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Feeding the Dry Cow

You should feed the dry cow to prepare her for high production in the next lactation and minimize metabolic disorders. You may need to feed the dry cow differently than you feed a milking cow. Most research indicates that a dairy cow should be given a 45- to 60-day dry period to:

1. regenerate udder tissue
2. replace body reserves used in the previous lactation
3. stimulate high production in the next lactation

Dry cow management affects future milk production, livability of the unborn calf, and the incidence of ketosis, milk fever, mastitis, udder edema, and displaced abomasum (twisted stomach).

Requirements of the Dry Cow

The nutrient requirements for the dry cow are summarized in table 1.

Table 1. Daily nutrient requirements of dry cows and cows producing 50 pounds of milk (expressed on a 100% dry matter basis)

Nutrient	Dry cow	Lactating cow
Protein—(%)	9	15
TDN—(%)	53	65
Net Energy—(M-cal/lb)	.50	.73
Fiber—(%)	15	15
Calcium—(%)	.35	.47
Phosphorus—(%)	.26	.35
Vitamin A—(IU/lb)	1450	1450
Vitamin D—(IU/lb)	300	300

The dry cow requirements include those nutrients needed for maintenance, and the rapidly developing fetus. Young 2- or 3-year-old cows need additional nutrients for growth. Alfalfa-grass forage will not meet the requirements of the dry cow nor will a ration consisting of corn silage alone (table 2).

Table 2. Approximate nutrient content of typical forage programs (100% dry matter basis)

	Alfalfa-grass	Corn silage	½ Alfalfa-grass ½ Corn silage
Crude protein (%)	16 (+)	8 (-)	12 (+)
TDN (%)	50 (-)	65 (+)	57 (+)
Net energy (M-cal/lb)	46 (-)	62 (+)	54 (+)
Fiber (%)	34 (+)	26 (+)	30 (+)
Calcium (%)	1.01 (+)	.28 (-)	.69 (+)
Phosphorus (%)	.25 (-)	.21 (-)	.23 (-)

Plus (+) values are above minimum nutrient requirements. Negative (-) values are below.

An additional 2 to 5 pounds of a simple grain mixture containing minerals and vitamins will meet the cow's requirements. Don't overfeed cows during the dry period because they may become too fat. Dry cows that are maintained on an adequate energy ration will produce as much milk in the next lactation as cows fed a high energy ration during the dry period.

Energy level after freshening is more critical than the level before calving. During the dry period, cows in satisfactory condition should not gain more than 100 to 200 pounds. Young cows will continue to grow during the dry period and adjustments should be made in their ration. USDA research indicates that body tissue is more efficiently replaced in late lactation than during the dry period. And, the increase in milk production in late lactation is another advantage of conditioning cows before they stop producing. Your goal is to maintain good condition during the dry period.

Fat cow syndrome results when a cow gains too much weight during the dry period. The over-weight cow will deposit fat in the liver which impairs its function. The fat cow is much more susceptible to stress and disease problems. She is more prone to ketosis after calving because of poor appetite and the need to mobilize her body tissue to meet her energy requirements. She may experience displaced abomasum (twisted stomach) because of less rumen fill and the extra fat deposited in connective tissue. Do not feed rations that are extremely high in energy to dry cows that are in good condition.

Lead Feeding—Pros and Cons

Lead feeding is the practice of gradually increasing the amount of grain fed to the dry cow 14 to 25 days before calving. Grain is increased at the rate of about 1 to 1½ pounds each day to have the cow consuming high levels of grain at calving. Some dairymen have had to abandon this practice because cows go off feed, gain excess weight, or experience displaced abomasum. The high level of grain feeding will depress forage intake. Lead feeding should be done cautiously. Lead feeding is not recommended above 15 pounds of grain per day before calving. You should keep grain intake at or below 1 percent of the cow's body weight to avoid the off-feed problems and maintain adequate forage intake. Some grain during the dry period is desirable to adjust the rumen microorganisms. Increase grain after calving 1 to 1½ pounds per day. Encourage the cow to consume high levels of grain and enough forage to maintain rumen function. The minimum forage dry matter requirement is 1 percent of the cow's body weight. Thus, a 1,400 pound Holstein cow should consume 14 pounds of forage dry matter or:

