

Corn

Corn Silage: Corn silage is a very palatable high energy roughage. Actual energy content depends largely on the amount of grain present.

Dry Matter Nutrient Content	Immature <25% DM	Normal 32-38% DM	Mature >40% DM
Dry Matter	100	100	100
Crude Protein	10	9	9
ADF	34	28	28
TDN	66	69	65
Calcium	0.29	0.28	0.26
Phosphorus	0.24	0.26	0.25

Feeding: Corn silage can be fed to dairy cows as their major source of roughage, provided 2.5 to 3.5 kg (5 to 7 lb) of long hay is fed per cow daily. The long hay is required to prevent depression of milk fat. Dry cows will get too fat on a diet of straight corn silage and so should be limited. As an alternative, feed a lower quality roughage. This also applies to beef cattle in the early stages of gestation. Corn silage makes an excellent feed for the last month of pregnancy and during lactation. Do not feed corn silage as the sole source of roughage to young animals; they do not have the capacity to eat enough to satisfy their nutrient requirements.

Corn Stover: Corn stover is the mature corn plant from which the ears have been removed. It contains leaves as well as stalks and can be a good source of feed for animals during gestation.

Dry Matter Nutrient Content	%
Dry Matter	100
Crude Protein	6.5
ADF	39
TDN	50-60
Calcium	0.57
Protein	0.1

Corn stakage consists of stalks with few or no leaves and is roughly equivalent to other cereal straws.

Corn forage is low in protein, minerals and may be low in vitamins. All corn forages must be properly supplemented with these to produce satisfactory results.

Grain: In the United States, corn is the most widely used energy source for all classes of livestock.

Dry Matter Nutrient Content	%
Dry Matter	100
Crude Protein	9
ADF	3
TDN	90
Calcium	0.04
Phosphorus	0.30

Generally, corn is worth from 110 to 115 per cent the value of barley. However, it usually requires more protein supplement for all classes of livestock and poultry when used as the sole grain. This is because it is particularly low in protein compared to the other grains. Corn is also lower in calcium and phosphorus compared to other cereal grains.

For ground corn a medium to coarse grind is preferred. This can be accomplished using 0.9 to 1.3 cm (3/8 to 1/2 inch) hammermill screen. Rolled corn is commonly called cracked corn.

Distillers Dried Grains

Residue remaining after alcohol production is called distillers dried grain. Before being sold it is normally dried down to 90 per cent dry matter. Distillers dried grains are fed mainly to dairy cattle as a protein source. DDG are used primarily as a protein supplement for dairy cattle where it is valued for its high rate of bypass protein.

Dry Matter Nutrient Content	Corn Distillers Grain with Solubles %	Wheat Distillers Grain with Solubles %
Dry Matter	100	100
Crude Protein	28	39
TDN	80	72
ADF	20	22
Fat	10	4
Calcium	0.22	0.16
Phosphorus	0.83	1.10

Fababeans

Forage: Fababeans make good silage and contain about the same energy and protein concentration as alfalfa. Although very dark in color, the silage is palatable.

Dry Matter Nutrient Content	%
Dry Matter	100
Crude Protein	17
ADF	37
TDN	60

Seed: Fababeans are palatable, digestible and non-toxic. The raw unprocessed

bean produced on the farm can be ground or hammermilled using a 1.3 cm (1/2 inch) screen and mixed directly into rations for all classes of livestock.

Feeding: When substituting fababeans for soybean meal, 1 kg(2 lbs) of fababeans replaces 0.5 kg (1 lb) of soybean meal and 0.5 kg (1 lb) grain in the ration. This 2:1 relationship exists because the protein content of the fababean is about half that of soybean meal.

Dry Matter Nutrient Content (Seed)	%
Dry Matter	100
Crude Protein	26
ADF	12
Fat	1.5
TDN	82
Calcium	0.15
Phosphorus	0.55

Feeding trials at the University of Manitoba have indicated that fababeans can make up to 35 per cent of the dairy concentrate without adversely affecting the production of milk.

Fababean meal may replace other vegetable protein supplements in both calf starter and grower rations. For beef cattle and sheep, fababeans can be used to supply the supplemental protein for all classes of stock.

Flax

Forage: Immature flax or flax straw may contain high levels of prussic acid (see section on prussic acid) and should be tested before feeding. Flax straw is very low in feeding value.

Dry Matter Nutrient Content (Flax Straw)	%
Dry Matter	100
Crude Protein	5
ADF	65
TDN	40

Dry Matter Nutrient Content (Whole Flaxseed)	%
Dry Matter	100
Crude Protein	25
ADF	12
TDN	118
Fat	40
Calcium	0.27
Phosphorus	0.8

Feeding: Limit whole flaxseed to a maximum of 10 per cent of the grain ration for beef and dairy cows. It can be used in about the same proportion of the grain ration for sheep and horses, but combine it with other protein supplements when fed to swine.

Grain Screenings

When cereals and other small grains are threshed, they contain various amounts of materials called screenings. These are removed before the grain is used for human consumption, exported or put to other uses where grains of a specific quality are required. The screenings consist of small, broken or shrunken kernels of grain. They may also contain wild oats and wild buckwheat, other weed seeds, chaff and broken pieces of stem.

