

# **Unit C: Poultry Management**

## **Lesson 1: Nutrients for Maintenance, Growth and Reproduction**

# Terms

- Carbohydrates
- Fats
- Minerals
- Nutrients
- Proteins
- Vitamins
- Water

**I. Nutrients** are the chemical substances found in feed materials that can be used, and are necessary, for the maintenance, growth, production, and health of the bird.

A. The nutrient needs of poultry are complex and vary by species, breed, age and sex of the bird.

- B. More than 40 specific chemical compounds or elements are nutrients that need to be present in the diet of the bird to support life.
1. These materials are divided into six classifications: water, protein, carbohydrates, fats, vitamins, and minerals.
  2. A good diet must include all six of these nutrients in proper amounts.
  3. If any are insufficient then growth, reproduction, eggshell quality, egg production, egg size and other factors may be affected.

## II. Each of the nutrients completes a specific task in the body.

### A. **Water** is the most important nutrient required by poultry.

1. Water is required for digestion and metabolism in poultry and makes up about 55-75% of the bird's body and 65% of the egg.
2. Water intake is approximately two times the intake of feed on a weight basis.
  - a. Water softens feed in the crop to prepare it for grinding in the gizzard.
3. Many chemical reactions that take place in the bird's body require water.
  - a. Blood is about 90% water and helps transport the other nutrients throughout the body as well as carry waste products outside the body.

4. Just as in humans, water cools the bird's body through evaporation.
  - a. Birds do not have sweat glands so a major portion of their evaporative heat loss happens in the air sacs and lungs due to rapid respiration.
5. If medications are to be given to poultry, it is generally through the water.
  - a. Both the compound and water quantities should be carefully and accurately measured before giving them to the birds.
  - b. After medication has been administered, the waterers should be emptied and rinsed.

## B. Proteins

1. Proteins are made of amino acids.
  - a. The number and kind of amino acids will determine the type of protein.
2. The main products of poultry are composed of protein.
  - a. On a dry-weight basis, the body of a mature broiler is more than 65% protein and the contents of an egg are about 50% protein.

3. The body of a bird does not need the proteins so much as the amino acids.
  - a. Chicken tissues have the ability to make some of the required amino acids if the other amino acids are in adequate supply.
4. No single feed source can supply all of the amino acids so a mixture must be provided.
  - a. The main sources of proteins for poultry feeds are animal proteins such as fish meal and meat and bone meal; and plant proteins such as soybean meal and corn gluten meal.

## C. Carbohydrates (carbs)

1. Carbs make up the largest portion of a poultry diet.
2. Carbs appear in greatest supply in plants in the form of sugars, starches or cellulose.
  - a. Starch is the form in which most plants store energy and it is the only complex carbohydrate which chickens can readily digest.
  - b. Chickens cannot digest cellulose.
3. Carbs are the major energy source for poultry but only ingredients containing starch, sucrose or simple sugars are efficient energy providers.
4. Corn and wheat are important sources of carbs in poultry diets.

## D. Fats

1. Fats are an important energy source because they contain twice as much energy as any other feed ingredient.
2. Because of this trait, fats play an important role in starting and growing diets.
  - a. Fats make up more than 40% of the dry egg contents and 17% of the dry weight of a market broiler.

3. Fats are also important in the diet because they help in the absorption of certain vitamins.
4. Fats also provide essential fatty acids.
  - a. Essential fatty acids aid in membrane integrity, hormone synthesis, fertility, and hatchability.

## E. Minerals

1. Minerals are divided into two classes: macrominerals (those needed in large amounts) and micro- or trace minerals.
  - a. While trace minerals are only needed in small amounts, a deficiency in any of them could result in poor production.
2. Minerals complete many important functions in the poultry body.
  - a. It is most important in the formation of bones.
  - b. Laying hens also require calcium for eggshell formation
  - c. Minerals are needed for the formation of blood cells, blood clotting, enzyme activation, energy metabolism and muscle function.

3. Grains are low in minerals, so all poultry feeds contain supplemental sources.

a. Calcium, phosphorus and salt are needed in the greatest amounts.

4. Microminerals like iron, copper, zinc, manganese and iodine are supplied through trace mineral mixes.

## F. Vitamins

1. There are 13 vitamins required by poultry that are classified as fat or water soluble.
  - a. Fat soluble vitamins are A, D, E and K.
  - b. Water soluble vitamins are thiamin, riboflavin, nicotinic acid, folic acid, biotin, pantothenic acid, pyridoxine, Vitamin B<sub>12</sub> and choline.
  - c. All these vitamins are essential for life.
2. The egg typically provides sufficient vitamins to supply needs of the developing embryo.
  - a. This is why eggs are a good source of vitamins for humans.

3. Vitamin A is needed for health and proper functioning of the skin and lining of the digestive, reproductive and respiratory tracts.
4. Vitamin D has an important role in bone formation and the metabolism of calcium and phosphorus.
5. Vitamin B metabolizes energy and other nutrients.

# Review/Summary

- 1. What nutrients are required for proper poultry growth?**
- 2. What is the importance of the six nutrients in the poultry diet?**