

The Milk Producer's Feed Guide

This feed guide is prepared to aid the milk producers in balancing practical rations at the minimum cost. Economical production of milk depends upon productive cows, good feeding, and careful management. All three are equally essential. Carefully study this leaflet before selecting and purchasing your feed supply. It will save your money and may increase your milk production.

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What to Feed

Give the cow a variety of feeds, such that the ration will have at least 1 part of protein to 6 parts of carbohydrates and fats; see table for composition, page 3.

When hays rich in protein, such as good leafy alfalfa or clover hay, are used in liberal amounts, select a variety of two or more grains that are relatively rich in carbohydrates and fats, such as ground barley or corn, with a little rolled oats or bran to lighten the mixture. Select the feeds that will supply the total nutrients at the lowest cost. See table on page 4.

When roughages low in protein such as prairie hay or oat hay are fed, or when liberal amounts of corn silage are used in the ration, the grain should furnish a large portion of the necessary protein. Such feeds as bran or oil meal should then be used quite freely with a limited amount of fattening feeds as barley or corn. See table on page 4 for most economical protein feeds.

Use as much good legume hay as possible. It is the best and as a rule the cheapest roughage available. Select the early cut, well cured and leafy hay. It is the richest in proteins, mineral matter and the essential vitamins. With choice hay, less grain is required; and the cows may be maintained in better physical condition.

Silage and roots are excellent feeds for winter and should be used freely wherever they may be produced at a relatively low cost.

Good succulent pasture grass is the best and cheapest feed nature has to offer. Provide as much of it as possible.

The following tables will show the amounts of protein, total digestible nutrients in 100 pounds of feed, and the proportion of protein to carbohydrates and fats:

CONCENTRATES

Low in protein, but fattening

Feeds 100 lbs.	Protein	Total nutrients— protein, fats and carbo- hydrates	Proportion protein to carbohydrates and fats
Dent corn	7.5 Lbs.	85.7 Lbs.	1:10.4
Barley	9.0	79.4	1: 7.8
Oats	9.7	70.4	1: 6.3
Rye	9.9	81.0	1: 7.2
Wheat	9.8	81.5	1: 7.3
Dried beet pulp	4.6	71.6	1:14.6
Molasses (beet)	2.9	58.7	1:19.2

High in protein

Bran and shorts	12.9	67.0	1: 4.2
Bran	12.5	60.9	1: 3.9
Oil meal (O.P.)	30.2	77.9	1: 1.6
Cottonseed meal (choice)	37.0	78.2	1: 1.1

ROUGHAGE DRIED

Low in protein

Fodder corn (medium)	3.0	53.7	1:16.9
Timothy hay	3.0	48.5	1:15.2
Prairie hay	4.0	47.9	1:11.0
Oat hay	4.5	46.4	1: 9.3

High in protein

Red clover	7.6	50.9	1: 5.7
Alfalfa	10.6	51.6	1: 3.9

SILAGE AND ROOTS

Corn silage	1.1	17.7	1:15.1
Sunflower silage	1.2	12.3	1: 9.0
Mangels	.8	7.4	1: 8.2
Beet pulp (wet)	.5	7.4	1:13.8
Potatoes	1.1	17.1	1:14.5

The above table was taken from "Feeds and Feeding", by Henry and Morrison, except for sunflower silage, which was taken from the Montana Experiment Station bulletin No. 134, by Joseph and Bliss.

These tables show the relative value of feeds based on digestible nutrients (all digestible matter in the feeds) and protein:

To supply digestible nutrients the feeds listed have a relative value, approximately, as follows:

When:

Hulled barley is worth	\$1.00
Corn is worth	1.08
Rye is worth	1.02
Wheat is worth	1.03
Oats is worth	.89
Bran and shorts is worth	.84
Bran is worth	.76
Oil meal is worth	.98
Cottonseed meal is worth	.99
Dried beet pulp is worth	.90
Molasses is worth	.74

The table may be used to determine the relative value of feeds at different prices:

If barley is priced at \$1.50 per hundred, the price that may be paid for oats may be arrived at by multiplying \$1.50 (the price of barley) by .89 (the figure given for oats). Thus $1.50 \times .89 = 1.33$, the relative value of oats.

To supply protein the feeds listed have a relative value, approximately, as follows:

When:

Bran is worth	\$1.00
Oats is worth	.75
Barley is worth	.70
Corn is worth	.58
Rye is worth	.77
Wheat is worth	.76
Bran and shorts is worth	1.01
Oil meal is worth	2.34
Cottonseed meal is worth	2.86
Dried beet pulp is worth	.36
Molasses is worth	.13

The table may be used to determine the relative value of feeds at different prices: If bran is priced at \$1.30 per hundred as a protein feed, what is oil meal worth? Example of how this is figured—\$1.30 (price of bran) $\times$ 2.34 (figure given for oil meal) = \$3.04, or the relative value of oil meal. Other feeds may be figured the same way.

