Formulation of ration for cattle and buffalo

Based on (a) Nutrient requirement of animal (b) Nutritive value of available feed/ fodders

Table:01 Daily Nutrient Requirement for Cattle and Buffalo

Category	B.Wt. (kg)	DM (kg)	DCP (kg)	TDN (kg)	Ca (g)	P (g)	Carotene (mg)	Vit. A (1000)
1. Calf	45	-	0.170	0.90	7	6	5.0	2
	60	-	0.195	1.10	9.5	8	6.2	2.5
	70	-	0.220	1.30	12	10	7.5	3
2. Growing cattle and buffalo (Kearls,1982) (Gain 0.5 kg/d)	150	4.20	0.310	2,20	16	10	-	9
	200	5.20	0.350	2.80	16	12	-	12
	250	6.25	0.380	3.20	16	14	-	13
	300	6.90	0.410	3.70	19	14	-	13
3.Mature cow and buffalo	300	4.50	0.200	2.40	12	10	32	13
	350	5.00	0.230	2.70	14	11	37	15
	400	5.50	0.250	3.00	17	13	42	17
	450	6.00	0.280	3.40	18	14	48	19
	500	6.50	0.300	3.70	20	15	53	21
	550	7.00	0.330	4.00	21	16	58	23
	600	7.50	0.350	4.20	22	17	64	26
4.Maintenance and pregnancy (last 2 months of gestation)	300	5.60	0.290	3.40	16	14	56	25
	350	6.40	0.320	3.70	21	16	67	27
	400	7.20	0.350	4.00	23	18	76	30
	450	7.90	0.400	4.40	26	20	86	34
	500	8.60	0.430	4.80	29	22	95	38
	550	9.30	0.470	5.20	31	24	105	42
	600	10.0	0.500	5.60	34	26	114	46
5. For milk production (per kg milk)	Fat %							
	4	-	0.045	0.315	2.7	2.0	-	-
	5	-	0.051	0.370	2.9	2.2	-	-
	6	-	0.057	0.410	3.1	2.4	-	-
	7	-	0.063	0.460	3.3	2.6	-	-
6.Bullocks								
1.Normal work*	300	5.80	0.330	3.10	-	-	-	-
	400	7.60	0.450	4.00	-	-	-	-
	500	9.40	0.560	4.90	-	-	-	-
2. Heavy work**	300	7.00	0.420	4.00	-	-	-	-
	400	9.80	0.570	4.80	-	-	-	-
	500	11.2	0.710	6.40				
3. Breeding bull	500	-	0.450	4.50	20	15	53	21
	600	-	0.530	5.40	22	17	64	26

***6 hours carting or 4 hours ploughing; **8 hours carting or 6 hours ploughing**

Note: During 1st and 2nd lactation in order to allow the growth of lactating cattle and buffalo add about 20% and 10% of maintenance allowance, respectively.

Table: 02 Nutritive Value (DM basis) of Common Feed and Fodders

Feed and fodder	DM* %	DCP %	TDN %	Ca %	P %	Carotene ppm
Straw						
Cereal straws		0.0	40	0.30-0.40	0.07-0.10	
Legumi. straws		3-4	45	1.00-1.50	0.10-0.15	
Green fodder						
1. Berseem		12	60	2	0.25	
2. Lucerne		16	60	1.25	0.35	
3. Jowar		8	50	0.7	0.4	
4. Maize		6	65	0.7	0.2	
5. Oat		10	70	0.5	0.3	
Silage						
1. Jowar		2.5	50	0.4	0.2	
2. Maize		3.5	60	0.6	0.2	
Hay						
Berseem hay		10	60	1.5	0.3	
Lucerne hay		16	56	1.6	0.12	
Cowpea hay		7.5	56	1.0	0.23	
Mixed grass (ripe)		5-6	35-55	0.26- 1.33	0.04-0.45	
Grains						
1. Jowar		6	75-80	0.04	0.3	
2. Maize		7	80	0.07	0.4	
3. Oat		4	70	0.1	0.4	
4. Barley		7	75	0.1	0.3	
Grain/Pulse by products						
1.Wheat bran		8-10	65-70	0.1	1.2	
2. Rice bran		9	70	0.1	2.7	
3. DORB		8-10	65	-	-	
4. Gran chuni		7	60	0.9	0.2	
Molasses		2	65	0.9	0.08	
Oil seed cakes						
1. CSC (Decort.)		30	85	0.2	0.6	
2. CSC (Undec,)		18	70	-	-	
3. GNC(Expeller)		40	75-80	0.2	0.6	
4. GNC (sol.ext.)		45	75	0.2	0.6	
5. Mustard cake		30	70	0.6	1.0	
6. Sesame cake		35	75	1.4	0.7	
Animal proteins						
1. Meat meal		45	65	8	4	
2. Fish meal		45	55	7	4	

