Poultry Feeds and Feeding

Food or Feed

It is eaten by man or animal, digested, absorbed, metabolized and utilized by the body cell.

COMPONENTS OF FOOD/Feed

1. Water

2. Dry matter
    a. organic
        i) carbohydrate
        ii) protein
        iii) fat
        iv) vitamins
    b. inorganic
        i) minerals

ESSENTIAL FEED NUTRIENTS

Carbohydrate, protein, fat, minerals, vitamins and water etc which are essential for growth, maintenance, production and reproduction of a man or animal.

►No energy is produced from water, vitamin and mineral
►CHO, protein and fat are called energy giving nutrient.

FUNCTIONS OF ESSENTIAL FEED NUTRIENTS:

Water:

- *Sources:* Water present in feed, Metabolic water and drinking water
- *Requirement of water:*Poultry (adult)-0.20 liter/day

- *Function:*

1. Cell rigidity and elasticity
2. Solvent action
3. Lubrication
4. Hydrolytic reactions
5. Ionic reaction
6. Transportation
7. Heat regulation
8. Respiration function

Carbohydrate:

1. Energy supply
2. Glycogen stored in liver and use in starvation
3. Maintain body temperature
4. Lactose helps to develop brain cell (lactose found in milk & it is known as milk sugar)
   (firstly CHO is used for energy supply in the body, if any kind of CHO deficiency occurs in the body then fat is used for energy supply, when CHO and fat both are deficit in the body then energy is produced from the protein)

Protein

1. Build up body tissue
2. Repair of body tissue
3. Synthesis hormone and enzyme
4. Feathers, nail, hair and wool formation
5. Energy supply (CHO and fat deficiency)
   (animal protein is high quality than plant protein, because animal protein contains all essential amino acids and it is also efficiently utilized)

Fats

1. Energy supply (It gives 2.25 times more energy than CHO and protein)
2. Skin smooth and oily
3. Flavor and palatability
4. It carries fat soluble vitamin (A,D,E,K)
5. Reserved under the skin and utilizes during starvation
   (excess CHO and protein converted into body fat)

Minerals

1. Bone and teeth formation
2. Blood cells contain a small amount of minerals for the normal function of blood cells.
3. Maintenance of ionic equilibrium and osmotic pressure.
4. Maintenance of acid-base equilibrium.
5. Minerals are directly related to the structure and functions of membranes.
6. Minerals are also found as structural components of some hormones
7. It actives the enzymes.

Vitamins

►Fat soluble vitamins:
Vit-A: Prevent xerophthalmia or night blindness. It helps eye vision.
Vit-D: It helps to absorption of Ca from the intestine for bone and teeth formation.
Vit-E: It helps in reproduction.
Vit-K: It helps to clot blood.
►Water soluble vitamins:
Vit-B Complex: Prevent anemia, helps growth and metabolism.
Vit-C: It is essential for the collagen formation (found in the gums) and prevents scurvy.

Caloric content of fat, protein, carbohydrates and alcohol

Calories are needed to provide energy so the body functions properly. The number of calories in a food depends on the amount of energy the food provides. The number of calories a person needs depends on age, height, weight, gender, and activity level. People who consume more calories than they burn off in normal daily activity or during exercise are more likely to be overweight.

Fat: 1 gram = 9 calories
Protein: 1 gram = 4 calories
Carbohydrates: 1 gram = 4 calories
Alcohol: 1 gram = 7 calories

1g nutrient	***Energy (Calories)***
CHO	4
Protein	4
Fat	9
Alcohol	7

Classification of poultry Feeds

1. Roughage feed

Roughage are bulky feeds containing large amount of crude fibre (CF) more than 18% and low (about 60%) in T.D.N. on air dry basis. eg, straw, grass, fodder etc.

Poultry birds are non- ruminant, so they can not digest fiber as like as animal. But they can digest small amount of vegetables, such as cabbage, Ipip-Ipil or any succulent leafy vegetables or grass.

2. Concentrate Feeds

Concentrates are feeds which contain small amount of CF (less than 18%) and high (more than 60%) in T.D.N. on air dry basis. eg. grain, oil cake, fish meal etc.

A. Animal origin -
Fishmeal, Blood meal, Meat Offal, Meat Meal, Feather meal, Hatchery by product meal, Surplus milk etc.

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B. Plant origin -
Products: Maize, Wheat, Barley, Oats, Sorghum, Bajra, Khesari, Maticali, Sweet potato etc.
By - products: Rice bran, Wheat Bran, Corn flower, Wheat flower, Bran of Khesari and Maticali, Molasses, oil cake etc.

3. Mineral supplements: Oyster shell, Bone meal, Egg shell, Lime stone, Chalk powder, Common salt, Vitamin-mineral premix etc.

