

JOB ROLE – DAIRY FARMER-I

Sector – Agriculture

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Class XIth



PSS Central Institute of Vocational Education
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Unit 4 : Providing Feed and Water for Livestock

Session 1 : Animal feedstuff , their characteristics, composition and quality

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Session Objectives

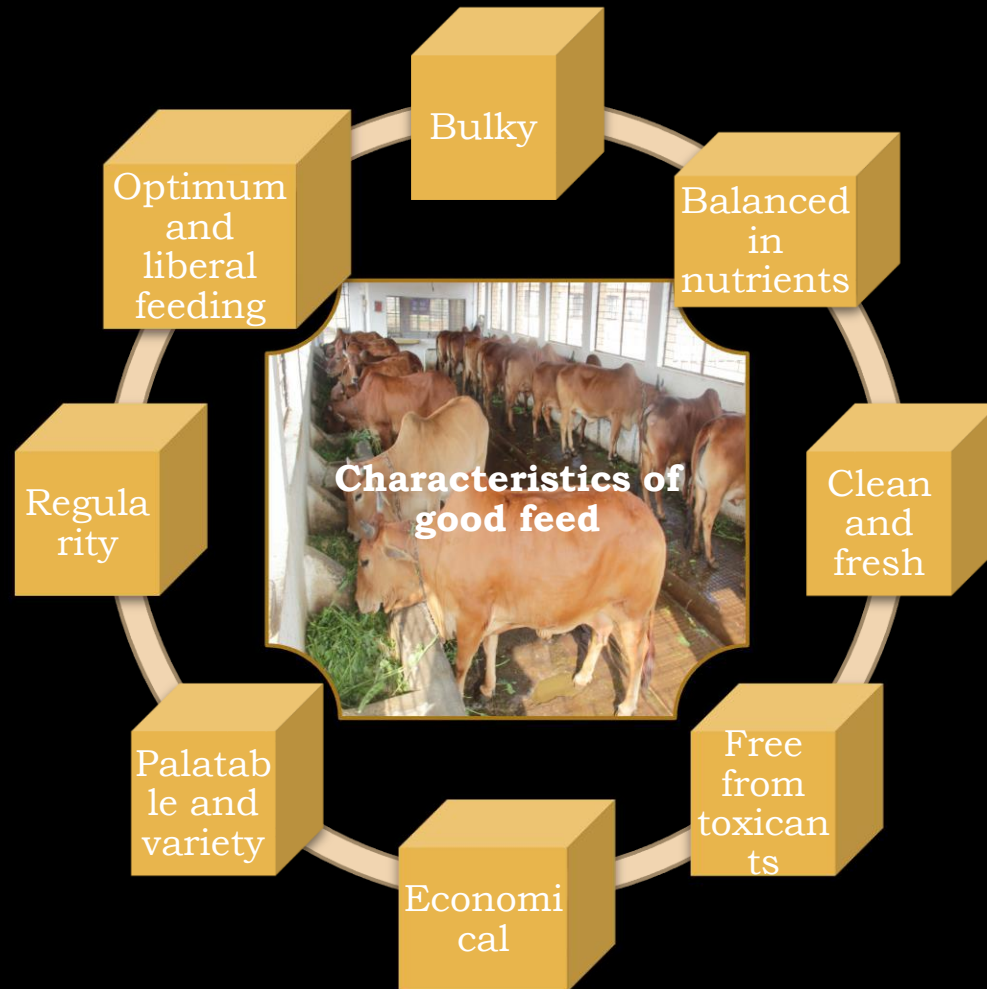
In this session the students will learn about the animal feedstuff, their characteristics, composition and quality including

- Types and characteristics of animal feedstuff
- Feed composition and its quality
- Assessing the overall quality of the animal feed
- Measurement of energy quality in animal feed
- Measurement of protein quality in animal feed

Introduction

- Feed costs constitute about 70 per cent of the total cost incurred on dairy animal production.
- A good animal feed is balanced properly with proteins, carbohydrates, fats, minerals and vitamins, and plays a pivotal role in successful dairy farming.
- A good quality feed is palatable, economical and has such composition that animals feed liberally.
- It is moderately bulky, laxative and free from toxins, selection of percentage of ingredients to be incorporated in the ration is based on their prices in particular seasons to reduce the cost of feeding