Average DM*: Dry feeds (grain, grain byproducts, cake, straw, hay animals proteins) 90 %; Non-leguminous greens (cereal fodders) 75 % and Leguminous fodders 80-85 % and Molasses 60%

I. Preparation of concentrate mixtures

Problem1. Prepare 100 kg calf starter containing 22% DCP and 75% TDN when following feeds and supplements are available
(i) Crushed Barley (ii) Sesame cake (iii) DORB (iv) Meat meal (v) Min. mixture (vi) Molasses (vii) Vit. AB_2D_3 (viii) Salt (ix) TM-5/other feed antibiotic/prebiotic

Solution:

Nutritive value of available feeds

Feed ingredients	**DCP (%)**	**TDN (%)**
1. Barley	7	75
2. Sesame cake	35	75
3. Meat meal	45	65
4. DORB	10	65

For making 100 kg calf starter

Step 1: Fix quantity of grain byproduct, animal protein source and minor ingredients

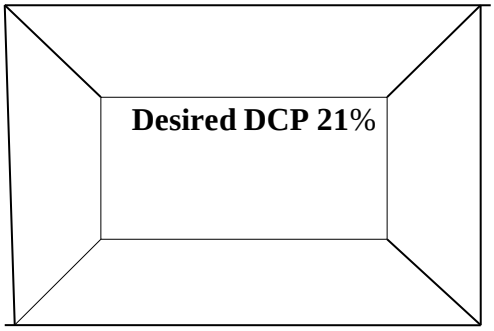
Feeds/supplements	**Quantity (kg)**	**DCP (kg)**
1. Meat meal	10	4.5
2. DORB	08	8.0
3. Min. mixture	02	-
Total	**20**	**5.3**

Step 2: Adjustment of DCP

DCP required to be supplemented through 80 kg [(100 (qty. to be prepared) - 20 kg (qty. already fixed in step 1)] is 16.70 kg [22 (required DCP) – 5.30 kg (DCP supplied by qty. of ingredients fixed in step 1)] Therefore, DCP desired in percentage will be 16.70/80 x100 = 20.88 (21.00) %.

Step 3: Calculate proportion of barley and sesame cake through Pearson square method

DCP 07 % (Barley) **14**



DCP 35 % (Sesame cake) **14**

28

Proportion of barley = 14/28x80 = 40 kg

Proportion of sesame cake = 14/28×80 = 40kg

Step 4: Calculation of Nutritive Value of mixture prepared

Ingredients	Quantity (kg)	DCP (kg)	TDN (kg)
Crushed Barley	40.0	2.80	30.0
Sesame cake	40.0	14.50	30.0
Meat meal	10.0	4.50	6.5
DORB	8.0	0.80	5.2
Min. mixture	2.0	-	-
	100.0	22.10	71.7

To above 100 kg mixture add –

Molasses - 5-10kg (depending on availability)

Salt - 0.5 kg

Vit AB_2D_3 - 10g (as per the recommendation of the manufacturer)

TM-5 - 20g (as per the recommendation of the manufacturer)

Answer: 100 kg calf starter can be prepared by mixing available feed ingredients and supplements as under-

Crushed barley 40 kg, Sesame cake 40 kg, Meat meal 10 kg, DORB 08 kg & Mineral mixture 2 kg. To this 100 kg add molasses 5-10 kg + Salt 0.5 kg +AB2D3 10 g + TM-5 20 g. Addition of molasses will take of TDN shortage.

