SUNFLOWER SEEDS FOR LACTATING DAIRY COWS AND GROWING HEIFERS

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In recent years in the upper midwestern states, a substantial amount of feed-grade sunflower seed has become available for feeding for a number of reasons. Acreage has increased dramatically. Some drought situations, delayed planting and early frost, weather, disease and insect damage have resulted in a large amount of sunflower seed becoming feed-grade. Also, in times of low market prices, feeding sunflower seeds may be an alternative marketing outlet for this crop.

Sunflower seeds can be fed to all types of dairy cattle, both growing and lactating animals. The seeds are high in energy and protein and can serve as a supplement for both of these nutrient components. Most of the energy is derived from the high oil content of the seed which averages 40 to 42 percent fat in oil varieties. This oil (fat) has a caloric or energy value of 2.25 times that of carbohydrates such as starches and sugars. Sunflowers grown for confectionery uses are somewhat lower in oil content, averaging 24 to 26 percent, but are higher in protein (22 to 24 percent) than varieties grown for oil, which average 18 to 19 percent protein in the whole seed.

There are a number of situations when it might be beneficial to feed sunflower seeds. During times of low market prices they may compete for feed value with other conventional grains. In addition, insect and weather-damaged seeds, culls, broken and odd-sized seedlots may be available for feed uses and many times are a very economical buy in terms of protein and energy value. Feeding sunflower seeds to high-producing cows is one way to increase caloric (energy) intake and, therefore, may be a method to maximize milk production.

Interest in feeding sunflower seeds has developed over the last 10 years primarily because of substantially increased planted acreage. North Dakota is ranked first in the U.S. and Minnesota second in sunflower production, with about 3 million acres raised in the two states. This gives livestock producers an opportunity to capitalize on the available seeds for cattle feed which are unsuited for the export market and human consumption.

Experiments were conducted both at North Dakota State University, Fargo and the University of Minnesota, Crookston and jointly on the Utilization of sunflower seeds for dairy animals. Very little information on the feasibility of feeding and nutritional value exists in the literature on modern day varieties of sunflowers. Many inquiries are being received concerning these questions and was another reason for conducting these studies.

The studies involved both lactating cows and replacement dairy heifers. Objectives were to determine optimum levels of sunflower seed in the ration for desirable growth in Holstein heifers and for milk production performance in Holstein cows. Secondly, blood serum, rumen fluid and milk were analyzed for a number of components including total lipids, triglycerides, fatty acids, cholesterol, protein and lipoprotein, urea-nitrogen and glucose at various levels of sunflower seed intakes. Heifers were fed total rations containing 0, 10, 20 and 30 percent whole sunflower seeds. Lactating cows were fed sunflower seeds at 0, 10, 20 and 30 percent of the grain ration. Rations were standardized to meet NRC requirements for protein, energy, minerals and vitamins.

In the lactating dairy cow studies, the level of sunflower seed intake did not affect milk composition. Some small changes were noted in the amounts of various fatty acids in the rumen fluid. Protein in the blood serum decreased slightly with increasing sunflower seed in the diet. Other milk, blood and rumen fluid parameters were mostly unchanged between the various treatments. Milk production was higher in all groups fed the sunflower seeds over the controls. The cows consuming the grain with 10 and 20 percent sunflower seed were the most efficient in converting feed to milk. Milk fat percentage was not affected by ration nor were any unusual flavors or odors detected in the milk by cows consuming up to 30 percent sunflower seeds in their grain.

Growing heifers utilized sunflower seeds in their diet very effectively and improved growth efficiency over

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control animals fed no sunflower seeds. Average daily gain, however, was not different among rations. Total dry matter intake was down slightly by heifers that received the sunflower seeds but total energy intake was similar. The high concentration of fat (energy) in the seeds compensated for the lower dry matter intake, which explains the similar caloric intake. The rations containing higher fat did increase most lipid constituents in the blood with a slight lowering of blood glucose. This, however, did not affect the heifers growth performance or rate of gain.

In summary, sunflower seeds at levels up to 30 percent of the grain mix can be fed to dairy cows. High-producing cows fed high levels of grain should be restricted to 20 percent sunflower seeds in their grain or a maximum of 6 to 8 pounds seed daily to stay within maximum fat levels of 8 to 10 percent recommend for dairy cattle diets. Higher levels of fat in the total diet could cause feed refusals and digestive upsets in cows. Research indicates that sunflower seeds can be fed either whole, rolled or coarsely ground to dairy cattle.

Milk production can be expected to increase slightly because of the higher energy content of the sunflower seeds, sometimes called sunseeds. Sunflower seeds do not adversely affect ration digestibility nor were any health or feeding problems observed at these levels of intake. Milk composition was not changed substantially with consumption of sunflower seeds. The high fiber content of the whole seed, which ranges from 19 to 26 percent, may be an advantage in rations consisting of a number of low fiber feeds to help maintain a minimum crude fiber level of 17 percent in the total ration which is required for dairy cows.

Young growing heifers also respond well to sunflower seeds in the ration. Levels of 0 to 20 percent sunflower seeds in the total ration dry matter can be used to replace other feed sources when economically feasible and available, resulting in good gains and growth rates.

REFERENCES

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were more favorable on a nonprime soil (as at Beulah), yields were higher than on adjacent prime soils. Soil textural differences (as at Center) may be more important in establishing yield level than classification as prime or nonprime. Soil chemical characteristics must also be considered, since the lower yields on the prime site as compared to the nonprime site at Beulah may have been partially related to the more acidic nature of the prime soil.

No decreases in crop yields were apparent at the reclaimed site at Beulah due to the higher initial EC and SAR values than those at the prime and nonprime sites. By 1983, appreciable downward leaching of both soluble salts and sodium was apparent.

These results suggest that mandatory separation of soil materials classified as prime or nonprime may not be necessary for optimum reclamation. Rather, the critical factors are (1) the chemical and physical characteristics of the soil materials and (2) the restoration of a postmine topography which includes "prime-land areas" in which soil moisture levels can develop which are similar to those in prime soils before mining. However, the relative contribution of moisture levels and the various soil physical and chemical factors to yield potential must be more precisely evaluated before specific reclamation guidelines can be established.

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