been seen in cattle that had essentially unlimited access to CCDS.

▲ Total Costs

When evaluating the economics of supplementation options -- commodities, byproducts, or commercial feeds -- the only legitimate price comparison is one based on the cost to put the needed nutrition in front of the animal. That being said, sticker price has no real economic meaning. The total cost of a supplementation program includes not just the feed, but also any transportation, time, labor, and equipment costs affiliated with obtaining, transporting, storing, and delivering the feed, as well as a realistic adjustment for waste and spoilage if applicable. These overhead expenses can be significant enough to offset what appear to be sizeable savings in direct feed

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▲ Potential Concerns

Cowherd nutrition has the potential to affect virtually every area of production that has a major impact on profitability. Milk production, weaning weights, if and when cows breed back, overall herd health, and response to vaccination programs are all closely tied to the feeding program. While appropriate utilization of available, low-cost feeds can benefit the bottom line, use of byproduct feeds like CCDS must be balanced against possible problems and setbacks.

Beyond the general issues of product variability and the need for balanced diets, CCDS can harbor several specific hazards.

Sulfur, as discussed above, is a concern at elevated levels. The S content of CCDS is inconsistent, because the amount of sulfuric acid used in the ethanol plants varies between runs. The point at which a problem will occur depends on the amount of sulfur that is also being taken in from other feed and water sources. Some research suggests that the sulfur supplied by distillers byproducts may carry a greater potential for causing problems than other sources.

Mycotoxins are poisonous compounds produced by specific microorganisms and molds. If any of these are present in the grain being delivered to the ethanol plant, they will be concentrated in the byproducts. Additionally, work done by plant pathologists at Iowa State University demonstrated

the presence of pathogens in CCDS that colonized and produced mycotoxins once they were exposed to air (i.e., when put out for cattle).

Ehylene glycol was determined to be the cause of death of several cows in North Dakota, and the published report implicated dietary CCDS as the source.

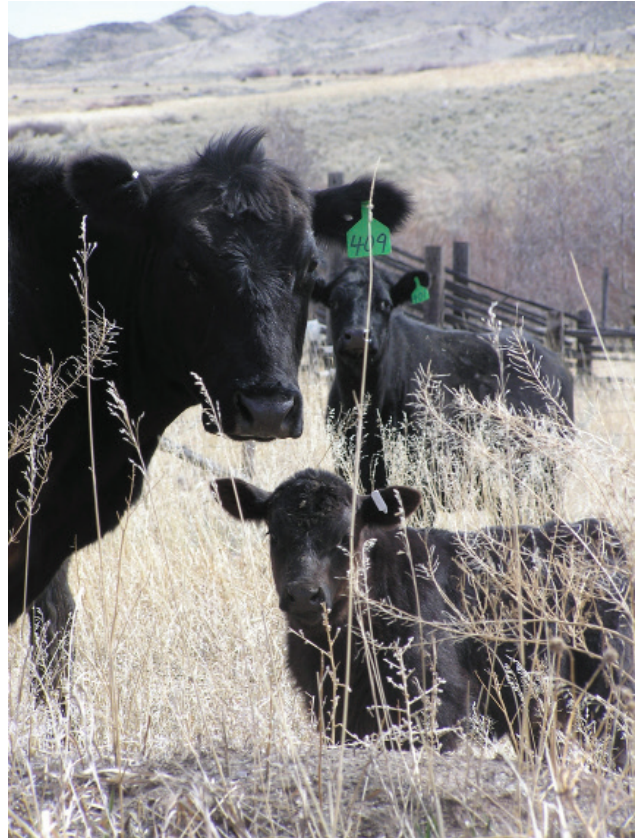
Patulin is another toxic fungal metabolite that can be produced from mold affiliated with CCDS.

It does not take many animal deaths to offset what appear to be substantial savings in feed costs. Use of byproducts, especially at high levels, requires adequate management to monitor sulfur levels of feed and water, and to minimize the chance of spoilage and microbial growth during storage or feeding.

▲ The Bottom Line

Feeding decisions for the cowherd represent both the biggest expense and most critical investment in cow/calf production. While managers must keep feed costs in line, questionable nutrition puts operations at serious risk in terms of production, reproduction, potential death loss, overall profitability, and peace of mind. The role of CCDS in cowherd diets should be determined with the following points in mind:

- ✓ CCDS can be an economic source of several valuable nutrients;
- ✓ CCDS is not a substitute for protein supplementation, but the two can effectively be used in combination;
- ✓ Economic evaluation of feeding CCDS must be based on total costs;
- ✓ Dietary inclusion should be based on nutritional need and recognition of potential performance, safety and environmental concerns.



¹Erickson, Galen. "Recent Research On By Product Feeds for Beef Feedlot and Cow-Calf Operations." in Proc.of 3rd National Alternative Feeds Symposium, Nov. 2003.

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