Problem 2. Prepare 100 kg calf starter containing 22% DCP and 75% TDN when following feeds and supplement are available

(i) Crushed maize (ii) GNC (iii) Wheat bran (iv) Fish meal

(v) Min. mixture (vi) Salt (vii) Molasses (vii) Vit. $AB_2 D_3$ (viii) Aurofac

Solution:

Nutritive value of available feeds

Feeds	**DCP (%)**	**TDN (%)**
1. Maize	07	80
2. GN cake	45	75
3. Fish meal	45	55
4. Wheat bran	08	70

Step1: Fix quantity of grain byproduct, animal protein source and minor ingredients

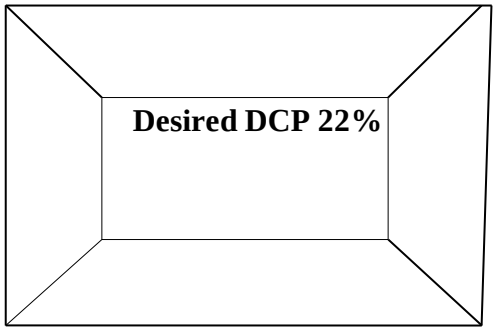
Feeds	**Quantity (kg)**	**DCP (kg)**
Wheat bran	08	0.64
Fish meal	10	4.50
Min. mixture	02	-
	20	5.14

Step 2: Adjustment of DCP

DCP required to be supplemented through 80 kg [(100 (qty. to be prepared) - 20 kg (qty. already fixed in step 1)] is 17.86 kg [22 (required DCP) – 5.14 kg (DCP supplied by qty. of ingredients fixed in step 1)] Therefore, DCP desired in percentage will be 17.86/80 x100 = 22.32 (22.00) %.

Step 3: Calculate proportion of maize and GN cake through Pearson square method

DCP 07 % (Maize) **23**



DCP 45 % (GNC) **15**

38

Proportion of maize = 23/38x80 = **48.42 kg**

Proportion of GN cake = 15/38×80 = **31.58kg**

Step 4. Calculation of Nutritive Value of mixture prepared

Ingredients	**Quantity (kg)**	**DCP (kg)**	**TDN (kg)**
Maize	48	3.36	38.40
GNC	32	14.40	24.00
Wheat bran	08	0.64	5.60
Fish meal	10	4.50	5.50
Min. mixture	02	-	-
Total	**100**	**22.90**	**73.50**

To above 100 kg calf starter add Molasses 5-10 kg + Salt 0.5kg +
Vit. AB_2D**3** and Aurofac as per the recommendation of the manufacturer

Answer: 100 kg calf starter can be prepared by mixing available feed ingredients and supplements as under-

Crushed maize 48 kg, GNC 32 kg, Fishmeal 10 kg, Wheat bran 08 kg & MM Mineral mixture 2 kg. To this 100 kg add molasses 5-10 kg + Salt 0.5 kg + AB_2D_3 10 g + Aurofac 20 g. Addition of molasses will take of TDN shortage.

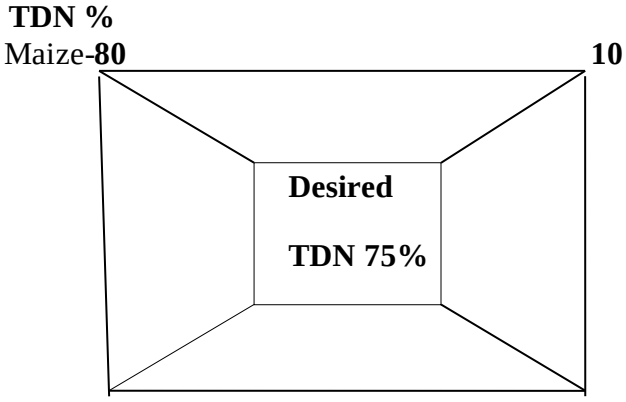
Problem 3. Prepare concentrate mixture for growing cattle containing 18% DCP and 75% TDN when following feeds are available (i) Maize (ii) Wheat bran (iii) GNC (iv) Mineral mixture (v) Salt

Solution:

Nutritive value of available feed ingredients

Ingredients	DCP (%)	TDN (%)
Maize	7	80
Wheat bran	10	65
GNC	40	75

Step 1: TDN adjustment by using energy or basal feeds i.e. maize and wheat bran by Pearson method



