



Cooperative Extension Service  
Institute of Food and Agricultural Sciences

## Small Poultry Flock Nutrition<sup>1</sup>

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### WATER

Water is probably the most important nutrient for poultry because a lack of adequate supply will adversely affect the bird's performance more quickly than a shortage of any other nutrient. This is why it is so important to keep an adequate supply of clean, fresh, cool water before the birds at all times. An automatic waterer, placed in the coolest area of the house or pen is probably best for most small-flock operations. If manually filled waterers are used, consideration should be given to the number and filling frequency required to ensure an adequate supply.

Water plays a very important role in digestion and metabolism of poultry. It comprises from 55 to 75% of the bird's body and about 65% of the egg. There is a strong correlation between feed and water intake. Research has shown that water intake is approximately two times the intake of feed on a weight basis. Water softens feed in the crop to prepare it for grinding in the gizzard. Many chemical reactions necessary in the processes of digestion and nutrient absorption are aided by or require water. As a major component in blood (90%) it serves as a carrier, moving digested material from the digestive tract to all parts of the body, and taking waste products to the points of elimination. As with humans and other animals, water cools the bird's body through evaporation. Since birds do not have sweat glands, a major portion of their evaporative heat

loss occurs in the air sacs and lungs due to rapid respiration.

If medications or other additives are given through the water, care should be taken to accurately measure both compound and water quantities and mix them well before administering. Also, carefully follow label directions as to the length of time the medication should be given. At the end of that period, waterers should be emptied and rinsed.

### NUTRIENTS

Nutrients are the chemical substances found in feed materials that can be used, and are necessary, for the maintenance, growth, production and health of animals. The nutrient needs of poultry are rather complex and vary with the species, breed, age and sex of the bird. More than 40 specific chemical compounds or elements are nutrients that need to be present in the diet to support life, growth and reproduction. The materials are often divided into six classifications according to their function and chemical nature: water, proteins, carbohydrates, fats, vitamins and minerals. For good health and performance, a diet must contain all of these known nutrients in the proper amounts. If any are insufficient, then growth, reproduction, eggshell quality, egg production, egg size, etc., may be reduced.

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Even though the same nutrients found in the diet are also found in the body tissues and eggs of poultry, there is not a direct transfer of nutrients from feed to tissue. Feed nutrients must be digested, absorbed and rebuilt into poultry tissue.

### **Proteins**

Proteins are made up of more than 23 organic compounds containing carbon, hydrogen, oxygen, nitrogen and sulfur. They are called amino acids. The properties of a protein molecule are determined by the number, kind and sequencing of the amino acids that comprise it. The principal products produced by poultry are composed of protein. 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.

Scientists learned many years ago that these amino acids were really the essential nutrients, rather than the protein molecule itself. Chicken tissues have the ability to make some of the required amino acids if the other amino acids are in adequate supply. Feed tags only show the amount of protein guaranteed in the feed but give no indication of the levels of individual amino acids. Amino acid analysis is very expensive and specialized. In order to insure that amino acid needs are met, the nutritionist will include a variety of feedstuffs that are good protein sources. Multiple feed ingredients are necessary because no single ingredient is an adequate source of all the required amino acids. The main protein sources 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.

### **Carbohydrates**

Carbohydrates make up the largest portion of a poultry diet. They are in greatest supply in plants, appearing there usually in the form of sugar, starches or cellulose. Starch is the form in which most plants store reserve energy, and it is the only complex carbohydrate which chickens can readily digest. The chicken does not have the enzyme systems required to digest cellulose and other complex carbohydrates, so it becomes part of the crude fiber component. Carbohydrates are a major energy source for poultry, but only ingredients containing starch, sucrose or simple sugars are efficient

energy providers. A variety of grains, such as corn, wheat and milo, are important sources of carbohydrates in poultry diets.

### **Fats**

Fats are important sources of energy for today's poultry diets because they contain more than twice as much energy as any other feed ingredient. This trait makes fat an important tool for the proper formulation of starting and growing diets. Fat makes up more than 40% of the dry egg contents and about 17% of the dry weight of a market broiler. Fats in feeds are also important for the absorption of vitamins A, D<sub>3</sub>, E and K, and as a source of essential fatty acids. These essential fatty acids are responsible for membrane integrity, hormone synthesis, fertility, and hatchability. For most commercially produced poultry feeds, animal fat, poultry fat or yellow grease would be the source of supplemental fat.

### **Minerals**

This nutrient class is divided into the macrominerals (those needed in relatively large amounts) and the micro- or trace minerals. Although microminerals are required only in small amounts, the lack of an adequate dietary supply can be just as detrimental to poultry as a lack of one of the macrominerals.

