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# Dairy Lines

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KANSAS DAIRY EXTENSION NEWS

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## Upcoming Events

**July 19**
**Kansas Holstein Field Day**
Axtell, Kansas

■

**August 16 & 17**
**Kansas Junior Dairy Show**
Salina, Kansas

■

**August 28 & 29**
**Midwest Dairy Management Conference**
Minneapolis, Minnesota



# Double Check NSC and UIP in Diets Formulated With By-product Feedstuffs

***by John E. Shirley***

Successful nutritional programs for dairy cattle recognize the need to fulfill the requirements for an active rumen microbial population which, in turn, helps supply the cow's body with essential nutrients. Optimal performance of rumen microbes is achieved when a diet balanced for fiber, non-structural carbohydrates, rumen degradable and undegradable protein, fat, minerals, vitamins and water is fed. Over or underfeeding of selected dietary components generally result in reduced rumen efficiency and a reduction in milk yield.

Increased cost of corn, grain sorghum, and soybean meal has fueled a move to increased inclusion of by-products in dairy cattle diets. Corn gluten meal, wheat mids, hominy, distillers grains and soy hulls are commonly used in diet formulation but as a substitute for a portion of the corn and/or soybean meal. Two key factors concerning by-product feeds must be considered when including them in diet formulations: non-structural carbohydrate (NSC) content and protein degradability.

Recommendations regarding NSC in diets is 35 to 40 percent of dry matter with rumen undegradable intake protein (UIP) at 35 to 40 percent of total dietary protein or 6 to 7 percent of total dietary dry matter intake. By-product feeds generally are low in NSC and high in UIP relative to corn, grain sorghum, and soybean meal (Table 1). The relationship between NSC and UIP in these feeds is fortuitous because when ruminally available starch (NSC) is decreased, microbial

*Continued on page 2*

**Table 1. Composition of Common Feedstuffs**

| Item | Feedstuffs | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SBM | Corn | Milo | Soy Hulls | Corn Gluten | Hominy | Wheat Mids | Distillers Grain |
| Dry matter, % | 89 | 88 | 88 | 90 | 90 | 90 | 90 | 90 |
| NEL | 0.88 | 0.92 | 0.84 | 0.80 | 0.94 | 0.98 | 0.71 | 0.93 |
| Protein, % | 48 | 9 | 9 | 12 | 67 | 14 | 18 | 25 |
| RUIP, % | 35 | 52 | 54 | 35 | 55 | 40 | 21 | 54 |
| ADF, % | 10 | 3 | 9 | 50 | 5 | 13 | 10 | 18 |
| NDF, % | 14 | 10 | 18 | 67 | 14 | 55 | 37 | 44 |
| Fat, % | 1.5 | 4.3 | 3.4 | 2.1 | 2.4 | 7.7 | 4.9 | 10 |
| NSC, % | 27.3 | 74.1 | 67.5 | 13.7 | 13 | 20.2 | 34.5 | 15.9 |