Proportion of maize in basal mixture = 10/15×100 = 66.67 (67) %

Proportion of wheat bran in basal mixture = 05/15×100 = 33.33 (33) %

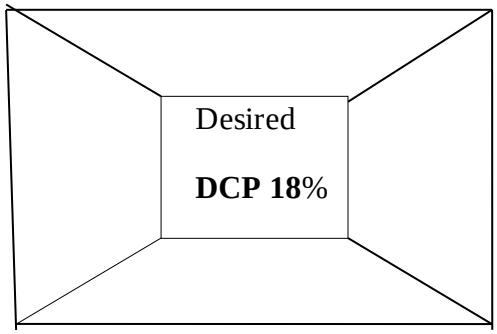
Nutritive value of basal mixture

Ingredients	Quantity (kg)	DCP (kg)	TDN (kg)
Maize	67	4.69	53.60
Wheat bran	33	3.30	21.45
Total	**100**	**7.99**	**75.05**

Step 2. **DCP adjustment by using protein feed i.e. GNC**

DCP %

Basal mix**.- 08** **22**



GNC-**40** **10**

32

Proportion of in basal mixture in Con. Mix. = 22/32×100 = **68.75 %**

Proportion of GNC in Con. Mix. = 10/32×100 = **31.25%**

In 100 kg basal mixture proportions of maize = 67 kg and wheat bran= 33 kg

Therefore, in 68.75 kg basal mixture the proportion of maize and wheat bran will be

Proportion of maize in 68.75 kg basal mix = 68.75× 67/100 = **46.06 or (46) kg**

Proportion of wheat bran in 68.75 basal mix = 68.75× 33/100 = **22.69 or (23) kg**

Proportion of GNC in concentrate mixture = **31.25 or (31) %**

Calculation of Nutritive value of Concentrate mixture

Ingredients	**Quantity (kg)**	**DCP (kg)**	**TDN (kg)**
Maize	046	3.22	36.80
Wheat bran	023	2.30	14.95
GNC	031	12.40	23.25
Total	**100**	**17.92 (18)**	**75.00**

To above 100 kg mixture add Mineral mixture = 2kg and Salt = 1kg

Answer: For preparation of 100 kg concentrate mixture containing 18 % DCP and 75% TDN, available feed ingredients should be mixed as follows:-

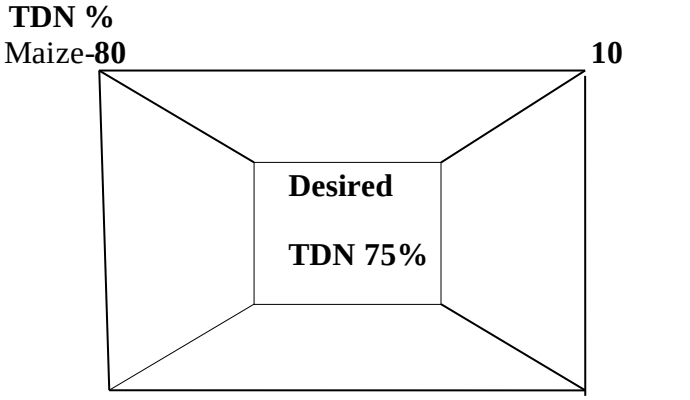
Maize 46 kg; wheat bran 23 kg; GNC 31 kg and to this 100 kg add 2 kg mineral mixture and 1 kg salt.

Question 4. Prepare concentrate mixture for lactating cow containing 15% DCP and 75% TDN when following feeds are available (i)Maize (ii) Wheat bran (iii) GNC (iv) Mineral mixture (v) Salt

Solution: Nutritive value of available feeds

Ingredients	DCP (%)	TDN (%)
Maize	07	80
Wheat bran	10	65
GNC	40	75

Step 1: TDN adjustment by using energy or basal feeds i.e. maize and wheat bran by Pearson method



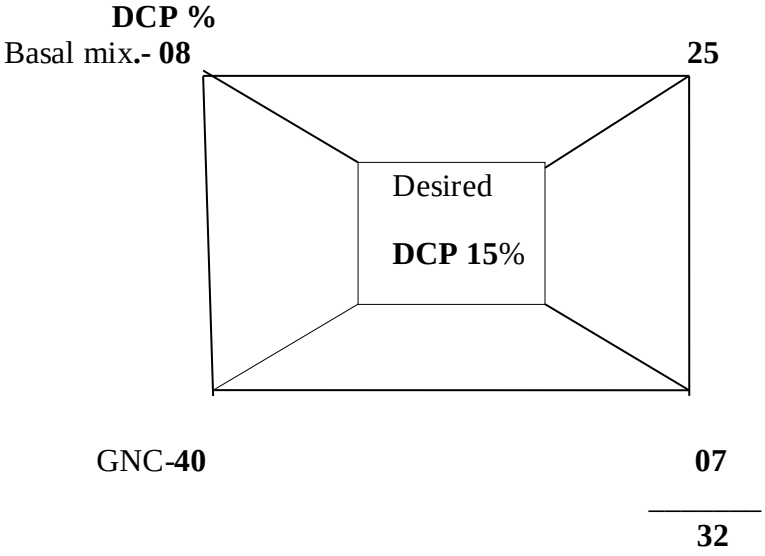
Proportion of maize in basal mixture = 10/15×100 = 66.67 (67) %