The main concern when using screenings for feed is the variability of consumption. As

screenings represent a source of feed energy, their composition determines their usefulness as a feed. The best grades of screenings, consisting chiefly of broken and shrunken kernels of small grain, have a feeding value slightly less than oats.

Screenings from the cleaning of canola and flax crops may be even higher in feeding value. As canola and flaxseed contain high levels of oils, which are high in energy, the screenings may be similar to barley in energy content and higher in protein. However, the high oil levels impose an upper limit on the level that these screenings can be incorporated into a diet without causing digestive upsets.

Light, chaffy screenings with an abundance of small weed seeds are much lower in feeding value, and are extremely variable in composition.

Dry Matter Nutrient Content (Average grain screenings)	%
Dry Matter	100
Crude Protein	12
ADF	24-37
TDN	60-70

Note: *There is considerable variation in screenings composition, depending on the source. Each batch should be analyzed for nutrient content.*

Feeding: Grain screenings can be used to extend feed supplies for ruminant animals which are not at high levels of production. They can be put to good use as the only concentrate fed to dry cows and replacement heifers provided the forage is of reasonable quality. If the forage is not of good quality, feed up to 3 kg (6 lb) per head each day for heifers weighing 227 to 318 kg (500 to 700 lb) or 4.5 kg (10 lb) per head each day for dry cows and beef cows. Supply extra energy when required using cereal grains.

As with any new feed, gradually increase the amount fed to this maximum level over a one week period. It is possible that feeding some batches of screenings could have a detectable effect on milk flavor. This should not be a significant problem if the screenings are not fed within two hours before milking. This is the same precaution that should be taken when feeding silage.

Low grade screenings are not recommended for swine. If used, incorporate them at low levels into finishing rations.

Liquid Supplements

Liquid supplements consist of a liquid medium plus one or more additives, i.e. molasses containing urea, minerals and vitamins. They have a place in cattle rations, but the feeding program should be carefully evaluated to assure efficient use.

Liquid supplements are a protein supplement -- not a complete ration. They are usually based on molasses diluted with water, giving about 70 per cent dry matter. Propylene glycol is used as a preservative and depresses the freezing point. They contain about the same total energy content as average screenings on a dry matter basis.

Most liquid supplements contain about 30 to 35 per cent crude protein, 25 to 28 per cent of which comes from urea. In other words, about 80 per cent of the crude protein is from urea.

About 0.5 to 2.0 per cent phosphorus is normally added. Little calcium is added as it will not stay suspended in the liquid mix. Therefore, a mineral mix containing calcium should also be fed. Other trace minerals may be added and liquid supplements may be fortified with vitamins.

Late summer pastures and poor quality winter roughages sometimes lack protein. A liquid supplement may help to improve low quality pasture or dry forage. However, when the energy content of forage is not sufficient, cattle will require an energy supplement as well as a protein supplement.

Advantages of Liquid Supplement

- When sprayed on poor quality roughages, palatability and intake are improved. Also, there is some evidence that digestion may be improved.
- Easy to use and convenient as it is commonly used free-choice with consumption being limited by the use of lick wheel.
- Provides not only protein, but other nutrients including some minerals and vitamins.

Disadvantages of Liquid Supplement

- Not a major source of energy as only a very limited amount can be fed, normally 0.5 to 1 kg (1 to 2 lb) per day.
- Cattle eat varying amounts.
- Unless sufficient energy is available in the ration, supplemental protein may not be used very efficiently.
- If sufficient energy is not otherwise available, cattle may overeat liquid supplement with toxic effects.

- Non-protein nitrogen may not be utilized as efficiently in cattle under 272 kg (600 lb).

Millet

Forage: Millet can be used for hay, pasture or silage. Feeding value is greatest for the total crop during the period from flowering to milk stage.

Dry Matter Nutrient Content	Hay %	Straw %
Dry Matter	100	100
Crude Protein	8	4
ADF	41	54
TDN	57	47
Calcium	0.33	0.09
Phosphorus	0.20	0.20

Grain: Millet grain is an acceptable feed provided it is ground.

Dry Matter Nutrient Content (Grain)	%
Dry Matter	100
Crude Protein	13
ADF	17
TDN	84
Calcium	0.03
Phosphorus	0.34

Molasses

Molasses is a by-product of the sugar industry. It is a readily available energy

source, high in sugar and very palatable. Beet molasses is about 78 per cent dry matter.

Dry Matter Nutrient Content	%
Dry Matter	100
Crude Protein	9
ADF	0.1
TDN	75
Calcium	0.21
Phosphorus	0.40

Feeding: Since beet molasses is much more laxative than cane molasses, the amounts fed should be limited. In ruminant rations, use only 5 to 10 per cent for maximum efficiency.

Besides being an energy feed, molasses:

- is an appetizer
- reduces ration dustiness
- improves the palatability of low quality roughages
- provides a carrier for non-protein nitrogen and vitamins in liquid supplements.

Native Hays

Native hays vary widely in nutritional value. When cut at the proper stage, they comparable to tame grass hays. When harvested at an advanced stage of maturity, they will have a lower feeding value.

Dry Matter Nutrient Content	%
Dry Matter	100
Crude Protein	8
ADF	47
TDN	51
Calcium	0.4
Phosphorus	0.1