Minerals have a number of important functions in the body. The most widely recognized of these is the formation of straight, strong and rigid bones. Laying hens also require minerals, primarily calcium, for eggshell formation. Minerals are needed for the formation of blood cells, blood clotting, enzyme activation, energy metabolism, and for proper muscle function.

Grains are low in minerals, so all poultry feeds contain supplemental sources. Calcium, phosphorus and salt are needed in the greatest amounts. Ground limestone and oystershell are good sources of calcium. Dicalcium or defluorinated phosphates are the customary carriers of phosphorus and calcium for poultry diets. Microminerals such as iron, copper, zinc, manganese and iodine are normally supplied through a trace mineral mix.

## Vitamins

The 13 vitamins required by poultry are usually classified as fat-soluble or water-soluble. The fat-soluble group includes vitamins A, D<sub>3</sub>, E and K. The water-soluble vitamins are thiamin, riboflavin, nicotinic acid, folic acid, biotin, pantothenic acid, pyridoxine, vitamin B<sub>12</sub> and choline. All these vitamins are essential for life and they must be provided in proper amounts for chickens to grow and reproduce. The egg normally contains sufficient vitamins to supply the needs of the developing embryo. For this reason, eggs are a good animal source of vitamins for the human diet.

Vitamin A is needed for the health and proper functioning of the skin and lining of the digestive, reproductive and respiratory tracts. Vitamin D<sub>3</sub> has an important role in bone formation and the metabolism of calcium and phosphorus. The B vitamins are involved in energy metabolism and the metabolism of many other nutrients.

Although some of these vitamins are abundant in feed ingredients, a vitamin premix is routinely used by the nutritionist to ensure adequate fortification.

## Feed Additives

Poultry feeds often contain substances not directly concerned with meeting nutrient requirements. An antioxidant, for example, may be included to prevent rancidity of the fat in the diet, or to protect nutrients from loss by oxidation. Pellet binders may be used to improve the texture and firmness of pelleted feeds.. Coccidiostats are routinely used in broiler feeds and also in diets for rearing replacement pullets. Sometimes, antibiotics are included to stimulate the growth rate and feed efficiency of young chickens. If coccidiostats and/or antibiotics are in your feed, careful attention should be paid to feeding directions on the tag, and withdrawal times should be strictly followed. Hormones are not added to any poultry feeds.

## USE THE RIGHT FEED

Poultry feeds are commonly classified as a starter, grower, finisher or layer, depending upon the type and age of bird they are designed to feed. The feed's brand name and/or feeding directions should indicate whether

the product was designed for your flock. If the store doesn't have the proper feed for your species, type, or age of bird, ask about initiating a special order or shop at another store.

## FEEDING MISTAKES

The most common mistake is using the wrong feed. Do not give your flock scratch feed or table scraps. Do not mix a complete commercial feed with scratch grains. Most commercial feeds are designed to meet all of the bird's nutrient requirements when fed as the sole source of nutrition. Blending with grains dilutes or reduces the level of nutrition and birds will not grow well, may reduce egg production and produce eggs with thin shells. They may also be less resistant to disease, or pick up and eat their feathers in an effort to offset nutrient deficiencies. Feather picking can lead to bleeding, sores, infections or even death.

Commercially prepared feeds are also designed to be available for consumption at all times. Adequate feeder capacity should be provided so that a continuous supply of feed is available. Ration-feeding of these diets can, again, result in reduced growth, egg production and eggshell strength.

## FEED QUALITY

The consumer's best assurance of good quality feed comes from the reputation of the feed manufacturer and local feed store. Florida law requires that poultry feeds and/or feed ingredients be checked periodically by a private laboratory for nutrients, mycotoxins, microbiological organisms, pesticide residues and drug residues. By law, no reference to the quality or grade of ingredients used can be displayed on the feed label. Florida labels do carry a date of manufacture. It is recommended that purchases be limited to a 2-3 week supply in order to maintain freshness in Florida's hot, moist environment. Feed should be stored in a cool, dry area, preferably in a container with a tight-fitting lid to control moisture, insects and rodents.

## **INVEST IN GOOD NUTRITION**

As in the case of human nutrition, cheapest is not always best. Sixty to seventy percent of poultry rearing and keeping expenses are for feed. This is really a good investment because good, plentiful nutrition results in content birds that grow and lay well with fewer health problems. Naturally, the type of feed needed will change as birds mature or start to produce eggs. Read and follow all feeding instruction on the label and keep feed available to birds at all times.

The importance of a plentiful supply of cool, clean water can also not be over emphasized. Water is a major part of eggs and meat and has a very important cooling function here in Florida.