Proportion of wheat bran in basal mixture = 05/15×100 = 33.33 (33) %

Nutritive value of basal mixture

Ingredients	Quantity (kg)	DCP (kg)	TDN (kg)
Maize	67	4.69	53.60
Wheat bran	33	3.30	21.45
Total	100	7.99	75.05

Step 2. **DCP adjustment by using protein feed i.e. GNC**



Proportion of in basal mixture in Con.mix. = 25/32×100 = **78.12 %**

Proportion of GNC in Con. Mix. = 07/32×100 = **21.88 %**

In 100 kg basal mixture proportions of maize = 67 kg and wheat bran= 33 kg
Therefore, in 78.12 kg basal mixture the proportion of maize and wheat bran will be
Proportion of maize in 78.12 kg basal mix = 78.12× 67/100 = **52.34 or (52) kg**
Proportion of wheat bran in 78.12 kg basal mix = 78.12× 33/100 = **25.78 or (26) kg**
Proportion of GNC in concentrate mixture = **21.88 or (22) %**

Calculation of Nutritive value of Concentrate mixture

Ingredients	**Quantity (kg)**	**DCP (kg)**	**TDN (kg)**
Maize	52	3.64	41.6
Wheat bran	26	2.60	16.9
GNC	22	8.80	16.5
Total	**100**	**15.04 (15)**	**75.0**

To above 100 kg mixture add Mineral mixture = 2kg and Salt = 1kg

Answer: For preparation of 100 kg concentrate mixture containing 15 % DCP and & &75% TDN, available feed ingredients should be mixed as follows:-
Maize 52 kg; wheat bran 26 kg; GNC 22 kg and to this 100 kg add 2 kg mineral mixture and 1 kg salt.

Question 5. Prepare 100 kg concentrate mixture for working bullocks containing 12% DCP and 70%TDN when following feeds are available- (i) Jowar (ii) DORB (iii) Cotton seed cake (iv) Mineral mixture (v) Salt

Solution:

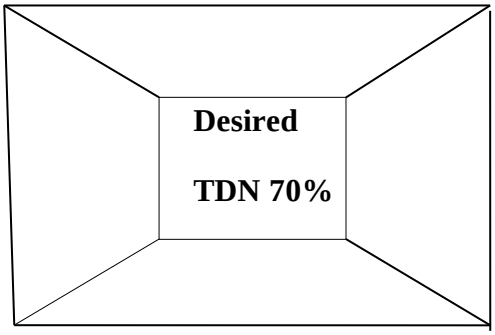
Nutritive value of available feeds

Ingredients	**DCP (%)**	**TDN (%)**
Jowar	06	75
DORB	10	65
CSC	18	70

Step 1: TDN adjustment by using energy or basal feeds i.e. Jowar and DORB by Pearson method

TDN %

Jowar-**75** **05**



DORB-**65** **05**

10

Proportion of Jowar in basal mixture = 5/10×100 = 50 %

Proportion of DORB in basal mixture = 5/10×100 = 50 %

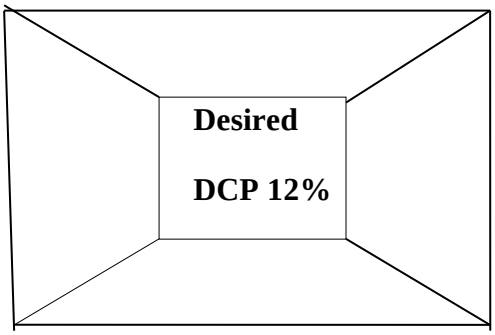
Nutritive value of basal mixture

Ingredients	**Quantity (kg)**	**DCP (kg)**	**TDN (kg)**
Jowar	50	3.00	37.5
DORB	50	5.00	32.5
Total	**100**	**8.00**	**70.0**

