

SWEET CORN (CANNERY) BY-PRODUCTS

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By-products from sweet corn that is canned or frozen can be utilized for feeding ruminants. In general, these by-products can be used similarly to conventional corn silage and corn stalks. Three different by-products are:

1. Cannery refuse or waste--primarily husk, cobs, cull ears and missed kernels,
2. Sweet corn stalks left in the field when ears are harvested, and
3. By-passed acres--sweet corn that the processor decides to leave (by-pass) rather than harvesting the ears for processing.

Corn-canning factory waste. Primarily cobs, husks, and cull ears, however, the ears are picked at an immature stage. Therefore the digestibility is higher than expected from the same parts from fully ripe corn. In general, the feeding value on a dry matter (DM) basis is about the same as fair quality (poorly eared) field corn silage.

The primary difference between cannery waste and poorly eared corn silage is water content. As collected at the plant it contains about 80 percent water. The high water content is cause for concern in hauling, storing, feeding, and evaluating cannery waste. Excess water can make hauling cost of DM high and can result in high loss due to seepage. Storing in low height structures such as bunker, trench, or stacks results in less seepage loss. Because of its high water content, the acidity of cannery waste silage is usually high. Therefore, DM intake will be lower than expected from good corn silage. Using it to balance rations for low producing, dry cows and older heifers in the dairy herd or for wintering beef cattle should not cause any difficulty, but may be a problem for maintaining high production in early lactation dairy cows.

Like corn silage, this product is low in protein and minerals, especially calcium. Feeding in combination with legume hay or low moisture legume silage is most satisfactory way to use cannery waste. Balancing the ration based on actual composition obtained from wet-chemistry laboratory analysis and carefully estimated actual

intake is recommended. Due to the very high moisture content and the resulting fermentation end-products, DM intake may be reduced when feeding canning waste.

The dollar value of cannery waste varies with its composition, especially water content. As a guideline, the as fed dollar value would be 70 percent of the value of fair corn silage or the value of five bushels of dry corn per ton. However to determine a purchase price subtract any additional cost for hauling storage and feeding. Also, because loss during storage and feeding will usually be higher than with corn silage an additional deduction of 10 to 20 percent is usually justified. Supply and demand will determine price, but a dollar value of 50 percent of corn silage would be a starting point to determine feasibility for trying cannery waste that is 75 to 80 percent water.

Sweet corn (canning corn) stalks. Because the ears are harvested at an immature stage; the stalks and leaves left in the field are also immature and green at harvest time. The DM in canning corn stalks will be higher in digestibility and feed value than stalk silage from mature field corn. The feeding value of the DM from sweet corn stalks would be comparable to cannery waste of fair corn silage.

The stalks and leaves are still immature and green when the ears are picked for canning or freezing. Thus, the water content of the stalks and leaves will be high; 75 to 80 percent. Therefore it is best to wait about ten days after harvesting the ears to allow some drying. Increased mold growth due to injury of the plants at corn harvest may force earlier harvest after the ears have been removed. Waiting too long results in leaf loss and over-drying of broken and down stalks. Weather conditions both before and after harvesting ears will be important in determining the best harvest time. When dried to less than 70 percent water, these stalks can be ensiled by the same methods and structures used for corn silage.

The dollar value of good sweet corn silage stalks would be comparable to fair corn silage. However, when considering possible purchase be sure to deduct the harvesting cost. Yield per acre will usually be lower and thus harvesting cost per ton will be higher. When considering purchase on a per acre basis, a good estimate of DM yield per acres is needed. There are large differences in the amount of stalks from different varieties of sweet corn grown. Because of immaturity, less stalk growth than with usual field corn and the removal of ears, the DM yield of sweet corn stalks per acre will usually be less than 50 percent of that expected from regular silage.

By-passed acreage of canned corn. Most by-passed acres are due to poor quality of the corn. Stunted or damaged corn due to drought could be very poor quality stalks. Other weather conditions, such as wind or hail damage, may result in by-pass acres of sweet corn that will make good silage. Other acres may be by-passed only because of excess acres, pest damage, or weather conditions that prohibited harvesting at the right time. This sweet corn would make excellent corn silage. By-pass acres will vary greatly in feed value from stalk silage to excellent quality corn silage. Likewise as-fed yield per acre will vary from only a ton on severely drought-stunted corn to ten tons or more when it was by-passed for other reasons.

It is difficult to give guidelines for feed values or acre value of by-pass corn. If no or few ears are present the stalks would be worth no more than cannery waste or stalks from harvest corn. Yield per acre may be so low that harvesting cost would be greater than feed value. By-passed acres of well-eared sweet corn would be left to more fully mature and then harvested, stored, fed and evaluated as a replacement for excellent field corn silage.

Possible hazards and precautions when using sweet corn by-products:

1. *Herbicides, pesticides and other chemicals.* It is always advisable to check with suppliers (cannery) to make sure no possible dangers exist. With by-pass acreage there could be problems, since harvest time or special treatment did not meet recommended practices. Thus it would be important to get that information.

2. *Nitrate.* Nitrate levels in canning corn would usually be the same as field corn. Likewise, factors that result in high nitrates in field would apply to canning-corn. Cannery waste would not be a likely problem. The stalks when stressed, damaged, and broken at picking time could accumulate nitrate as they try to recover. After a week or ten days the stalks would either be dead or the nitrate would be utilized. Thus, silage made from stalks after the usual waiting period would be normal in nitrate level and after ensiling the nitrate level would be even lower. Pasturing or green chopping stalks could be a source of nitrate problems. Avoid overfeeding at one time, wait for the plant to overcome stress after harvest (week to 10 days), and feed balanced rations to help avoid this problem. By-passed acres could be a source of problems if the by-pass is the result of drought or severe weather damage that stressed the corn. Growth immediately after a rain or recovery from other stress could result in high nitrate for a few days. By-pass acreage of normally grown corn would not be a problem. Ensiling the corn

by-products helps reduce the nitrate problem. The lower part of the stalk contains the highest level of nitrate. Cutting high leaves more nitrate in the field. Laboratory testing for nitrate level is available and should be used in case of doubt.

3. *Silo Gas - nitrogen dioxide.* When ensiling any crop, especially cereal grains including conventional corn silage, silo gas is a potential hazard. Breathing the gas damages both livestock and humans. Follow usual precautions of avoiding enclosed areas near the bottom of the silo and do not enter the silo without running blower first. Ensiling cannery by-products should be done with the same precautions suggested for making field corn silage.