

Protein - As milk production increases, it becomes important that some dietary protein escape degradation in rumen fermentation. Protein that bypasses the rumen is degraded to amino acids and absorbed from the small intestine for utilization. These essential amino acids are needed by the high producing cow and must come either from dietary protein that escapes degradation or microbial protein produced during rumen fermentation and passed along to the small intestine.

The 1988 Nutrient Requirements of Dairy Cattle discussed for the first time both absorbed and crude protein. The dietary intake protein is described as undegradable intake protein (UIP) and degradable intake protein (DIP). Although a specific percent UIP is not stated, the calculations suggest 35-40% bypass protein.

Processing or heat treatment of feedstuffs increases the amount of bypass protein in the feedstuff. Commonly used bypass protein supplements are distillers grains, brewers grains, corn gluten meal, blood meal, meat and bone meal, feather meal, and heat treated soybeans (Table 5).

For faster usage and convenience, Table 3 has been developed to contain the combined requirements for maintenance and milk production for different sized dairy cows

producing milk containing 3.5% fat. The compiled information in Table 3 will save time in calculating requirements.

Table 2. Milk production — nutrients per pound of milk of different fat percentages.

Fat (%)	Crude Protein (lb)	NEL (Mcal)	TDN (lb)	Ca (lb)	Phos (lb)
3.0	.073	.29	.280	.0027	.0017
3.5	.079	.31	.301	.0030	.0018
4.0	.086	.33	.322	.0032	.0020
4.5	.092	.36	.343	.0035	.0021
5.0	.100	.38	.364	.0037	.0023
5.5	.105	.40	.385	.0039	.0024

Feeding The Lactating Herd

Feeding dairy cattle becomes more and more of a science each year due to a constantly rising level of milk production. As the level of milk production increases, either the cow must eat more pounds of feed, or the feed must contain more nutrients per pound. The latter seems to have prevailed in recent years. The amount of nutrients has been increased by the addition of an ever

Table 3. Combines requirements for maintenance and milk production at various levels for cows of three different sizes producing 3.5% milk fat (NRC 1988).

lb Milk	Body Wt (lb)	Daily Nutrient Requirements				
		CP (lb)	NEL (Mcal)	TDN (lb)	Ca (lb)	Phos (lb)
30	1000	3.35	17.2	16.7	.131	.083
	1200	3.55	18.3	17.4	.139	.088
	1400	3.74	19.4	18.8	.147	.094
40	1000	4.14	20.3	19.7	.161	.101
	1200	4.34	21.4	20.8	.169	.106
	1400	4.53	22.5	21.8	.177	.112
50	1000	4.93	23.4	22.7	.191	.119
	1200	5.13	24.5	23.8	.199	.124
	1400	5.32	25.6	24.9	.207	.130
60	1000	5.72	26.5	25.7	.221	.137
	1200	5.92	27.6	26.8	.229	.142
	1400	6.11	28.7	27.9	.237	.148
70	1000	6.51	29.6	28.7	.251	.155
	1200	6.71	30.7	29.8	.259	.160
	1400	6.90	31.8	30.9	.267	.166
75	1000	6.91	31.1	30.2	.27	.17
	1400	7.30	33.4	32.4	.28	.18
80	1000	7.30	32.7	31.7	.281	.173
	1400	7.69	34.9	33.9	.297	.184
85	1400	8.10	36.5	35.4	.312	.193
90	1400	8.48	38.0	36.9	.327	.202
100	1400	9.27	41.2	40.8	.36	.23
110	1400	10.06	44.2	42.9	.39	.24
120	1400	10.85	47.4	45.9	.42	.26