Step 2. **DCP adjustment by using protein feed i.e. Cotton Seed Cake**

DCP %

Basal mix**.- 08** **06**



CSC-**18** **04**

10

Proportion of in basal mixture = 6/10×100 = **60 %**

Proportion of CSC in Con. Mix. = 4/10×100 = **40 %**

In 100 kg basal mixture proportions of Jowar = 50 kg and DORB= 50 kg (step 1)
Therefore, in 60 kg basal mixture the proportion of Jowar and DORB will be

Proportion of jowar in 60 kg basal mix = 60× 50/100 = **30kg**

Proportion of DORB in 60 basal mix = 60× 50/100 = **30 kg**

Proportion of CSC in concentrate mixture = **40 % (step 2)**

Calculation of Nutritive value of Concentrate mixture

Ingredients	**Quantity (kg)**	**DCP (kg)**	**TDN (kg)**
Jowar	30	1.80	22.5
DORB	30	3.00	19.5
CSC	40	7.20	28.0
Total	**100**	**12.00**	**70.0**

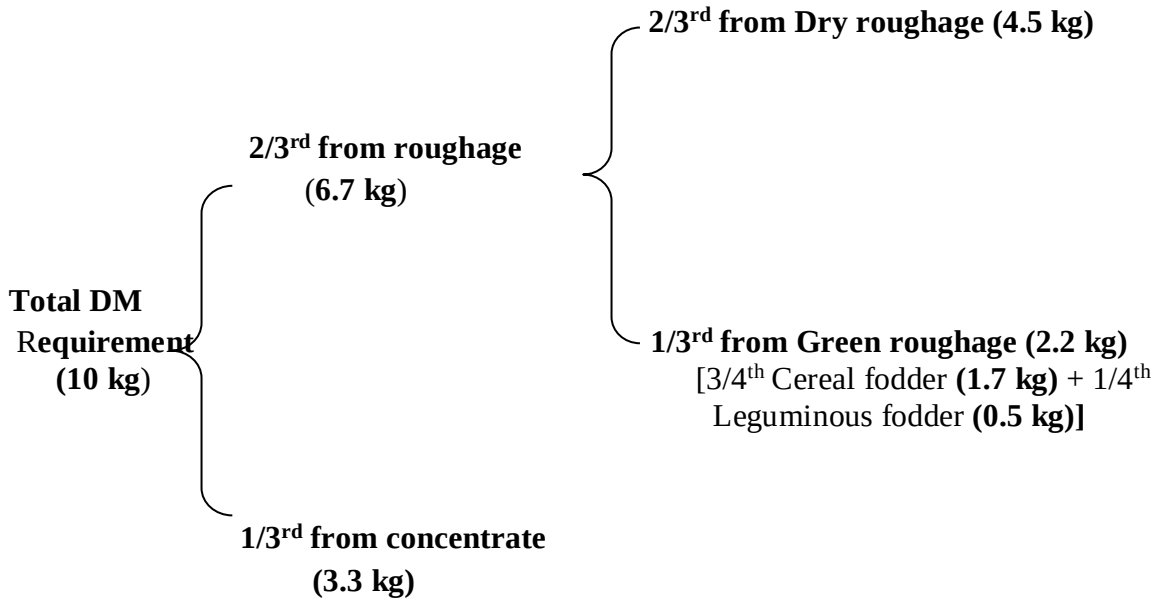
To above 100 kg mixture add Mineral mixture = 2kg and Salt = 1kg

Answer: For preparation of 100 kg concentrate mixture containing 12 % DCP and & &70% TDN, available feed ingredients should be mixed as follows:-

Jowar 30 kg; DORB 30 kg; CSC 40 kg and to this 100 kg add 2 kg mineral mixture and 1 kg salt.

II. Formulation of ration

Partitioning of DM requirement



Approximate DM intake limit in cattle and buffalo

Maintenance:1.5% of BW

Maintenance + 5kg milk/day: 2% of BW

When 10 kg milk/day: 2.5% of BW

When 15 kg milk/day: 3% of BW

When more than 15 kg: 3.5 % of kg BW

Thereafter no increase in DMI even milk production is 40-50 kg/day

Question 1. Formulate ration for growing heifer body weighting 150 kg gaining @ 0.5/day available feeds are (i) Berseem hay (ii) Wheat straw (iii) Wheat bran (iv) Crushed maize.