## Heart of America Dairy Herd Improvement Summary (May)

| | Quartiles | | | | Your Herd |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | |
| Guernsey | | | | | |
| Rolling Herd Average | 17,339 | 14,449 | 13,257 | 11,665 | |
| Summit Milk Yield 1st | 59.8 | 50.1 | 50.2 | 45.4 | |
| Summit Milk Yield 2nd | 72.9 | 63.0 | 60.3 | 54.0 | |
| Summit Milk Yield 3rd | 78.8 | 70.8 | 65.2 | 59.0 | |
| Summit Milk Yield Avg. | 70.3 | 62.3 | 58.8 | 54.0 | |
| Income/Feed Cost | 979 | 950 | 926 | 695 | |
| SCC 1st LACT | 177 | 188 | 262 | 175 | |
| SCC 2nd LACT | 255 | 190 | 263 | 164 | |
| SCC 3rd+ LACT | 321 | 326 | 527 | 301 | |
| SCC Average | 254 | 250 | 374 | 233 | |
| Days to 1st Service | 90 | 84 | 84 | 74 | |
| Days Open | 117 | 134 | 137 | 130 | |
| Projected Calving Interval | 399 | 416 | 419 | 412 | |
| Milking Shorthorn | | | | | |
| Rolling Herd Average | 19,267 | 16,237 | 14,396 | 12,144 | |
| Summit Milk Yield 1st | 60.3 | 52.8 | 49.6 | 43.2 | |
| Summit Milk Yield 2nd | 78.5 | 68.9 | 61.6 | 54.7 | |
| Summit Milk Yield 3rd | 83.3 | 76.0 | 68.6 | 57.3 | |
| Summit Milk Yield Avg. | 74.3 | 67.4 | 61.3 | 51.9 | |
| Income/Feed Cost | 1,458 | 1,334 | 1,018 | 837 | |
| SCC 1st LACT | 241 | 222 | 189 | 285 | |
| SCC 2nd LACT | 328 | 268 | 230 | 263 | |
| SCC 3rd+ LACT | 376 | 455 | 333 | 536 | |
| SCC Average | 322 | 350 | 269 | 409 | |
| Days to 1st Service | 87 | 90 | 84 | 95 | |
| Days Open | 135 | 139 | 143 | 131 | |
| Projected Calving Interval | 422 | 426 | 431 | 417 | |
| Holstein | | | | | |
| Rolling Herd Average | 21,679 | 18,866 | 16,883 | 14,026 | |
| Summit Milk Yield 1st | 70.1 | 63.1 | 58.0 | 50.2 | |
| Summit Milk Yield 2nd | 89.5 | 80.0 | 72.4 | 61.1 | |
| Summit Milk Yield 3rd | 94.7 | 84.6 | 77.6 | 65.6 | |
| Summit Milk Yield Avg. | 83.7 | 75.5 | 69.5 | 59.7 | |
| Income/Feed Cost | 1,633 | 1,364 | 1,175 | 921 | |
| SCC 1st LACT | 226 | 253 | 286 | 341 | |
| SCC 2nd LACT | 237 | 274 | 308 | 393 | |
| SCC 3rd+ LACT | 385 | 429 | 486 | 584 | |
| SCC Average | 286 | 327 | 374 | 465 | |
| Days to 1st Service | 92 | 94 | 97 | 96 | |
| Days Open | 143 | 142 | 142 | 141 | |
| Projected Calving Interval | 423 | 422 | 422 | 421 | |
| Jersey | | | | | |
| Rolling Herd Average | 15,742 | 13,393 | 11,987 | 10,194 | |
| Summit Milk Yield 1st | 51.4 | 46.3 | 40.4 | 36.7 | |
| Summit Milk Yield 2nd | 62.7 | 54.4 | 49.1 | 43.1 | |
| Summit Milk Yield 3rd | 66.6 | 59.7 | 53.1 | 46.9 | |
| Summit Milk Yield Avg. | 60.3 | 54.6 | 48.2 | 42.9 | |
| Income/Feed Cost | 1,457 | 1,019 | 914 | 759 | |
| SCC 1st LACT | 245 | 271 | 186 | 301 | |
| SCC 2nd LACT | 262 | 279 | 225 | 383 | |
| SCC 3rd+ LACT | 360 | 408 | 370 | 531 | |
| SCC Average | 299 | 332 | 284 | 426 | |
| Days to 1st Service | 88 | 88 | 87 | 92 | |
| Days Open | 126 | 124 | 121 | 131 | |
| Projected Calving Interval | 405 | 403 | 400 | 410 | |

*Double Check, continued from page 1*

activity decreases and the need for UIP is increased in order to supply the cow with amino acids. However, the UIP in these feeds often are low in lysine, methionine, or both, thus milk protein and milk yield may be depressed when a large portion of the grain mix consists of by-product feeds.

