



South Dakota State University • U.S. Department of Agriculture

## Sunflower Seeds in Dairy Cattle Rations

*by Dr. David J. Schingoethe, professor of dairy science*

Feeding whole sunflower seeds to dairy cattle as a way to increase the energy content of the diet of high-producing dairy cows may boost milk production by three to eight percent. That is the same kind of increase you can expect from feeding other sources of fat such as soybeans, cottonseed, tallow, or dry fat products. Use as a cattle feed also provides an alternative market outlet for sunflower seeds, especially if you are confronted with low market prices or damaged seeds.

Sunflower seeds are a high-energy feed for dairy cows because they are high in fat. One pound of fat contains 2.25 times as much energy as one pound of carbohydrates from feed grains or forages. Most dairy cows cannot consume enough energy during the first one-half of a lactation, so increasing the fat content of their diet may be beneficial. These same cows will give less response to supplemental fat in later lactation when they are not producing as much milk. Sunflower seeds also can be fed to growing heifers and beef cattle, but the benefits would be minimal as compared to the benefits when fed to high-producing dairy cows.

### Nutrient composition of sunflower seeds

Typical nutrient contents of sunflower seeds are listed in Table 1. Oilseed varieties, which are grown primarily for vegetable oil, are most likely to be fed because they are most plentiful and contain the most energy. Oil-type sunflower seeds account for about 95 percent of all sunflowers grown in the United States. They typically contain 41 to 45 percent or more fat, while non-oilseed (confectionary) varieties contain slightly more than one-half as much fat.

Protein content is a little higher in confectionary varieties (23 to 24 percent) than in oilseed varieties (19 to 20

percent). They also contain more fiber, because the fibrous hull of sunflower seeds is usually more extensive in confectionary varieties. The greater amount of fiber, coupled with the lower fat content accounts for the lower net energy of lactation ( $NE_{Lactation}$ ) and total digestible nutrient (TDN) values of confectionary seeds.

Both types of seeds compare favorably against other feeds as energy sources. One pound of oilseeds contains 1.5 times as much energy ( $NE_{Lactation}$ ) as one pound of corn, and confectionary sunflower seeds contain about eight percent more energy than corn. Oil-type sunflower seeds contain 20 to 30 percent more energy than soybeans and cottonseed, which contain 19 to 20 percent fat. But, those other oilseed crops contain more protein (42 and 23 percent, respectively) and their fiber is more digestible than the fiber in sunflower seeds. Low digestibility of the fiber in sunflower hulls is a possible disadvantage of sunflowers.

Sunflower screenings as well as culls -- damaged or broken seeds or meats -- sometimes are available at reasonable prices. These can be considered as a means of lowering costs of energy and protein in the ration. However, screenings usually contain less fat (less than 30 percent) and are more variable in composition than sunflower seeds. Thus, analysis of each batch may be necessary to properly formulate nutritionally balanced diets containing sunflower screenings.

### Feeding guidelines

Fat content of the seeds primarily determines how much sunflower seeds cows can be fed. Too much fat, more than 8 percent of total ration dry matter, will likely cause digestive problems and interfere with ruminal fermentation. Most forages and grains contain 2 to 4 percent fat; you can easily boost the fat to 5 to 6 percent of ration dry matter

with a supplemental fat source such as sunflower seeds. This additional 3 to 4 percent fat can be supplied by 3 to 5 pounds of sunflower seeds (oil-type) per cow daily. As a proportion of total mixed rations, this means that sunflower seeds may comprise 10 percent of the total ration dry matter or 20 percent of the grain mixture. When feeding confectionary sunflower seeds, these amounts can be increased by one-third, or 1 to 1.5 pounds more per cow daily than amounts recommended for oilseed types.

When cows are fed supplemental fat, from sunflower seeds or from any other fat source, increase the calcium content of the diet to more than 0.9 percent of dry matter. You may need to boost the magnesium content slightly to more than 0.3 percent magnesium in order to maintain a balance between calcium and magnesium. This is because fatty acids in the digestive tract tie up some of the calcium and magnesium and reduce the amount of these minerals available to the cow. Research indicates that providing additional calcium may help prevent the slight drop in milk fat tests that sometimes occur when you feed a highly unsaturated fat source such as sunflower seeds.

Since the energy content of the diet is elevated with the supplemental fat from sunflower seeds, the protein content may also need to be increased. For instance, if a 16 percent protein diet is adequate without supplemental fat, a 17 percent protein diet may be necessary with supplemental fat to provide a proper protein-energy balance for optimal milk production.

#### **How to feed sunflower seeds**

Sunflower seeds can be fed whole without any processing. At South Dakota State University, we usually have cracked or rolled the sunflower seeds, although research data shows no advantage to this extra processing. North Dakota and Minnesota researchers, as well as many farmers, have successfully fed sunflower seeds without any processing.

Heating sunflower seeds such as by roasting or extrusion is not necessary, unlike the situation with soybeans. SDSU researchers found that milk production of cows was the same whether they were fed rolled or extruded sunflower seeds. (The feeding value of soybeans usually is improved by a heat processing and is particularly beneficial when cows are consuming more than 4 to 5 pounds of soybeans daily.)

Diets are consumed readily with no palatability problems when sunflower seeds are fed in total-mixed rations. However, cows may not readily consume sunflower seeds when top-dressed or fed separately from other ration ingredients.

## **Advantages of feeding sunflower seeds**

The proportion of saturated fatty acids in the milk produced may decrease when dairy cows are fed sunflower seeds. This change is beneficial because medical research indicates that consuming a less saturated (more unsaturated) fat may be more healthful for consumers. The fat in sunflower seeds is among the highest of all fat sources in proportion of unsaturated fatty acids.

When cows are fed unsaturated fats such as sunflower seeds, the milk fat produced is more unsaturated than normal. This makes a butter that is softer and more spreadable at refrigerated temperatures -- a desirable feature of margarines -- but still has the desired butter flavor. Milk and cheese still maintain desirable flavors and properties but also may be more healthful because they contain less saturated fat.

**Table 1. Composition of sunflower seeds**

Component	Sunflower seed type	
	Oilseed	Non-Oilseed
Dry matter (DM), %	90.0	90.0
Crude protein, % of DM	19.6	23.5
Energy		
NE <sub>Lactation</sub> , Mcal/lb.	1.38	.97
TDN, % of DM	101.0	76.0
Fat, % of DM	44.0	25.0
Fiber		
Neutral detergent fiber, % of DM	24.1	...
Acid detergent fiber, % of DM	16.5	28.5
Crude fiber, % of DM	22.5	24.1
Ash (total minerals), % of DM	3.7	3.8
Calcium, % of DM	0.26	0.30
Phosphorus, % of DM	0.67	0.60



Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA. Mylo A. Hellickson, Director of CES, SDSU, Brookings. Educational programs and materials offered without regard to age, race, color, religion, sex, handicap, or national origin. An Equal Opportunity Employer.

300 copies printed by CES at a cost of 5.5 cents each. August 1992.