

*Director's
Digest*



FRED D. BISPLINGHOFF, D.V.M.
Director Technical Services

7150 ESTERO BLVD. • APT. 906
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ANIMAL PROTEINS AND FATS IN DAIRY HERDS
THAT AVERAGE 26,000 LBS. OF MILK

DRS. W. TERRY HOWARD AND RANDY SHAVER
UNIVERSITY OF WISCONSIN-MADISON

How to feed high-producing cows always is a popular topic. For the past few years, we've been taking a detailed look at the feeding programs of our top-producing herds to see what we can learn.

Official DHI rolling herd averages of the top four Wisconsin herds for 1989 based on total fat plus protein averaged more than 26,000 pounds of milk, 1,000 pounds of fat, 800 pounds of protein. Herds ranged from 80 to 115 cows, and all were housed in tie stall barns and fed total mixed rations (TMR). Three were milked 3x.

Alfalfa haylage was the predominant forage. Two herds fed corn silage, and two fed baled hay.

Haylages averaged 50 percent dry matter. Haylages and hays ranged from 16.8 percent protein to 18 percent, and acid detergent fibers (ADF) varied from 37.6 down to 31.6.

Relied On Fat

Whole cottonseed was a fat source for three herds. Roasted soybeans rather than whole cottonseed were fed as a source of supplemental vegetable in Herd B.

Tallow was fed as the second source of fat in three of the herds. Ruminally inert or "protected" fat was fed as the second source of fat in Herd A and the third source of fat in Herd D.

Sources of undegradable or "bypass" protein included blood meal, meat and bone meal, roasted soybeans and distillers' dried grains. The animal protein by-products were fed as a source of "bypass" protein, and soybean meal was used to balance degradable protein needs.

DHI milk yields during our study averaged 86.5 pounds per cow for the four herds ranging from an average of 79 to 94 pounds. Estimated dry matter consumption of TMR averaged 54 pounds per cow, ranging from 48 to 60 pounds.

These herds were fed a high group TMR for the full lactation without top feeding additional grain or protein. Two herds fed the TMR twice per day, one three times per day and one once daily. Sweeping up the TMR four to six times daily to stimulate appetite was common.

Rations averaged about 64 percent dry matter. (See Table 2.) Crude protein content of the rations averaged 19 percent, ranging from 18 to 19.5. Undegradable or "bypass" protein as a percent of crude protein ranged from 38 to 41.

These rations contained adequate fiber, averaging about 20 percent ADF, 31 percent NDF and 21 percent NDF from forage. This reflects by-product fiber sources and feeding 42 to 45 percent forage in the ration dry matter. Nonfiber carbohydrate content of the four rations averaged 35 percent, ranging from 31 to 39. This underscores that these were not high-starch, low-fiber rations which likely helped these high-producing herds maintain 3.7 to 3.9 percent milk fat tests.

Total supplemental fat averaged 2.3 pounds per cow or 4.3 percent of ration dry matter. Supplemental fat was fed at up to 5 percent of ration dry matter in Herd D, but the success of Herd A with a lower fat ration suggests that returns from the third pound of added fat may be low.

Rations were similar in energy to NRC guides for high groups, averaging 76 percent total digestible nutrients (TDN) and 0.79 megacalories net energy-lactation per pound of dry matter.

Rations fed in Herds A and B contained 1 percent calcium as generally is recommended for high-fat rations, while rations fed in Herds C and D contained higher levels. Only Herd A supplemented phosphorus according to NRC-1988 guidelines, while rations fed in the other three contained higher levels of supplemented phosphorus.

On average, 7 milligrams of selenium were supplemented per cow per day. Level of vitamin supplementation varied, averaging about 200,000, 50,000, and 900 international units per cow per day of vitamins A, D and E, respectively.

Feed costs are summarized in Table 3. These costs were calculated from estimated TMR intake and ration ingredient composition, using the same average prices for forages, grains and supplements in all four herds.