Milk yield and composition (fat and protein percent) from cows fed corn/soy-based diets often is enhanced when limited amounts of by-product feeds are included because corn contains 74 percent NSC. Elevated dietary NSC (>40 percent) contributes to increased rumen acidity resulting in decreased rumen microbial activity and depressed appetite. This sequence of events translates into a reduction in milk fat percent as well as a decrease in milk and milk protein yield. Sodium bicarbonate often is used to counteract rumen acidity and is indicated when high grain diets are fed, particularly in conjunction with corn or grain sorghum silage. Substituting soy hulls and/or hominy for a portion of the corn and distillers grain or corn gluten for a portion of the soybean meal will reduce dietary NSC and help restore rumen microbial activity and milk yield. Conversely, diets high in forage and relatively low in concentrates (55:45 forage to concentrate ratio) when the forage is alfalfa or alfalfa-grass hay mixture may be low in NSC (<32 percent) thus, rumen microbial activity would be decreased because of an insufficient supply of energy. This scenario often results in a decrease in the percent protein in milk, an increase in milk fat percent and a decrease in milk yield. Substitution of significant amounts of low NSC by-product feeds for corn in this case would have a negative effect on production.

Diets containing dry rolled grain sorghum as the primary grain are particularly tedious because it is relatively low in rumen soluble carbohydrate even though it is relatively high in NSC. These diets generally result in an increase in milk fat percent and a decrease in milk yield and percent protein relative to corn or steamed, flaked grain sorghum. Inclusion of soy hulls, corn gluten, hominy, or wheat mids in dry, rolled grain sorghum diets should be monitored carefully. Limited substitutions may result in increased performance because these byproducts would improve overall diet digestibility in the rumen.

In short, by-product feeds can reduce feed cost and improve or maintain milk yield and composition when used judiciously.

# Kansas Holstein Association Field Day

**Cosponsored by Kansas Dairy Commission**

**Friday, July 19, 1996**

***Hosted by:***
**Schmitz Holstein Farm**
**Joe & Amy Schmitz & Family**
**Axtell, Kansas**
**1 mile south, 1 mile west of Junction US36 & KS110**

***Program:***

| | |
|---|---|
| **9:30 a.m.** | **Registration—Visit commercial exhibits** |
| **10:30 a.m.** | **Introductions** |
| **10:45 a.m.** | **Panel—Intensive Grazing** |
| **Noon** | **Lunch—Sponsored by Kansas Dairy Commission & Exhibitors** |
| **1:00 p.m.** | **Tour Facilities & Pasture Paddocks** |
| **2:30 p.m.** | **Door Prizes** |

Joe & Amy Schmitz & Family

Play Room in the Milking Center

## Hay Prices*

| | Location | Quality | Price ($/ton) |
|---|---|---|---|
| Alfalfa | Southwestern Kansas | Premium | 110–120 |
| Alfalfa | Southwestern Kansas | Good | 100–110 |
| Alfalfa | South Central Kansas | Premium | 100–115 |
| Alfalfa | South Central Kansas | Good | 90–100 |
| Alfalfa | Southeastern Kansas | Premium | 100–115 |
| Alfalfa | Southeastern Kansas | Good | 90–100 |
| Alfalfa | Northwestern Kansas | Premium | 90–100 |
| Alfalfa | Northwestern Kansas | Good | 80–90 |
| Alfalfa | North Central Kansas | Premium | 85–100 |
| Alfalfa | North Central Kansas | Good | 80–90 |

***Source:*** USDA Weekly Hay Report, *Week ending June 7, 1996*

*Premium Hay RFV = 170-200
Good Hay RFV = 150-170

## Feed Stuffs Prices

| | Location | Price ($/ton) |
|---|---|---|
| SBM 48% | Kansas City | 232.50–236.50 |
| Cotton Seed Meal | Kansas City | 203–209 |
| Whole Cottonseed | Memphis | 185 |
| Meat and Bone Meal | Central United States | 225–235 |
| Blood Meal | Central United States | 390–400 |
| Corn Hominy | Kansas City | 160–164 |
| Corn Gluten Feed | Kansas City | 145 |
| Corn Gluten Meal 60% | Kansas City | 330–340 |
| Distillers Dried Grain | Central Illinois | 175–181 |
| Brewers Dried Grain | St. Louis | 147 |
| Wheat Middlings | Kansas City | 115–117 |

***Source:*** USDA Weekly Feed Stuffs Report, *Week ending June 7, 1996*

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