

## Balancing the Ration of the Dairy Cow

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would have to eat 280 pounds of silage daily containing 68.52 pounds of dry matter. No cow can eat this quantity of silage, and no matter how liberally you might feed her she would still be starving because of the lack of protein.

Contrast corn silage with alfalfa hay. Alfalfa tests 91.4 per cent. dry matter, 11 per cent. protein, 39.6 per cent. carbohydrates, and 1.2 per cent. fat; 23 pounds of alfalfa hay would supply all of the protein necessary to a cow giving 22 pounds of milk daily. It would also supply 22.9 pounds of dry matter, 9 pounds of carbohydrates, and .276 pounds of fat. If we compare this with the Wolf-Lehmann standard we will find that it is a little short in dry matter, carbohydrates and fat. It is, however, not far off, and alfalfa comes the nearest to being a complete feed for dairy cattle of any crop grown on our farms. If we were to feed more alfalfa hay, however, and thus bring up the other constituents to the standard, we would be feeding more protein than necessary, and protein is too valuable to waste. It would also be a great drain on the cow's system to get rid of the excess protein.

The Ideal Combination of Roughage  
Alfalfa, however, is rich in the very point where corn silage is poor. Why not combine the two? Let us start with a ration of 40 pounds corn ensilage and 20 pounds alfalfa. Here is the way it would figure out:

	D.M.	P.	C.H.	F.
40 lbs. silage ..	8.136	.360	4.52	.29
20 lbs. alfalfa ..	16.392	2.300	7.92	.540
	24.528	2.56	12.44	.830

Wolf-Lehmann Standard .... 29 2.5 13 .5

If we balance this up we find that the nutritive ratio is 1 to 5.35. Although not agreeing exactly with the standard, it is nevertheless a good ration, and one that has proved to give fine results when fed to cows giving a moderate flow of milk. If the ensilage were of extra good quality, with a large proportion of well-matured cobs, the slight deficiency in carbohydrates would be made up. Milk, however, is rich in protein, and if a cow is milking heavily, she would need to have more protein than is supplied in this ration of ensilage and alfalfa. Although the cow's stomach is capacious, all of her requirements could not be supplied by increasing the amounts of ensilage and alfalfa, as she simply would not have room for them. The extra requirements of the heavily milking cow must be given by adding foods very rich in protein and the extra carbohydrate requirements will be supplied in part by the protein concentrates added, and by such concentrates as corn meal, which have a high per cent. of carbohydrates in a very digestible form. A reference to the table on page three will show which foods will best meet this purpose.

### A Choice of Many Foods

Everyone, however, may not have both ensilage and alfalfa, and it may be necessary to combine various foods in order to get a properly balanced ration. Let us suppose that we have a choice of clover hay, oat straw, or alfalfa for roughage, and of bran and oil cake for concentrates. The combinations of these will be determined somewhat by the supplies that we have on hand. After considerable calculating we might determine that such a ration as the following is most satisfactory for our purpose:

	D.M.	P.	C.H.	F.
12 lbs. clover ..	12.7	1.02	5.37	.235
5 lbs. oat straw ..	4.54	.06	1.93	.04
20 lbs. ensilage ..	16.27	.27	3.39	.11
5 lbs. bran ....	4.405	.61	1.96	.135
2 lbs. oil meal ..	1.81	.266	.654	.014
	29.725	2.546	13.304	.654

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