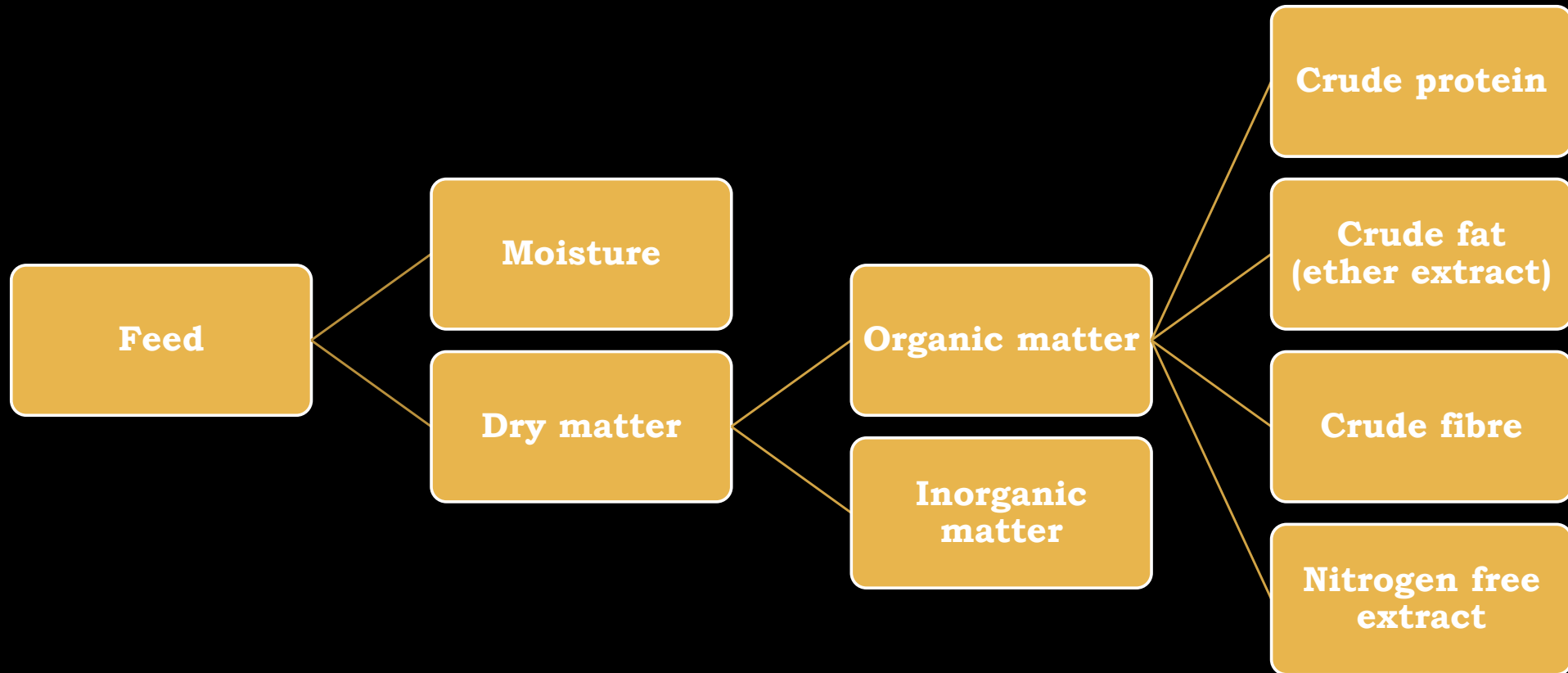
Animal Feedstuff, their Characteristics, Composition and Quality



Types and characteristics of animal feedstuff

- Animal feedstuff are broadly classified into three categories depending upon percentage of crude fibre (CF), total digestible nutrients (TDN) and crude protein (CP).
- Depending upon the availability of different items, a dairy farmer can add or delete the nutrient items in various ways to fulfil the dietary needs of the livestock

