



Limit These Feeds in Rations for Dairy Cattle

Charles C. Stallings*

When feeding lactating dairy cows it is best to limit amounts of certain feeds. Reasons can be problems with palatability, high oil or fat content, and imbalances of certain nutrients. Knowing these restrictions can prevent problems from occurring. Also, combinations of some of these feeds can be a problem if the maximums are used with no regard to type and amount of nutrients that are provided. This is where your nutritionist can be an asset in identifying optimal relationships with consideration for cost of the ration. Here is a list of some feeds used in Virginia and suggested maximums. Remember that these are maximum amounts and not necessarily optimum amounts.

Table 1. Feed maximums

	% of concentrate	lbs./100 lbs. BW	lbs./cow/day
Urea	1.5	0.03	0.4
Fish meal	3	0.08	1
Blood meal	3	0.08	1
Tallow	4	0.12	1.5
Molasses, dry	6	0.15	2
Peanut skins	—	0.3	4
Bakery waste	—	0.3	4
Soybean hulls	20	0.4	5
Wheat middlings	20	0.4	5
Cottonseed hulls	20	0.4	5
Whole cottonseeds	—	0.5	7
Roasted soybeans, rolled	25	0.5	7
Brewers grains, dry	25	0.5	7
Distillers grains, dry	25	0.5	7
Citrus pulp, dry	—	0.6	8
Corn gluten feed, dry	30	0.8	10
Brewers grains, wet	—	2.3	30

Urea is non-protein nitrogen and contains 281% crude protein. Utilization and conversion to true protein must be via incorporation into rumen microorganisms.

Excess amounts can be fatal to cows so it is important not to over supplement. In addition, urea should not be used with ammoniated feeds such as silage and hays. Urea is an inexpensive source of soluble nitrogen that may be lacking in some diets, and it should be fed with a readily available carbohydrate source such as corn or barley.

Fish meal and blood meal are added to rations in an attempt to supply the limiting amino acids for production. They are not palatable at high inclusion rates. In addition, fish meal will reduce milk fat if fed above the suggested amounts. Both are relatively expensive sources of protein and should be used selectively.

Tallow or animal fat is a saturated fat and a concentrated source of energy. Because high levels of fat interfere with fiber digestion in the rumen, feeds should be limited that contain significant amounts of fat. Unsaturated fats such as corn or soybean oil should not be used in free form in ruminant rations. Oilseeds (soybeans and cottonseeds) can be fed within limits shown in Table 1.

Molasses supply energy in the form of sugars. Since sugars are rapidly fermented in the rumen, excess amounts should not be fed because the rumen can become acidic. At 6% of the concentrate or 2 lbs./cow/day there should be no problem as long as no other sources of sugar are fed. Molasses are often used to enhance palatability.

Both **peanut skins and bakery waste** can be difficult to feed. Peanut skins are fluffy and nutrient content varies with amount of nuts present. Bakery waste can be packaged in plastic. Feeding both feeds might require some hand feeding. Peanut skins have some oil that can be an energy source for cattle as does bakery waste. The tannin content reduces protein digestibility of the skins. Bakery waste can also supply starch and replace some grains in the ration.

*Extension Dairy Scientist, Nutrition, Virginia Tech

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Soybean hulls or flakes are sources of digestible fiber. They can replace starch or grains in dairy rations. They should not be used to replace forages unless excess fiber is being fed. Soybean hulls do not stimulate chewing and rumination the way forages do.

Wheat middlings are moderate in protein and energy. High levels in concentrates can result in low energy concentration and reduced milk production.

Cottonseed hulls and whole seeds are feeds that can substitute for some of the forage because they stimulate chewing and rumination. Both have relatively high levels of fiber. Cottonseed hulls can stimulate feed consumption when fed with other feeds. Whole seeds contain 20% fat and must be limited to prevent excess fat in the ration. In addition, cottonseed products (whole seeds, and meal) need to be limited to prevent the potential for gossypol toxicity.

Roasted soybeans are better utilized than raw, unprocessed beans especially for non-ruminants. Unlike whole cottonseeds, soybean seeds should be rolled or crimped before feeding. Soybeans contain 20% fat and are high in energy. Also, heating increases the rumen resistant protein, but excessive heat can result in indigestible protein. Therefore, any heating or roasting should be controlled.

Brewers and distillers grains can be fed either dry or wet. The drying process increases the rumen resistant protein. Little starch is present in these products

because it has been utilized in the fermentation process. What is left is mostly protein and fiber. Distillers grains can contain 10% fat, resulting in a higher energy than in brewers grains. Brewers grains are similar to corn silage in energy content.

Corn gluten feed is a byproduct of corn syrup manufacturing. This feed has protein that is mostly degradable in the rumen and is not considered a source of rumen resistant protein. Energy is similar to some grains. Corn gluten feed is often an economical feed to use in rations.

Citrus pulp is a source of digestible fiber and adds bulk to rations. Also, it can replace a portion of the forage fiber, but is relatively low in protein.

When combinations of these feeds are used it becomes unclear as to what the maximums should be. Generally, limit combinations of these feeds to no more than 25% of the ration dry matter. With certain feeds this can be excessive. For instance, if soybeans and cottonseeds were fed in combination at their maximums, the 14 lbs. would contain 2.8 lbs. of oil. This is clearly excessive. Know what each feed contributes to the ration and use in amounts that are in balance with other ingredients. Cost is certainly a consideration but not the only one. Table 2 contains nutrient content of feeds. Variation in nutrient content can be significant with by-product feeds. In such cases, nutrient analysis before feeding is recommended.

Table 2. Nutrient content of selected feeds.

	DM%	NEI Mcal/ lb	TDN	CP	ADF	NDF	Fat	RUP
			-----% DM-----					%CP
Urea	99	0.0	0	281	0	0	0.0	0
Fish meal	93	0.76	73	65.0	1	1	10.5	80
Blood meal	90	0.68	66	98.0	1	1	1.4	82
Tallow	99	2.65	177	0.0	0	0	99.5	0
Molasses, dry	94	0.70	70	10.3	8	10	0.9	25
Peanut skins	92	0.62	60	17.6	20	28	23.0	50
Bakery waste	92	0.94	89	10.7	13	18	12.7	NA
Soybean hulls	91	0.81	77	12.1	50	67	2.1	40
Wheat middlings	89	0.71	69	18.4	11	37	4.9	18
Cottonseed hulls	91	0.37	42	4.1	64	90	1.7	50
Whole cottonseeds	92	0.99	96	21.0	29	39	23.0	45
Roasted soybeans, rolled	90	0.99	94	42.2	11	15	20.0	49
Brewers grains, dry	92	0.68	66	29.4	24	46	7.2	50
Distillers grains, dry	93	0.92	88	29.7	18	42	9.2	46
Citrus pulp, dry	91	0.80	77	6.7	22	23	3.7	NA
Corn gluten feed, dry	90	0.86	83	25.6	11	38	2.4	20
Brewers grains, wet	21	0.69	66	23.2	23	42	6.5	35

DM = dry matter, NEI = net energy lactation, TDN = total digestible nutrients, CP = crude protein, ADF = acid detergent fiber, NDF = neutral detergent fiber, fat = ether extract, and RUP = crude protein undegraded in the rumen (by-pass protein), and NA = not available.