Observe that the feeds usually purchased to supply the protein, such as bran and oil meal, also have considerable value in furnishing the other nutrients and vice versa, a point that should be considered in buying feeds.

The Relative Value of Roughages

The time of cutting and the manner of curing dry roughages greatly influence the feeding value. In general the early cut, leafy, well cured roughage is the best for milk cows. While the difference in the amount of total digestible nutrients in the dry roughages listed is very slight, the actual value as a feed for milk cows is more nearly proportional to their protein content. Good alfalfa hay heads the list, while choice sweet clover or red clover hay are fair substitutes. The cereal hays, grass hays and corn fodder, are all relatively low in protein, and have a much lower feeding value for dairy purposes.

Silage and Roots

Most silage and root crops are low in feeding value due to the large amount of water they contain. About three pounds of silage and five pounds of roots are required to replace one pound of hay. Most silage and root crops are low in protein. See table, page 3.

Pasture

Native dry land pasture has very little value as a feed for milk cows, while the irrigated or sub-irrigated pastures furnish an abundance of choice feed over a long period at a relatively low cost. The tame grass mixture pastures are perhaps the best for milk cows, though sweet clover pastures give good results, and usually have a higher carrying capacity.

How Much to Feed

Feed according to one of the following rules

Rule 1. Feed all the roughage the cow will eat and only enough grain to keep her in good condition.

Rule 2. For a low testing cow feed all the good suitable roughage (principally alfalfa hay) she will eat, and 1 pound of grain for each $2\frac{1}{2}$ pounds of milk she produces in excess of 20 pounds per day.

For a high testing cow feed hay as above and give 1 pound of grain for every 2 pounds of milk she produces in excess of 12 pounds per day.

Rule 3. Feed all the roughage the cow will eat and 1 pound of grain per day for every 3 to 6 pounds of milk the cow produces daily, varying with the richness of the milk, and the quality of the hay used.

Suggestive Winter Rations

To Be Fed According to One of the Above Rules

- A. Alfalfa or sweet clover—all the cows will eat.
Grain mixture—5 parts corn or barley, 3 parts oats, 2 parts bran and shorts.
- B. Alfalfa or clover hay—all the cows will eat.
Corn or Sunflower silage—25 to 45 pounds.
Grain mixture—3 parts rye, wheat, barley or corn; 3 parts oats, 4 parts barn or 2 parts oil meal.
- C. Oat hay—all the cows will eat.
Alfalfa or sweet clover, 12 to 18 pounds.
Grain mixture—same as B.
- D. Clover and timothy mixed—all the cows will eat.
Corn silage, 25 to 40 pounds.
Grain mixture—2 parts barley, rye, or wheat; 3 parts oats.
5 parts bran.

Pertinent Pointers

Feed the dry cow in such a way that she will be in good flesh and in thrifty condition at calving time.

Where silage is available it should replace about one-half of the hay. It takes about 3 pounds of silage to replace 1 pound of good hay.

See that the cow has salt at all times.

Remember that it does not pay to feed grain to inferior cows.

While on extra good pasture cows will need but little if any grain, except the heavier producers.

Avoid a heavy, compact grain mixture. Rolled oats and bran are good to lighten the feed.

Avoid sudden and unnecessary changes in the amounts or the time of feeding. Over-feeding may be worse than under-feeding.

Remember that many so-called "short-milkers" are really good cows, but are forced dry through improper feeding.

Keep the cow comfortable at all times. The effects of good feeding are lost if the cows are not properly managed.

A well bedded shed to protect the cows when not in the barn in the winter is a good investment.

Keep the cow's stall well bedded at all times.

Give the cow all the water she wants at least twice a day.

If there is a lack of mineral matter in the ration, add 1 to 2 per cent of sterilized bone meal to the grain mixture.

A variety of feeds generally gives better results than a ration composed of one or two feeds.

The following practical bulletins and circulars may be obtained by writing to the U. S. Department of Agriculture, Washington, D. C.:

F. B. No. 1412, Care and Management of Dairy Bulls.

F. B. No. 976, Cooling Milk and Cream on the Farm.

F. B. No. 1315, Cleaning Milk Machines.

F. B. No. 1079, Harvesting and Storing Ice on the Farm.

F. B. No. 1212, Farm Dairy Houses.

F. B. No. 206, Milk Fever.

F. B. No. 1422, Udder Diseases of Dairy Cows.

F. B. No. 1167, Essentials of Animal Breeding.

The following circulars may be obtained by writing to the Montana State Experiment Station, Bozeman, Montana:

Circular No. 104, Raising Dairy Cattle.

Circular No. 106, Feeding and Managing Dairy Cattle.

Circular No. 130, Dairy Barns for Montana Farms.

Bulletin No. 166, Irrigated Pastures.

The following circulars may be obtained by writing to the Montana Extension Service, Bozeman, Montana:

Circular No. 73, The Production, Care and Marketing of Cream in Montana.

Stanchions for Dairy Calves.

Making Hay to Increase the Milk Flow.