4. Vitamin supplements: All leafy vegetables, Yellow corn, Fish liver oil, Vitamin-mineral premix etc.

5. Feed Additives

They are not nutrients. These are included in the ration to increase the intake of feed, digestion, absorption and metabolism. Sometimes it is used to improve the quality of the products and to keep health sound against diseases. They are also called non-nutrient feed additives.
Examples:
Antioxidents, Flavouring agents, Pellet binders, Xanthophylls, Canthaxanthin, Grit, Enzymes, Pribiotics, Antibiotics, Hormone, Antifungal and Anticoccidial drugs etc.

Poultry Ration

Ration

Amount of feed which an animal intakes within 24 hours. The feed may be given at a time or in portions at intervals. It may or may not be balanced.

Balance Ration

A ration which contains all recommended essential feed nutrients according to age, sex, purpose and condition of an individual. There are 2 types of balance ration-

a. Maintenance ration
b. Production ration

Maintenance Ration-The balance ration which is required for an animal to maintain its normal physiological functions of the body. There is no loss or gain body weight and even no chemical change of body composition.

Production Ration- This is required for poultry birds which are in production condition. The balance ration which is required over and above maintenance ration. This is an additional allowance of ration with maintenance ration.

Types of layer ration-

1. Layer Starter (Energy: 2700 ME kcal/kg and CP: 22%)
2. Layer Grower (Energy: 2650 ME kcal/kg and CP: 16%)
3. Layer-Layer ration (Energy: 2700 ME kcal/kg and CP: 18%)

Types of Broiler ration

1. Broiler-Starter (Energy: 3000 ME kcal/kg and CP: 22%)
2. Broiler- Grower (Energy: ME kcal/kg 3100 and CP: 21%)
3. Broiler- Finisher ration (Energy: ME kcal/kg 3200 and CP: 19%)

Methods of Poultry Feeding

Improperly fed well-balanced ration will not give the most satisfactory results unless a satisfactory method is followed. Some of the methods are as follows:

1. Whole grain feeding system:

In this system feed ingredients are supplied to the birds in the separate containers.

2. Grain and mash method:

In this system some ingredients are supplied as grain or grain mixture along with balanced mash.

3. All mash:

This is a scientific and popular method. In this method ingredients are crushed into mash mixture which is fed either in dry or wet condition.

4. Pellet feedings:

Now-a-days it is a very popular method. There is no option for bird during feed intake. Pellet is prepared from dry mash under high pressure. In this system wastage of feed can be avoided.

5. Crumble feeding:

It is grinding or cutting form of pellet, granular in shape. This is good as starter ration for early feeding of broiler and chicks. Sometimes shows better performance than pellet.

Requisites of a Good Quality Poultry Ration

1. Balanced with essential feed nutrients according to age and purpose.
2. Variety of ingredients.
3. Fresh ingredients.
4. Feed ingredients should be crushed.
5. Calori-Protein ratio should be present
6. Palatable for birds.
7. No bad flavor.
8. Low moisture.
9. Addition of vitamin-mineral premix.
10. Free from fungus and larve of parasites.
11. Addition of micro-nutrients and feed additives.
12. The ration should be highly digestible
13. Provision of fresh clean drinking water.

14. Ration should be economic

Crude protein and energy value of some common poultry feeds

Concentrate feeds	CP %	ME Kcal/Kg
Wheat	13.0	3250
Maize	10.5	3600
Rice polish	13.0	2900
Wheat bran	14.5	1200
Mustard oil cake	35	2400
Til oil cake	36	2600
Groundnut oil cake	39	2800
Soybean meal	45	2250
Fish meal	45	2000
Blood meal	80	2850
Meat meal/Meat offal	55	2100
Molasses	2.8	2400
Vegetable oil	-	8800
Feather meal	84	2300
Protein Concentrate	60	2900

Crude Protein (CP) = Total nitrogen of protein and non protein substance

True protein =CP- N_2 of NPN

Gross Energy (GE)= is the amount of heat that is released when a substance is completely oxidized in a bomb calorimeter.