Feed Composition

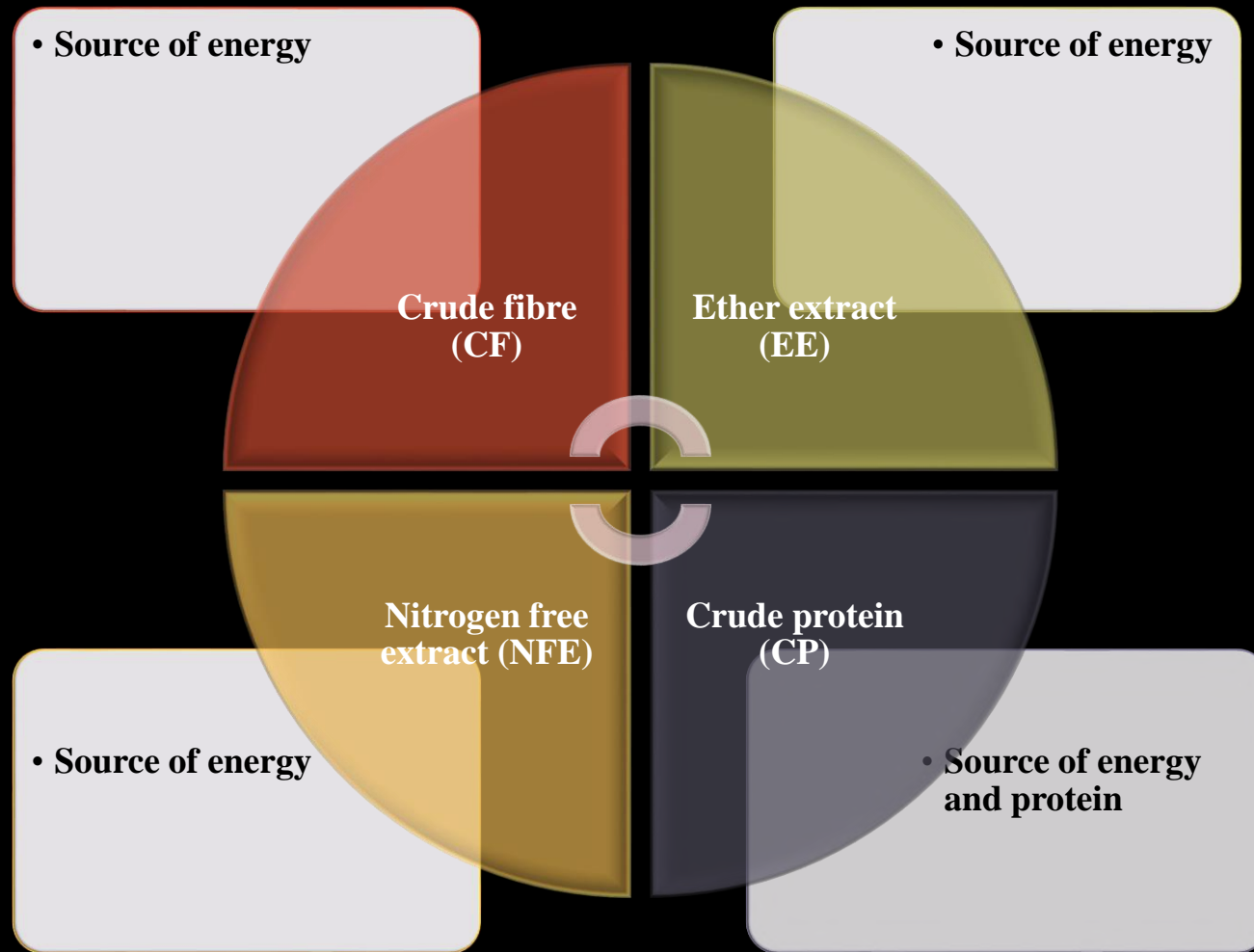


Feed composition and its quality

- The animal feed can be approximately partitioned in six major components, i.e., water, ash, crude protein (CP), ether extract (EE), crude fibre (CF) and nitrogen free extract (NFE)

