Description

This lecture note was prepared and delivered to B.V.Sc..& A.H. students studying the course of Livestock Production Management. The course is offered during the first professional of the academic year at College of Veterinary & Animal Sciences, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India. This lecture note provides an over view of general feeding and basic facts for ration formulation of dairy animals. I have tried my level best to extract the contents, simplify the facts in easy to memories in very short time. Further constructive suggestions to improve this lecture note are always welcome from users on my email and WhatsApp.

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Address Correspondence to:

Dr. Ahmad Fahim
Assistant Professor
Department of LPM.
COVAS, SVPUAT, Meerut- 250110 (U.P.) India
ahmadfahim300@gmail.com
WhatsApp no. 6397253336

Ration Formulation for Dairy Animals

- Nutrient and Ingredient
- DM and Fresh basis
- Cows nutritional needs vary during different stages of her production cycle
    - Optimize milk yield
    - Optimize reproduction
    - Prevent metabolic disorders

- Concentrates:
    - Supplied in amounts consistent with:
        - Milk production
        - Cow body weight
        - Nutrients in roughage
- Forages:
    - Vary in nutritional composition
        - Legumes
        - Non Legume
        - Straw and Stovers (LQR)
- Imbalance feeding
    - Poor growth and reproduction
    - Poor production
    - Short productive life
    - Metabolic disorders

- **Successful dairy nutrition:**
  - Constant, high quality water supply
  - High quality feedstuffs
  - Sufficient fiber in ration
  - Maintain an optimal level of concentrate feeding
  - Sufficient manger space
  - High level of DM intake
  - Feed is available 24 hr per day

Guidelines for ration formulation

These guidelines are used to decide the tentative DMI and concentrate roughage ratio of feed DM. Depending on the body condition of the dairy animals and quality of feed necessary change may be done

1. Calculate the total nutrient requirements by adding maintenance requirement as per body weight and lactation requirement as per milk yield
2. Add 20% of maintenance requirement for 1st lactation and 10% for second lactation.
3. The practical dry matter intake is calculated by adding 2% of body weight and one third of milk yield
4. The concentrate and roughage ratio is decided based on production level

Feeding of roughage and concentrate based on level of production

Milk Yield (kg)		Roughage : Concentrate ratio	
Cattle	**Buffalo**	**Roughage**	**Concentrate**
Upto 6 kg	Upto 5 kg	100	0[#]
7-15	6-10	70	30
16-20	11-15	60	40
21-30	16-20	50	50*
30 +	20+	40	60*

Such animals should be provided appropriate amount of mineral mixture supplementation and roughage should be of very good quality.

Although the low milk production may be supported by supplementing only quality green fodder it is better to provide 1kg concentrate mixture to support animal for higher level of production

* At this level of production appropriate supplements and additives should be added in ration for maintenance of rumen and animal health

Formulation of concentrate mixture

For an average milk production level hit and trial method is used for formulation of compounded concentrate mixture for cattle and buffaloes. The following is the distribution of ingredients

- **Cereal Grains (Maize, Bajra, barley any other locally available cereal)- 32-40%**

Cereal grains are rich in starch and have moderate amount of proteins. These are considered as energy supplying ingredient in the ration the level should be decided based on the production level and body condition score of animals

- **Protein supplements (Cottonseed cakes, Mustard oil and deoiled cake, Soyabean meal, Groundnut cake, sunflower meal, guar korma, Guar churi, etc) - 28-34%**