Fecal Energy (FE) = Gross energy of faeces

Digestible Energy (DE) = GE - FE

Urinary Energy = Gross energy of urine

Metabolizable Energy (ME) = GE- FE -UE

Heat Increment = Heat loses through feed utilization

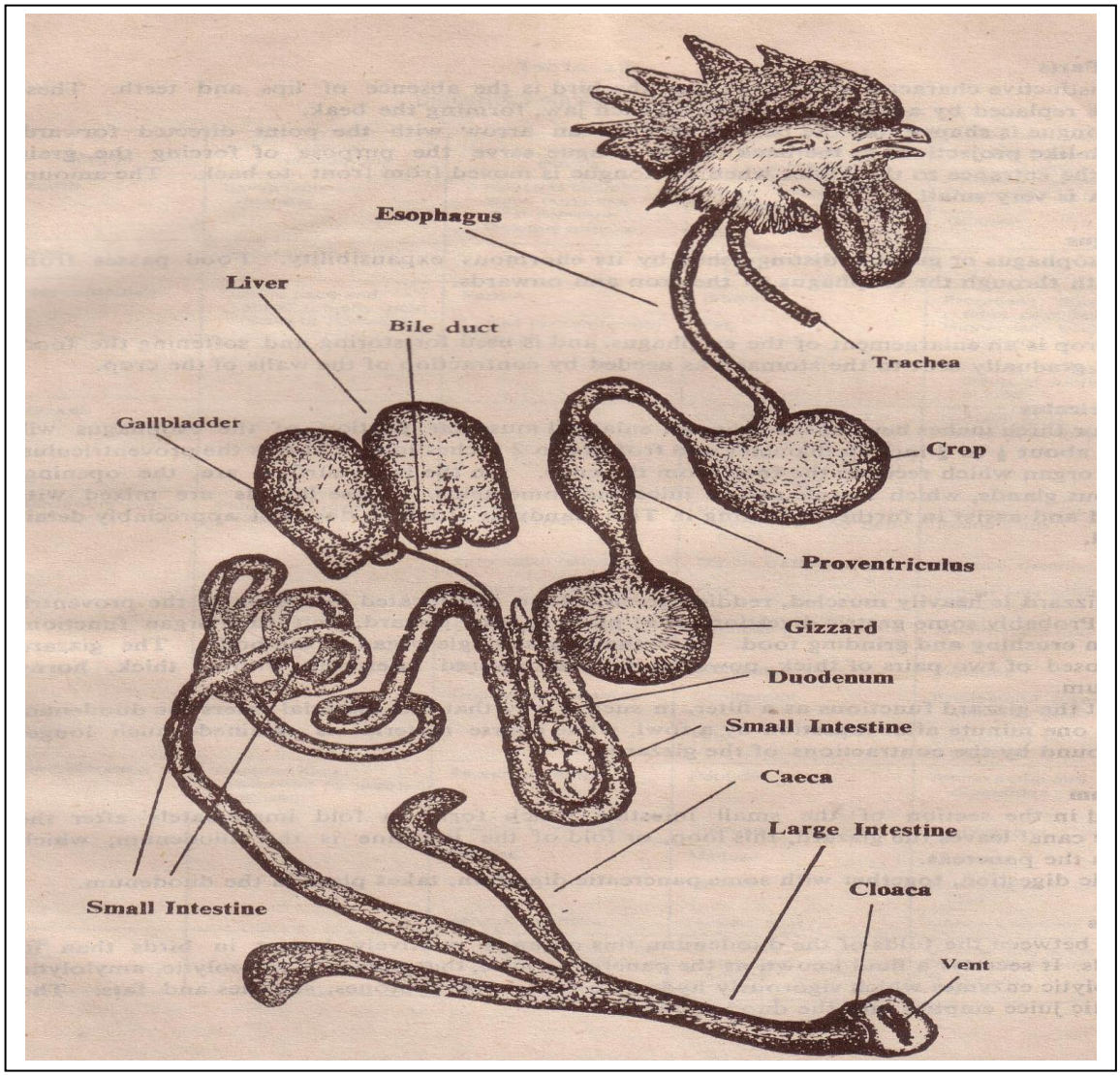
Net Energy (NE) = ME-HI

Uses of net energy
a. Body maintenance
b. Production

Mineral feeds	
Bone meal	Ca-30.0%, P-15.0%
Oyster shell	Ca-38.0%
Limestone	Ca-35.0%
Sodium chloride	Na-38.35%, Cl-60.65%
Vit-mineral premix	Source of vitamins and minerals

Digestive system of poultry

Esophagus: Food passes from the mouth through the esophagus to the crop
Crop: This is an enlargement of esophagus and is used for storing and siftings the food materials.
Proveuticulus: It is a tube like enlargement of esophagus and located 2"-3" beyond the crop. It receives food from the crop. It secretes gastric juice and some acids which is mixed with food to digest it.



Gizzard: Just after proventiculus there is a strong round reddish color muscular organ which helps in crushing and grinding of food.

Small intestine: It is in between gizzard to cacea about $2\frac{1}{2}$ ´ long in adult bird and acts as an organ of absorption of nutrients in simple form.

Caeca: Two blind sacs of 5"-7" in length which is located at the junction place of small and large intestine and serve as storage of faceal material, digestion of fibre and some absorption may take place here.

Large intestine: It is projected from caeca to cloaca . It is a tract of final absorption of the digested food materials.

Cloaca: It is opening of urogenital system. Facal and urine pass through cloaca. It is also a copulatory organ in bird.