1. 16 pounds of hay
2. 28 pounds of hay silage
3. 42 pounds of corn silage
4. 56 pounds of direct cut grass silage

Research results indicate that cows will reach maximum dry matter intake on this feeding program, along with moderate amounts of grain, as quickly as when on a lead feeding program and still avoid the problems. **The goal for high producing dairy cows is to maximize energy intake when it is needed most, i.e. early lactation during peak milk production.**

Metabolic Disorders and the Dry Cow

We don't completely understand the factors that influence the incidence of milk fever, but attention to calcium and phosphorus nutrition is one way to reduce this problem. The level of calcium and phosphorus in the dry cow ration is more important than the ratio. The dry cow should consume less than 100 grams of calcium and at least 30 to 40 grams of phosphorus per day. Cows fed legume forage only will receive more than the 100 grams of calcium each day. You can reduce the calcium intake by feeding grass forage or corn silage rather than legume hay or silage. Include a 14 to 24 percent phosphorus supplement. You can develop a specific ration for the dry cow. Formulate the grain mix to provide adequate amounts of minerals and vitamins when 2 to 5 pounds of grain are fed per day.

Example Dry Cow Grain Ration

- 940 pounds of cereal grain
(oats, barley, corn and cob meal, etc.)
- 40 pounds of calcium-phosphorus mineral
 - legume forage (monosodium phosphate or commercial equivalent)
 - grass and corn silage (dicalcium phosphate or commercial equivalent)
- 10 pounds of a vitamin A & D premix
 - 1,500,000 units of vitamin A per pound of premix
 - 500,000 units of vitamin D per pound of premix
- 10 pounds of trace mineral salt

You can reduce the incidence of clinical ketosis by keeping the cow on feed and by maximizing energy intake after calving. Increase appetite by avoiding over-conditioning the dry cow.

Displaced abomasum (twisted stomach) may be related to management and nutrition of the dry cow. Feeding high levels of grain to the dry cow may increase the problem by altering rumen fermentation, increasing acid and gas production, and reducing stomach movements. The level of grain feeding should be controlled since fat cows are also more susceptible to the disease. Avoid finely chopped silage and grain, the fineness of the dry cow ration contributes to the problem. Feeding 5 to 10 pounds of baled hay will compensate for finely chopped feeds. The lack of rumen fill and altered fermentation could explain this observation. Cows that have concurrent disease or disorders (mastitis, metritis, milk fever, off-feed) are stressed and more susceptible to displaced abomasum. Good management will minimize these situations.

Livability of the Calf

Nutrient status of the dry cow will affect the survival of her calf. The primary considerations are adequate energy, protein, minerals (especially calcium and phosphorus), trace minerals, and vitamins. You should add 50,000 I.U. of vitamin A and 15,000 I.U. of vitamin D daily to the dry cow ration. Or, you may supply vitamins A and D with an intramuscular injection 2 weeks before calving. Adequate vitamin A increases the vigor of the calf and vitamin A level in the colostrum. The in-

jectable vitamin route is easy to administer and eliminates mixing and deterioration problems in the ration.

Minerals are needed for growth and development of the unborn calf (fetus). You must provide the cow with adequate energy and protein so that she can provide adequate nutrients for the developing calf without using her body reserves. Over-feeding will not increase the size or weight of the calf. Calf size is influenced by the sire, the length of gestation, age of the cow, and minimum level of nutrition.

Summary Points

- Avoid fat, over-conditioned cows
- Condition cows before they go dry
- Lead feed cautiously
- Increase grain after calving at the rate of 1 to 2 pounds per day
- Insure that the ration is balanced
- Avoid finely chopped feeds, both forage and grain
- Minimize metabolic and organic diseases (mastitis, metritis, milk fever, ketosis, etc.)
- Make ration changes gradually
- Provide adequate levels of calcium, phosphorus, trace minerals, and vitamins.

Other Publications and References

- "Feeding the Dairy Herd," Extension Bulletin 218
- "Calcium and Phosphorus for Dairy Cattle," Dairy Husbandry Fact Sheet No. 8
- "Corn Silage in Dairy Cattle Rations," Dairy Husbandry Fact Sheet No. 7
- "Using Colostrum to Raise Dairy Calves," Dairy Husbandry Fact Sheet No. 9
- "Vitamins for Dairy Cattle," Dairy Husbandry Fact Sheet No. 12

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