Animal feed constituents		Components	
Moisture		Water, volatile substances	
Dry matter	Organic matter	Crude protein	Pure protein, amino acids, non-protein nitrogen compounds
		Ether extract (crude fat)	Fat, complex lipid, sterols, fatty acids, fat soluble dyes
		Crude fibre	Cellulose, hemicelluloses, lignin
		Nitrogen free extracts	Soluble carbohydrate, hemicelluloses, lignin, pectin, organic acids, tannin, water-soluble dyes
	Inorganic matter	Crude ash	Pure ash, organic residue

Assessing the overall quality of the animal feed



- An ideal animal feed is supposed to supply animals' full requirements for energy and proteins
- The ultimate *source of energy and protein in animal feed* quality of feed is determined by the ability of the feed to supply energy and/or protein.
- It is important to note that an animal can draw energy from CF, EE, NFE and CP, however the protein part of the diet is only derived from CP content of the feedstuff.
- After consuming the feed, the animal digests and metabolises the nutrients present in the feed. Like in humans, the health of an individual depends not upon the total food consumed but on the digestibility of the consumed food, similar is the case with farm animals.

- In farm animals, the digestible part of the feed/ nutrient is that proportion which is metabolized and utilized by the animal and not excreted in the faeces.
- The digestible part of the feed determines the availability of nutrients available to the animals for various functions like maintenance, growth, reproduction, production and work (draft).

Measurement of energy quality in animal feed

Concept of Total Digestible Nutrients (TDN)

- Calculating TDN in animal feed is a very useful tool for the dairy entrepreneur as knowledge of peak requirements of TDN of the animals is matched with peaks in fodder quality (leafiness or matured stem) to achieve lower cost of feeding.
- When we add digestible proportions of crude fibre (CF), crude protein (CP), ether extract (EE) and nitrogen free extract (NFE) of a feedstuff, we get TDN value of the feedstuff.
- TDN is expressed as a percentage value and calculated as :

$$\text{TDN (\%)} = \text{digestible CF (\%)} + \text{digestible CP (\%)} + (\text{digestible EE (\%)} \times 2.25) + \text{digestible NFE (\%)}$$

Measurement of protein quality in animal feed

Crude protein

- The crude protein content of the feed is determined with *the assumption* that all the nitrogen present in a feedstuff is contained in the form of different proteins and all such proteins contain about 16 % nitrogen.
- Ruminants (like cow, buffalo, goat, sheep, etc.) have the ability to utilize and convert all the plant nitrogen into animal protein for different bodily functions.

Average nutritive value of common feeds/fodders on fresh weight basis

Feed ingredients	Moisture (%)	CP (%)	TDN (%)
Concentrate feeds/by-products			
Maize	10.0	9.0	82.0
Barley	10.0	9.5	75.0
Jowar	10.0	7.2	70.0
Bajra	10.0	6.6	65.0
Gram	10.0	14.4	80.0
Wheat	10.0	12.8	80.0
Oats	10.0	10.4	75.0
Wheat bran	10.0	15.0	60.0
Rice bran	10.0	9.6	65.0
Groundnut cake	10.0	45.0	75.0
Mustard cake	10.0	36.0	74.0
Cotton seed cake	10.0	21.6	70.0
Til cake	10.0	45.6	78.0
Green fodders			
Berseem	85.0	2.4	13.0
Jowar	75.0	0.7	16.0
Maize	75.0	1.6	17.0
Oats	75.0	1.8	17.0
Bajra	75.0	1.2	15.0
Hybrid napier	75.0	1.5	15.0

Different types of straw			
Wheat straw	10.0	3.0	40.0
Rice straw	10.0	2.0	40.0
Oat straw	10.0	7.2	55.0
Maize Kadbi	10.0	1.8	40.0
Jowar Kadbi	10.0	1.2	40.0
Bajra Kadbi	10.0	1.2	40.0
Sugarcane tops	30.0	1.2	42.0
Different types of hay			
Dub hay	15.0	4.5	45.0
Berseem hay	10.0	15.0	60.0
Different types of silage			
Maize silage	70.0	1.2	18.0
Oat silage	70.0	1.4	18.0

Summary

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