

# Definition of Feed

- Substances.....
- Does not have any harmful effect on animal health when given in normal amounts,
- meet the maintenance and yield requirements of animals,
- Organic / inorganic, plant or animal sources or
- Founded freely in nature

## Definition of Feed

- In normal levels can positively affect animal performance but,
- In higher than normal levels may be harmful and toxic
- For example: Salt
- Dry sugar beet pulp

# Feed

- Feeds contain one or more organic or inorganic substances.
- Many feeds used in animal nutrition contain more or less organic or inorganic nutrients such as protein, CHO, vitamins and minerals
- Grains, meals and roughes
- Limestone: Only Ca
- Oils/Fats:

# Legislation 11.6.2010

**Feed** is any processed or partially processed, or unprocessed feedstuffs, including any feed additives, used for the oral feeding of animals.

## Definition of some terms used in animal nutrition science

- **Maintenance requirement:** The amount of feed needed to support an animal when it is doing no work, yielding no product, and gaining no weight
- **Yield requirement:** The amount of feed needed to support an animal yield (work, weight gain, milk, egg production) plus maintenance

- **Roughage:** Feeds contain more than 18% crude fiber and less than 60% total digestible nutrients (TDN)
- **Concentrates:** Feeds generally contain less than 18% crude fiber and more than 60% TDN.
- **Concentrate mixture:** Feeds contain more than one type of feed
- **Ration:** The amount of consumed by an animal in a 24-hour period to meet maintenance and yield requirement.

# Classification of Feeds

- 1-According to sources
- 2-Nutrient density
- 3-Feed legislation

## Classification of Feeds According to Their sources

- **FORAGES**
  - **Green feeds**
    - Meadows and pastures
    - Raw feeds
    - Root and tuber leaves
  - **Roots and tubers**
    - Root feeds and tuber feeds
  - **Bulky Feeds**
    - Straw, skins, and stems
  - **Conserve feeds**
    - Hay
    - Silage



# 1. Roughages

Roughages are also called as forages

## Characteristics of Roughage Feedstuffs

- Bulky (Low weight per unit volume)
- High content of cell wall material (25-30% crude fiber)
- Mostly for ruminant animals

- Generally low in energy
- Higher in fiber
- Higher mineral content
- Extremely palatable to ruminants
- Nutritive value can be extremely variable (species, age, parts)
- Must be present in ruminant's rations to maintain health rumen and milk fat content
- Limited inclusion in beef finishing diets, excluded from swine or non ruminant's rations

- **CONCENTRATE FEEDS**
- Grains
- Industrial byproducts
- Animal sources Feeds
- Mineral feeds
- Feed additives

# Grain feeds

- Cereals
- Legume seeds
- Oilseeds

# Industrial byproducts

- Milling industry
- Sugar industry
- Oil industry
- Starch industry
- Fermentation industry

# Feeds of animal origin

- Milk and dairy products
- Meat Meals
- Mean and bone meals
- Cadaver meals
- Blood meals
- Feather meals
- Fish meals
- Chicken slaughterhouse meals
- Animal fats

# Mineral feeds

- Macrominerals
- Microminerals
- Mix mineral feeds

# Feed additives

- **Anabolics** (prohibited)
- **Antifungals** (acidifying)
- **Antimicrobials**(prohibited or limited)
- **Antioxidants** (Vitamin E, etoxiquin, BHT, BHA)
- **Antiparasitics**(anticoccidials)
- **Emulsifiers**
- **Pellet binders** (melas, clay, lignosulphonate)
- **Colourings** (karotinoid)



## Feed additives

- Preservatives for physiological balances
  - Sodium bicarbonate, ammonium sulphate
- Regulatory substances for feed quality
- Enzymes (cellulase, beta Glucans, xylanase)
- Probiotics, prebiotics, symbiotics
- Acidifiers

# Classification of Feeds According to Nutrient Content

## 1. Feeds rich in Protein

- >30% CP in DM
- Vegetable Origin
  - SBM, CSM, Corn Gluten Meal
- Animal Origin
  - » Meat & Bone Meal, Blood Meal
  - » Most are banned/restricted from livestock diets
  - » Fish Meal