Solution: (a) Daily nutrient Requirement of the heifer DM 2.8% of BW= 4.20 kg
TDN = 2.20 kg
DCP = 0.31kg
Ca = 16 g
P = 10 g

Nutritive value of available feeds

Ingredients	DM (%)	DCP (%)	TDN (%)	Ca (%)	P (%)
Berseem hay	90	10.00	60	1.50	0.30
Wheat straw	90	0.00	40	0.30	0.07
Maize	90	7.00	80	0.07	0.40
Wheat bran	90	10.00	65	0.10	1.25

Ration I

Ingredients	DM (kg)	DCP (kg)	TDN (kg)	Ca (g)	P (g)	RM (kg)
NR	**4.20**	**0.310**	**2.20**	**16.00**	**10.00**	
B. hay	4.20	0.420	2.52	87.50	12.60	4.67

When required DM (4.2 kg/d) is supplied through berseem hay alone, it can fulfill the DCP and TDN requirement there is no need to give any concentrate/other roughage. But the specially DCP is higher by 110 g/d (35 %), it is unnecessary wastage of protein thus one should explore the possibility to reduce protein supply by incorporation of some other available feed which is low in protein i.e. wheat straw.

Ration II

Ingredients	DM (kg)	DCP (kg)	TDN (kg)	Ca (g)	P (g)	RM (kg)
NR	**4.20**	**0.310**	**2.20**	**16.00**	**10.00**	
B. hay	3.20	0.320	1.92	48.00	9.60	3.60
Wheat straw	1.00	0.000	0.40	3.00	0.70	1.10
Total	**4.20**	**0.320**	**2.32**	**51.00**	**10.30**	

RM = Raw material (as such quantity of feeds)

Answer: Ration consisting of Berseem hay - 3.6 kg + Wheat straw 1.10 kg per day can fulfill the requirement of the given heifer.

Question 2. Formulate the ration of a cow weighing 300kg at advanced stage of gestation when following feeds are available gram straw, maize and cotton seed cake (un-decorticated).

Solution: Nutrient requirement

DM - 5.6 kg
DCP - 0.29 kg
TDN - 3.4 kg
Ca - 16 g
P - 14 g
Vit A - 25000 IU

Most the farmers in this region feed gram straw, some offer about 1-2 kg CSC (undecortcated) with little wheat bran. By use of these feeds it not possible to balance the ration with respect to TDN. There fore, the following ration may be recommended along with supplementation of essential trace minerals and vitamin A & E.

Nutritive value of available feeds

Ingredients	DM (kg)	DCP (kg)	TDN (kg)	Ca %	P %
Gram straw	90	04	45	1.00	0.12
Maize	90	07	80	0.07	0.40
CSC (un-decorticated)	90	20	75	0.20	0.60

Recommended ration

Ingredients	DM(kg)	DCP(kg)	TDN(kg)	Ca (g)	P(g)	RM (kg)
Gram straw	3.0	0.120	1.35	30.00	3.60	3.33
Maize	2.6	0.182	2.08	1.82	10.40	2.89
Total	5.6	0.302	3.43	31.82	14.00	

Answer: Raw material (as such quantity of feeds)
Gram straw - 3.40 kg
Maize - 2.90 kg supplement with trace minerals and vit. A & E.
No need use to CSC

Question 3. Compute ration for an adult cow weighting 400kg, producing 10kg milk containing 4.5% fat, daily three under the following feeding situations:

When (i) Non maintenance type fodder + readymade conc. Mix. (DCP, 15% and TDN 75%)

(ii) Maize fodder (ad lib) + readymade conc. Mix. (DCP, 15% and TDN 75%)

(iii) Leguminous fodder (10kg/h/d) + straw+ readymade conc. Mix. (DCP, 15% and TDN 75%)

Total DM Requirement may be calculated as 2.5 % of body weight when milk production is 10 kg/d

Refer Table 01	**DM (kg)**	**DCP (kg)**	**TDN (kg)**	**Ca (g)**	**P (g)**
Req. for maintenance	-	0.250	3.00	17.00	13.00
Req. for production (4.5 % fat, 10 kg milk)	-	0.480 (0.048x10)	3.40 (0.340x10)	28.00 (2.8 x 10)	21.00 (2.1x10)
Total requirement	10.00	0.730	6.40	54.00	34.00

