Feeds, forages and feeding of dairy animals

Welcome

International Livestock Research Institute

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International Livestock Research Institute

Importance of Feeds

A Formula -1 Car

Cannot run on bad quality fuel

A Holstein Cow

Cannot perform with poor quality feed

Phenotype = Genotype X Environment

Classification of Feeds

Roughages

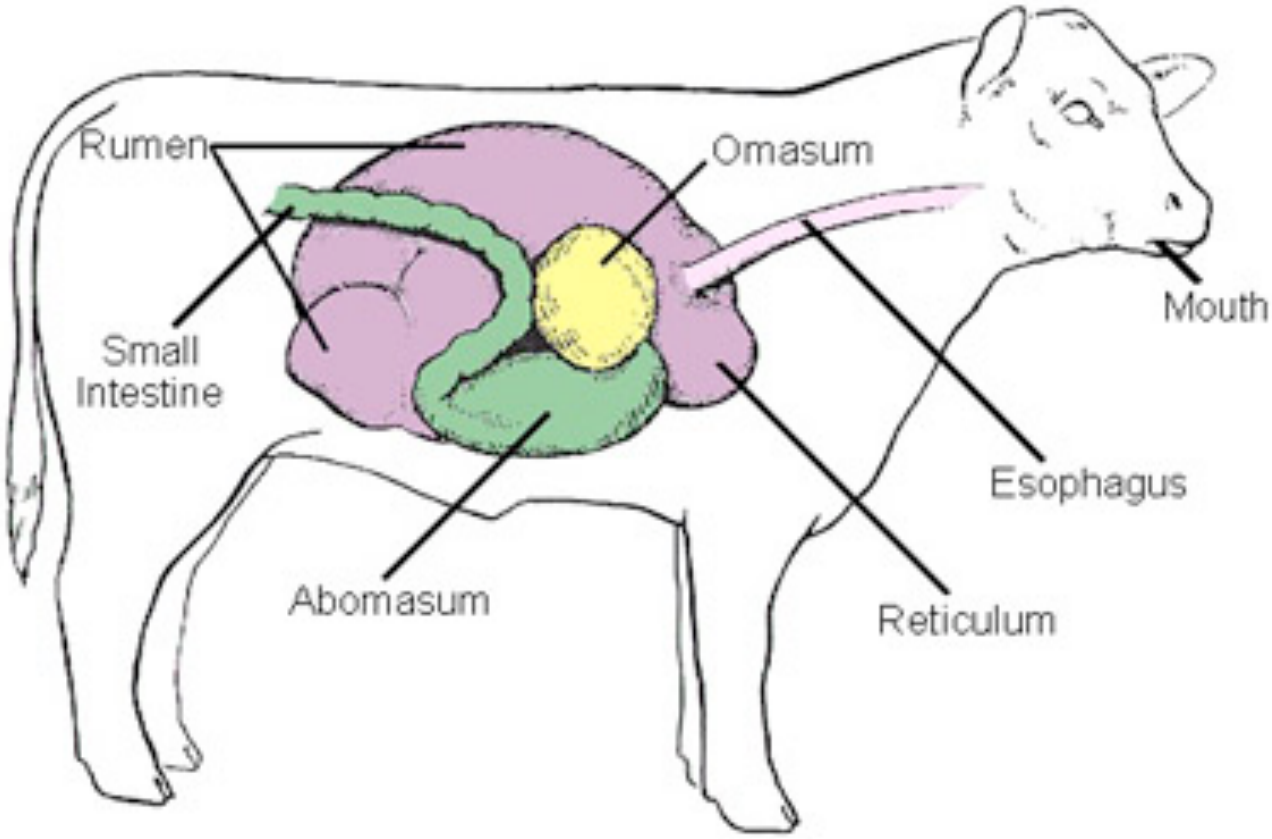
>18% fibre

Concentrates

Concentration of energy or protein or both

Nutritionally Balanced Compounded Feeds

Ruminants and importance of roughages



Feed is digested by enzymes produced by microorganisms in the rumen

Saliva produced while rumination neutralizes acidity in the rumen

Energy rich feeds and their energy content

Sl. No	Energy rich feeds	Energy (ME) per kg DM
1	Maize grain	13.5 MJ
2	Sorghum	13.5 MJ
3	Pearl millet	13.4 MJ
4	Wheat	13.1 MJ
5	Barley	12.4 MJ
6	Finger millet	11.8 MJ
9	Wheat bran	11.0 MJ
7	Rice grain	10.1 MJ
10	Rice bran (11-20% fibre)	10.1 MJ
8	Oats	09.9 MJ

