

Feeding the Dairy Cow - Look up tables

A T Chamberlain and J M Wilkinson

Tom@rumnut.co.uk j.m.wilkinson@leeds.ac.uk

Intakes

3% of body weight or 2.5% body weight + 10% of yield

Weight (kg)	Milk yield (l/day)					
	Dry	10	20	30	40	50
400	7.5	11.0	12.0	12.0	12.0	12.0
450	8.5	12.3	13.3	13.5	13.5	13.5
500	9.4	13.5	14.5	15.0	15.0	15.0
550	10	14.8	15.8	16.5	16.5	16.5
600	11	16.0	17.0	18.0	18.0	18.0
650	12	17.3	18.3	19.3	19.5	19.5
700	13	18.5	19.5	20.5	21.0	21
750	14	19.8	20.8	21.8	22.5	22.5

Energy requirements

Maintenance	70 MJ ME for 600 kg cow
Milk production	5 MJ ME / litre of milk
Weight change	30 MJ ME/kg weight change

Suggested limits of inclusion for dietary sources of energy

Milk yield	20	25	30	35	40	45	50
NDF (% DM) Min	37	36	35	34	33	32	31
Starch (% DM) Max	12	15	18	21	24	27	30
Sugar (% DM) Max	3.4	4.3	5.1	6	6.9	7.7	8.6
Oil (% DM) Max	3.5	4	4.4	4.8	5.2	5.6	5.9

Protein requirements(Crude protein)

Milk yield (litres/day)	Crude protein (g/kg DM)
0	135 to 145
10	145 to 155
20	155 to 165
30	165 to 175
40	175 to 185
50	185 to 200

Possible correction factors for dry matter intake on farm

Reason	Correction factor	Comments
Complete diet	1.2 - 1.3	Depends how good the basic ration was
Holstein	1.1 - 1.2	Larger frame and gut size
Out of parlour feeders	1.05 - 1.1	As for complete diet
Mixed forages	1.0 - 1.05	Depends on "fit" of blend of forages
Self feed silage	0.9 - 0.95	Depends on silo face width
Poorly preserved silage	0.9	Depends on proportion of diet
Electric fence at silage face	0.8 - 0.9	Greatest in short-necked animals
Week of lactation	0.67 - 1.00	

Clinical assessment of DM of grass and silage on the farm

Dry matter (%) of grass in the field	
12 to 15	Rain or dew on surface/wellies get wet when walking through crop
15 to 20	Dry leafy grass
20 to 25	Dry grass with 50% ear emergence
25 to 30	Dry mature grass with fully exposed stems

Dry matter of silage (%)	
12 to 15	Juice runs out rapidly when silage is squeezed in hand. Lots of effluent
15 to 20	Juice runs out steadily when squeezed in hand. Effluent
20 to 25	Juice drips when squeezed, ball unfolds slowly. Effluent.
25 to 30	No juice, ball unfolds rapidly. Little effluent
30 to 35	Patchy white mould in silage. No effluent.
40 to 50	Dark overheated patches towards top of silo
50 to 60	Very little evidence of fermentation. Silage may smell of tobacco due to overheating

Analyses of Common FeedAll analyses per kg DM except DM which is % fresh weight.											
Feed name	DM	ME	FME	CP	Ca	Mg	P	NDF	Fat	Sugar	Starch
	%	MJ	MJ	g	g	g	g	g	g	g	g
Hay D50-55	85	8.1	7.5	109	5.0	1.5	2.7	699	16	68	2
Hay D600-65	86	9.6	9.0	131	6.3	1.6	3.0	650	18	93	1
Barley Straw	87	6.5	6.0	43	4.5	0.8	0.9	809	14	18	n/a
Wh Straw	87	6.1	5.6	38	3.8	0.8	0.7	805	13	11	n/a
Grass D 60-65	23	9.8	9.1	106	4.4	1.4	2.5	629	19	154	n/a
Grass D 65-70	21	10.7	10.0	121	4.6	1.4	2.7	610	20	161	3
Grass D 70-75	21	11.2	10.4	139	4.9	1.4	2.9	576	22	174	3
Gr Silage Average	27	10.4	8.1	151	6.8	1.6	3.1	546	35	17	7
Gr Silage Good	27	10.8	8.4	156	5.8	1.5	3.0	523	37	21	10
Gr Silage V Good	21	11.1	8.2	171	6.0	1.4	2.9	483	51	19	n/a
Maize Silage	30	11.2	9.0	88	3.9	2.4	1.8	390	30	5	206
Barley Grain	86	12.8	12.3	128	1.1	1.2	3.9	234	13	35	528
Citrus Pulp	88	11.8	10.7	72	19.0	1.3	1.2	254	32	217	n/a
Fodder Beet	18	11.9	11.8	63	3.9	1.4	1.8	127	3	649	n/a
Maize Gluten Fd	89	12.7	11.5	232	2.8	4.3	10.0	390	34	n/a	151
Molasses Cane	75	12.7	12.7	41	9.6	4.4	1.2	0	n/a	850	0
SBP Dry Molass	86	12.5	12.4	129	5.9	1.0	0.7	294	4	296	5
Wheat Grain	87	13.6	12.9	123	0.6	1.1	3.4	66	19	58	660
Brewers Grains	28	11.7	9.0	245	3.3	1.5	4.1	572	77	10	57
Fishmeal White	92	14.2	11.4	694	56.2	2.3	38.1	n/a	81	1	1
Palm Kernel Ext	90	12.8	10.4	216	2.3	3.0	5.6	692	68	39	12
Rape Seed Meal	90	12.0	11.2	418	7.8	4.5	12.0	279	23	103	40
Full Fat Soya	89	14.7	8.4	360	4.5	3.0	5.8	200	180	n/a	n/a
Soyabean MI Exp	90	13.5	11.2	504	2.3	3.0	9.7	290	66	n/a	n/a

The ideal silage analysis for a milking cow diet

Dry matter	More than 300 g/kg
ME	More than 10.5
FME/ME	More than 0.70
CP	150 to 175 g/kg DM
pH	4.0 to 4.5
NDF	500 to 550 g/kg DM
NH₃-N	Less than 50 g/kg total N
Amino-acid N	More than 700 g/kg total soluble N
Residual sugars	More than 100 g/kg DM
Lactic acid	80 to 120 g/kg DM
Volatile fatty acids	Less than 0.20 of total acids

Density of silage

Typical fresh weight (and dry matter) density (kg/m³) of silage

Dry matter (g/kg)	Bunker/clamp		Big bale
	Grass	Maize/Whole-crop	Grass
150	800 (120)	-	-
200	725 (145)	700 (140)	430 (85)
250	680 (170)	650 (160)	400 (100)
300	650 (195)	620 (185)	380 (115)
350	630 (220)	600 (210)	350 (123)
400	610 (245)	590 (235)	330 (130)
450	600 (270)	580 (260)	300 (135)

Source Chamberlain, A.T. and Wilkinson, J.M. Feeding the Dairy Cow. 241pp, Pubs Chalcombe Publications, Painshall, Church Lane, Welton, Lincoln, LN2 3LT, UK. ISBN 0 948617 32 2£19.95 inc p+p in UK, £27.00 elsewhere)