

# BIODIESEL BENEFITS FOR CATTLE PRODUCERS:

## Feeding Byproducts of Biodiesel Production

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### EXECUTIVE SUMMARY

The biodiesel industry in the United States is entering a period of rapid growth. Increases in the cost of diesel fuel are also increasing the interest in renewable fuels in the agricultural community. When oilseeds are used to produce biodiesel, a large amount of byproduct is produced. Oilseed meals are useful protein supplements for beef cattle and can be used in a wide variety of beef cattle diets. In the region which WORC serves (Colorado, Idaho, Montana, Oregon, North Dakota, South Dakota and Wyoming), the most common use will likely be as a protein supplement for cows grazing dormant pastures during the fall and winter months. It is relatively easy to integrate the use of these byproducts into beef cattle operations, particularly in the northern Great Plains, where many beef cows graze dormant native range or other low quality forages for much of the fall and winter.

The purpose of this paper is to review the nutritive value of various oilseeds used in biodiesel production in the region served by the Western Organization of Resource Councils and to give feeding recommendations for the resulting oilseed meals. In addition, this paper briefly reviews the physical and chemical processes used to produce biodiesel from oilseed crops.

Major oilseed crops in the region which could potentially be used for biodiesel production include soybeans, sunflowers, safflower, mustard, camelina, and canola. Of these, camelina, sunflower, and canola have the greatest oil content.

During the biodiesel production process, oilseeds are crushed and oil expelled. In some cases the remaining cake or meal may be sold at that point, while in others, it may undergo solvent extraction to remove the additional residual oil. The oil undergoes a process known as transesterification in which the triglyceride is converted to glycerol and three methyl esters. The oilseed meals which remain following the oil extraction process are valuable livestock feeds. Soybean meal is the highest quality vegetable oil meal due primarily to its favorable amino acid content and high digestibility. It is used widely in monogastric (swine and poultry) diets across the world. Other oilseed meals generally have lower digestibilities and/or less favorable amino acid profiles when compared to soybean meal. However, the meals from other oilseeds are still very useful, especially in diets for ruminant animals where amino acid profile and fiber level are not as problematic as in monogastric diets.

In beef cattle applications, the most common use of oilseed meals is as a protein supplement, either in beef cow diets or in growing and finishing diets for feedlot cattle. Little research has been conducted with glycerol and its use as a feed ingredient and therefore it is difficult to make broad recommendations regarding its use in livestock diets. Increased interest in renewable fuels, specifically biodiesel, will lead to a greater availability of byproducts which result from biodiesel production. These feed ingredients are suitable for use in a wide variety of beef cattle diets.

Oilseed meals can be used as a feedstuff in a wide variety of beef cattle nutrition applications. However, they are best suited for use as protein supplements in wintering diets for beef cows or in growing and finishing diets for beef calves. With this in mind, it is relatively easy to integrate the use of these byproducts into beef cattle operations, particularly in the northern Great Plains, where many beef cows graze dormant native range or other low quality forages for much of the fall and winter. In these situations, supplementation using feedstuffs such as grain milling coproducts (wheat middlings, distillers grains), commercial supplements, or oilseed meals is quite common during the fall and winter.

Byproducts resulting from either on-farm or small scale production of biodiesel would be quite useful to ranchers in this region.