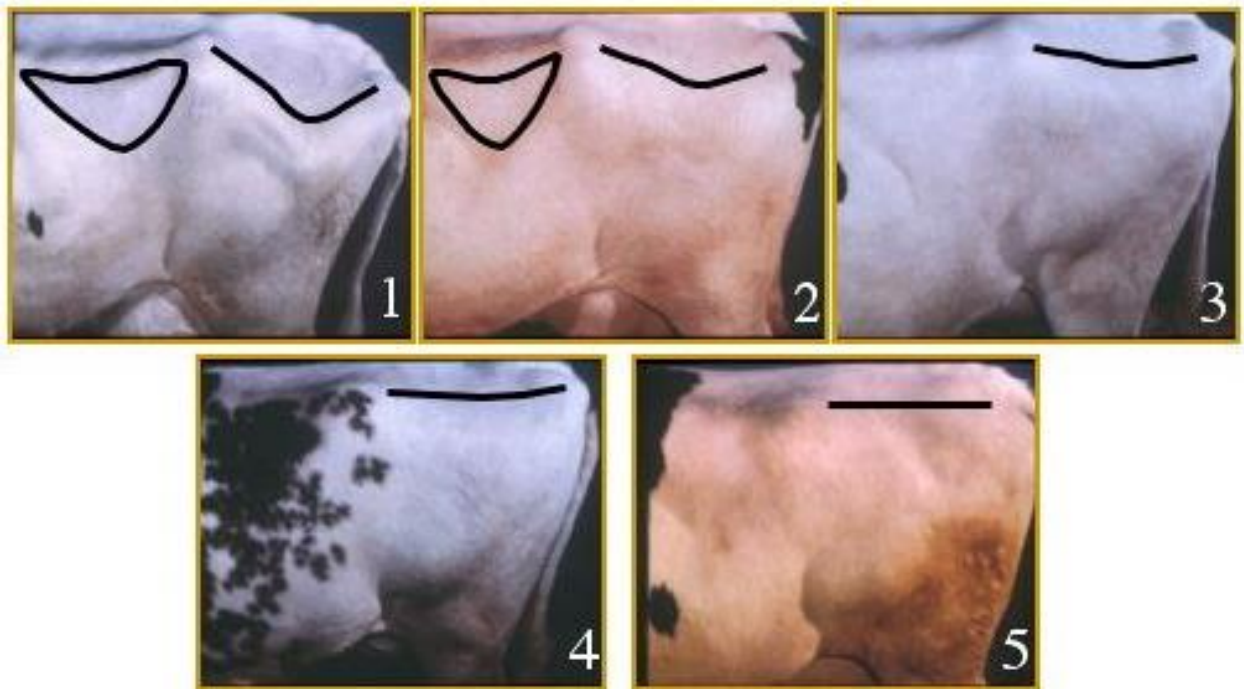
Protein rich ingredients should be added carefully according to the palatability issues of local area. It is better if we use more than two protein supplements in the ration. Protein is costliest nutrient and hence ingredients need to be selected carefully. Depending on the availability of roughage and production level of animal these may be reduced or increased.

- **Agriculture byproducts (Wheat bran, Rice bran, Deoiled rice bran, byproducts of pulses processing industry) - 28-32 %**

These byproducts generally have more protein than cereal grains but less than protein supplements, rich in phosphorous and fibre and varying amount of fat.

- **Mineral Mixture -2 %**
- **Salt -1%**

- **Body Condition Score**
  - Used to monitor nutrition, reproduction, and health programs



BCS for different physiological phase

Calving	-	3.5 – 4.0
Early Lactation	-	2.0 – 2.5
Mid	-	2.5 – 3.0
Dry Off	-	3.5 – 4.0

Transition Period

- 0 – 3 months post-calving most important
  - Hard to provide adequate nutrition
    - Milk yield is high
    - Intake is limited

- Cow uses her body fat and protein to provide for the nutrients not taken in by her daily ration = **Negative Energy Balance**
  - » Losing body weight during heavy milk production
  - » Causes problems with conception
  - » **Rumen Health-** Ensure feed intake
  - » **Vit E and Selenium-** Feeding diets with 0.3 ppm of supplemental selenium to all classes of cattle and feeding 1000 IU/day of supplemental vitamin E to dry cows and springing heifers and 500 IU/day to lactating cows improves immunity, reduces the incidence of clinical mastitis, and reduces SCC
  - » **Niacin**
  - » **Choline**

- Freshly Calved Animals need Special care
- The DMI is low and milk production is increasing
- Animal starts losing its body weight
- Try to increase the DMI
  - Increase concentrate portion (min NDF 29% in TMR).
  - Yeast, buffers can be used
  - Give easily digestible roughage