# Classification of Feeds According to Nutrient Content

## 2. Feeds rich in Energy

- > 5MJ/kg NEL or 9 MJ/kg ME in DM
  - All cereal grains
  - Oils/fats

- 3. Feeds rich in bulk
- >18% crude fiber
- straw, hay
- 4. Feeds rich in mineral
- bone meal, DCP, limestone
- 5. Feeds rich in vitamins

### 3. Mineral Supplements

- Calcium Carbonate
- Limestone
- Others

### 4. Vitamin Supplements

- Fish Oil
- Others

### 5. Feed Additives

# Concentrates

- TDN
  - Sum of the digestible protein, digestible fiber, digestible nitrogen-free extract and digestible fat x 2.25

# Concentrates

- When feeding concentrates, the cereal grains play the most important role.
  - Provide the bulk of the energy along with a large portion of the dietary protein.
- These grains are low in fiber, and are considered to be highly digestible by all of the livestock species
  - Nonruminants such as poultry and swine have the bulk of their ration consisting of these highly digestible cereal grains.

# Concentrates

- Cereal Grains
  - Seeds from cereal plants
  - Corn, Oats, Barley and Sorghum
    - Primary grains fed to livestock and poultry
    - Rice and Wheat are primarily consumed by humans
  - Millet, emmer, spelt and triticale are fed in small amounts.
  - Grains are very palatable to livestock with the exception of Rye.

# Factors Affecting of Value of Feed

- 1. Preparation of feeds
- 2. The common interaction among feeds
- 3. Feeding habits
- 4. The amount of consumed feed
- 5. Feed composition
- 6. Antinutritional factors in feeds



# Factors Affecting Valuation of Feeds

- 7. Storage of feeds
- 8. The nature of the land where feeds are produced
- 9. Harvest time for feed materials
- 10. Infestation in feeds
- 11. Chemical processing

# 1. Preparation of feeds

- Removing hulls
- Broken of whole grain
- Heating and steaming
- Pelleting

# Common interaction among feeds

- Combination of feeds is more beneficial than individual feeding
  - barley and wheat with hay and bran
  - broad bean, vetch and tare with constipation effect; molasses beet leaf with the laxative effect
  - legume herbs together with wheatgrasses
  - The compound dynamic effect of feeds (energy)

## The amount of consumed feed

- The transition rate through the digestive system
- The surface of effect of digestive enzymes
- The percentage of digestion decreases 1-9 units when meintanance is consumed twice as much.

## Feed composition

- The amount of cellulose in feed and its chemical composition
- Ration's nutritional composition also plays an important role in ruminants
  - Increase in readily soluble carbohydrates reduces microorganisms that digest HP and RC
  - RP has to be at least 5% for the digestion of cellulosic in ruminant

## Antinutritional factors

- affects the valuation of feeds
- and animal health in a negative way.
  - Cotton seed meal (gossypol),
  - Soy bean meal (trypsin inhibitor), Tannins,
  - in Vetches (visin),
  - in Seed feeds (fitin),
  - in sugar beet leaves and in some weeds (oxalic acid),
  - in Alfalfa and colza (saponins),
  - in flax seed (linamarin),
  - in rye spur

# Storing feeds

- Loss of green leaves during drying, baling, transportation
- Sun drying harms carotene
- Storage of plants without sufficient drying (more than 13% water) results in significant nutrient loss through mold and decay, as well as the formation of mycotoxins, which threaten animal health

# The nature of the land where feeds are produced

- Precipitation
- Fertilization (Barley RP = 10-14%)
- Mineral composition (P, Se, I, Cu, Co)



# Infestation in feeds

- Weeds, stone, soil
- Bacteria, fungi, mycotoxin
- Pesticide residues, chemical residues in pulps.

# Chemical application

- Straw
- NaOH
- NH<sub>3</sub>
- Ürea