Source: Feedipedia, FAO, 2012

Protein rich feeds and their protein content

Sl. No	Protein rich feeds	Protein per kg DM
1	Soybean meal	518 g
2	Groundnut meal	440 g
3	Cotton seed meal	410 g
4	Niger meal	338 g
5	Sunflower meal	324 g
6	Rape /Mustard meal	260 g

Source: Feedipedia, FAO, 2012

Difference in the nutritive value of various crop residues

Crop residue type	Energy content (ME MJ/Kg DM)	Protein content (CP g/Kg DM)	What % of residue is digestible (OM digestibility)
Groundnut	8.24	147	59
Pigeon pea	7.88	202	58
Maize	7.20	69	49
Pearl millet	6.70	50	51
Sorghum	7.00	39	48
Rice	7.10	50	50
Wheat	7.10	54	49

Source: ILRI

Difference in nutritive value of different varieties of the same crop (Sorghum)

Cultivar/ Hybrids	Digestibility (%)	Energy ME (MJ/kg)	Protein (CP%)
Andhra	50.0	NA	3.69
Bellary HB	48.9	NA	3.56
Raichur	51.7	NA	2.88
Rayalasema	48.6	NA	3.13
Telangana	46.9	NA	3.06
Andhra HB	49.3	NA	3.88

(Blummel and Parthasarathy Rao, 2006)

Nutritionally balanced feeds have all nutrients in balanced proportion

Maize	30%
Barley	08%
Barnyard millet	20%
Mustard oil cake	07%
Soya seed	15%
Rice polish	03%
Wheat bran	07%
Urad husk	05%
Salt	03%
Mineral mixture	02%
Total	**100%**

ME 10 MJ; CP 14%

Different brands will have different qualities

Nutrient requirement of dairy animals

Daily requirement (300 kg body weight)

	Energy (ME)	Protein (DCP)
For body maintenance	40 MJ	350g
Per kg milk production (4% fat)	5 MJ	96g

The requirement can be met through green fodder, dry fodder and concentrate /balanced feed

Maximum dry matter an animal can take is 2.5% of its body weight (7.5 kg in the above example)

Use dual purpose crops for better quality residue

Sorghum (BJV44), Pearl millet (ICMV221), Groundnut (ICGV91114, 02266, 00351)

Always chop roughages and mix with concentrates to increase intake and reduce wastage

Impact of chopping (on dairy animals)

10% ↑ intake = 10% ↑ milk

Chopping + Manger →
Reduces refusal from 5kg to 1kg (saves 4 kg/animal/day)

Different types of chaff cutters are available


Dry fodder may be chopped and
stored in structures like this

Green fodder may be chopped on the day of feeding

Green forage production

1. Forage Sorghum
Irrigated: COFS-29 -7 cuts-210 MT– (75-35--- days)
Dryland: CSH24MF -3 cuts-90 MT (first cut 75 days, then 45days)

2. Forage Maize
For green – P3546 – 1 cut only (20-25 MT)
For silage – PAC 745 – 1 cut only

3. Forage Pearl millet
IC MV 15111, ICMV 05555
ICMV 15777

Forage sorghum

Variety: COFS29

Forage production

Forage crops	Seed rate	Fodder yield	No of cuts
Maize (P3546) 65% digestibility	8kg/acre	30 ton/acre	1 cut
Maize (PAC745) Advanta-SILAGE	8kg/acre	30 ton/acre	1 cut
Maize (3580) Pioneer-SILAGE			
Sorghum (CSH24MF) 66% digestibility DRYLAND	4kg/acre	30-40 ton/acre	3 cuts 75d-45d-45d
Sorghum (COFS-29) 46% digestibility IRRIGATED	2kg/acre	85 ton/acre	7 cuts 75d-35d-35d-35d⇢
Brachiaria	2kg/acre	60 ton/acre	3 cuts 120d-60d-60d

If surplus green forage is available, it can be converted into silage for use in the lean period

Forages as a cash crop

-Black gram Khariff (10Q)	Rs 0.50 lakh
-Sorghum Rabi @20 Q grain	Rs 0.60 lakh
-Sorghum Rabi @ 3 ton CR	Rs 0.02 lakh
-Total	**Rs 1.12 lakh**

Silage

-Total yield (irrigated)	84 tons/Acre
-Revenue @Rs2/kg	Rs 1.68 lakh
-If sold as silage @Rs 3	**Rs 2.52 lakh**

Sustainable feed intensification

→+5% dig→1 lit/day

→+10% intake→½ lit/day

→+1kg feed→2 lit/day

Approx. +1000 lit per lactation=Rs30000

** Productivity can be enhanced by managing feed 'quality' (pre-requisite: responsive breed)*

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Patron: Professor Peter C Doherty AC, FAA, FRS
Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

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