Note: Parenthesis have requirements for 1 kg milk with 4.5 % fat

(i) Non maintenance fodder + conc. mix

Ingredients	**DM (kg)**	**DCP (kg)**	**TDN (kg)**	**Ca (g)**	**P (g)**	**As such qty. (kg)**
Wheat straw	5.00	0.00	2.00	15.00	3.50	5.55
Conc. mix	5.00	0.75	3.75	25.00	30.00	5.55
Total	**10.00**	**0.75**	**5.75**	**40.00**	**33.50**	

Supplementation of vit A & E are recommended since there no green

(ii) Maize fodder + conc. Mixture

Ingredients	**DM (kg)**	**DCP (kg)**	**TDN (kg)**	**Ca (g)**	**P (g)**	**As such qty. (kg**
Maize fodder	7.50	0.37	5.25	45.0	15	30.00
Conc. mix	2.50	0.37	1.87	12.5	15	2.750
Total	**10.00**	**0.74**	**7.12**	**57.5**	**30**	

(iii) Berseem +Wheat staw + conc. Mix

Ingredients	**DM (kg)**	**DCP (kg)**	**TDN (kg)**	**Ca (g)**	**P (g)**	**As such qty. (kg**
Wheat straw	3.50	0.00	1.40	10.50	2.50	3.90
Berseem	1.50	0.15	0.83	28.50	3.00	10.00
Conc. mix	5.00	0.75	3.75	25.00	30.00	5.550
Total	**10.00**	**0.90**	**5.98**	**64.00**	**35.50**	

Note: There is high DCP and low TDN so we can replace 1 kg Conc. Mix with 1kg broken rice (TDN 90 %)

Question 4. Compute ration for normal working bullock weighing 400kg when following feeds are available (i)Wheat straw (ii) Ready made Concentrate mixture (12% DCP and 65% TDN).

Ingredients	DM (kg)	DCP (kg)	TDN (kg)	As such qty. (kg)
NR for normal working bullock	**7.60**	**0.45**	**4.00**	
Wheat straw	3.80	0.00	1.52	4.20
Conc. Mix (DCP 12 % & TDN 65 %)	3.80	0.46	2.47	4.20
Total	**7.60**	**0.46**	**3. 99**	

Answer: Wheat straw 4.20 kg; Con. Mix. 4.20 kg + Vit A& E supplementation

Question 5. Formulate ration for heavy working bullock weighing 300kg when wheat straw and conc. mix containing 12%DCP and 65%TDN is available

Ingredients	DM (kg)	DCP (kg)	TDN (kg)	Ca (g)	P (g)	As such qty. (kg)
Nutrient Requi.	**6.60**	**0.33**	**3.10**			
Wheat straw	3.85	0.00	1.54	11.00	2.70	4.25
Conc. mix	2.75	0.33	1.79	13.00	16.30	3.05
Total	**6.60**	**0.33**	**3.33**	**24.00**	**19.00**	

Ans. Wheat straw-4.25 Kg and Conc. mix -3.00kg + Vit. A & Esupplementation

Question 6: Formulate ration for breeding bull weighing 500 kg when following feeds are available 1. Wheat straw 2. Maize fodder 3. Conc. Mixture (DCP 12% & TDN 65 %)

Ingredients	DM (kg)	DCP (kg)	TDN(kg)	Ca (g)	P (g)	RM (kg)
NR , Breeding bull, 500 kg	**-**	**0.45**	**4.50**	**20**	**15**	
Wheat straw	4.50	0.00	1.80	13.50	3.10	5.00
Maize fodder	3.00	0.15	2.10	18.00	6.00	12.00
Conc. mixture	3.00	0.36	1.95	15.00	18.00	3.33
Total	**10.50**	**0.51**	**5.85**	**46.50**	**27.10**	

Ration II

Ingredients	DM (kg)	DCP (kg)	TDN(kg)	Ca (g)	P(g)	RM (kg)
Wheat straw	4.00	0.00	1.60	12.0	2.8	4.40
Maize fodder	3.00	0.15	2.10	18.0	16.0	15.00
Conc. mixture	2.50	0.30	1.63	12.5	15.0	2.70
Total	**9.50**	**0.45**	**5.33**	**42.5**	**33.8**	**21.10**

Answer: Wheat straw,4.40 kg ;Maize fodder- 15kg and Conc. Mix -2.75 kg