Total feed cost averaged \$3.68 per cow per day, ranging from \$3.07 to \$4.40 per cow per day. Feed cost per hundredweight of dry matter takes into account differences in intake, and this value averaged \$6.80, ranging from \$6.36 and \$7.37.

Feed cost per hundredweight of milk most accurately reflects cost of production. The average was \$4.24 ranging from \$3.79 to \$4.68. Herd D had the highest feed cost which was related to feeding the higher levels of fat and phosphorus and use of five additives.

Table 1. Ration ingredients of top Wisconsin herds

Ingredient	Herd			
	A	B	C	D
	Pounds dry matter/cow/day			
Haylage	18.1	13.8	16.7	25.2
Corn silage	7.8	4.2	--	--
Hay	--	3.4	4.4	--
HM shelled corn	16.5	--	18.0	--
HM ear corn	--	15.1	--	17.3
Whole cottonseed	5.8	--	4.7	6.0
Roasted soybeans	--	4.0	--	--
Tallow	--	1.0	0.8	1.2
Ruminally inert fat	0.6	--	--	0.6
Blood meal	0.5	0.6	1.2	0.9
Distillers' dried grains	2.7	1.8	--	--
Linseed meal	--	--	--	1.8
Meat and bone meal	1.5	1.9	1.9	1.9
Soybean meal, 44%	2.7	2.0	2.2	2.7
Minerals/vitamins/additives*	0.86	0.55	1.05	2.1
TOTAL	57.0	48.3	50.9	59.7

*Sodium Bicarbonate (buffer) . . . Herds A and D. Niacin . . . Herds A, B, C and D. Yeast . . . Herds C and D. Isoacids . . . Herds C and D. Zinc Methionine . . . Herds C and D.

Table 2. Nutrient composition for top Wisconsin herds

	Herd				4-herd average
	A	B	C	D	
December DHI milk, lbs/cow	92	81	79	94	86.5
Dry matter intake, lbs/cow	57.0	48.3	50.9	59.7	54.0
Nutrients - DM basis					
DM, %	61	64	68	61	63.5
Crude protein, %	18.0	19.5	19.4	19.2	19.0
UIP ¹ , % of CP	38.4	41.3	39.5	37.1	39.0
NDF, %	30.3	33.5	27.4	32.9	31.0
ADF, %	19.3	20.4	19.1	22.9	20.4
Forage, %	45.4	44.4	41.5	42.2	43.4
NDF from forage, %	20.4	22.8	19.6	20.4	20.8
NFC ² , %	37.8	32.6	38.9	30.8	35.0
Supp. fat, lb	2.1	2.1	2.0	3.1	2.3
Supp. fat, %	3.7	4.4	3.9	5.2	4.3
TDN, %	77.1	75.8	76.5	75.3	76.2
NE-L, Mcal/lb	0.80	0.79	0.80	0.78	0.79
Calcium, %	1.05	1.01	1.21	1.35	1.16
Phosphorus, %	0.47	0.59	0.55	0.63	0.56
Supp. selenium, milligrams/day	8	7	7	6	7
Supp. Vit A, IU/lb	3,684	2,657	3,930	6,804	4,270
Vit D, IU/lb	877	1,329	983	503	923
Vit E, IU/lb	18	13	20	16	17

¹UIP = Undegraded intake protein as a percent of crude protein (commonly referred to as "bypass" protein).
²NFC = Nonfiber carbohydrate (starch, sugars and pectin).
³IU = International units.

Table 3. Feed costs of top Wisconsin herds

	Herd				4-herd average
	A	B	C	D	
DHI milk, lbs/cow	92	81	79	94	86.5
Dry matter intake, lbs/cow	57.0	48.3	50.9	59.7	54.0
Total feed costs*					
	Dollars				
Per cow per day	3.72	3.07	3.51	4.40	3.68
Per 100 pounds dry matter	6.53	6.36	6.90	7.37	6.80
Per hundredweight milk	4.05	3.79	4.44	4.68	4.24

*Forage prices per ton of dry matter used were haylage (\$70), corn silage (\$65), and hay (\$70).
 Corn price was \$2.50 per bushel.