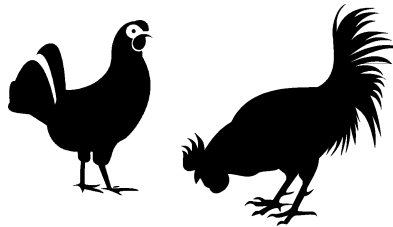


Nutrition

for the Backyard Flock

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Nutrients

We raise chickens because they can efficiently change cereal grains and other feedstuffs into eggs and meat. What we feed our chickens is very important. Chickens use feed for two main purposes: (1) as an energy source to maintain body temperature and to carry on activities such as breathing, walking, eating and digesting the feed and (2) as building material for the development of bone, flesh, feathers and eggs. The feed that chickens eat is made up of water, carbohydrates, fats, proteins, minerals and vitamins. Each nutrient serves a special need.

Water

One of the most important yet most neglected nutrients is water. Water carries waste products, helps cool the bird by evaporation, and softens feed and carries it through the digestive tract.

The baby chick is about 79 percent water. As the bird gets older, the percentage changes but not the need for water. A young chick needs a constant supply of fresh water to stay healthy. It doesn't drink a lot of water at one time so it has to drink often.

Water constitutes about 65 percent of an egg. If a hen runs out of water for even a few hours, egg production may be reduced. Make water available at all times. Most hobby flock owners use water fountains or troughs rather than automatic waterers and drinkers to provide water. If you fill the waterers only in the morning, the bird may run out of water by mid-afternoon.

This can lower egg production; a laying bird will drink 25 percent of her daily water intake during the 2 hours prior to darkness.

Carbohydrates

Carbohydrates make up the biggest share of the poultry diet. They include starches, sugars and cellulose. Carbohydrates in the form of starches (or simple sugars) are needed for body maintenance and energy. Important sources of carbohydrates in poultry feeds are corn, milo and various other grains. Cellulose and other complex carbohydrates cannot be used efficiently and are classified as crude fiber.

Fats

Animal and vegetable fats are the highest energy sources in feedstuffs. They also improve the physical consistency of diets and dispersion of micro-ingredients in feed mixtures. Supplemental fats may increase energy use in adult birds in association with a decreased rate of food passage through the digestive tract. The substitution of fat for a portion of the dietary carbohydrates may enhance energy use by reducing the heat increment of feeding and digestion.

Stabilize fats with an antioxidant, otherwise they are likely to become rancid, especially in hot weather. Small amounts of fat are desirable since they supply essential fatty acids, reduce dustiness and improve palatability. Carbohydrates cost less than fats and are easily digested, absorbed and transformed into fat.

Proteins

Proteins are complex compounds made up of amino acids. Feed proteins are broken down into amino acids by digestion. They are then absorbed and transported by the blood to the cells that assemble these amino acids into body proteins. Body proteins are used in the construction of body tissue. Tissues that mainly consist of protein are muscles, nerves, cartilage, skin, feathers and beak. The albumin (white) of the egg is also high in protein.

The tag on a bag of poultry feed lists the percent crude protein. This tells you only the percentage guarantee and does not indicate the quality of the protein used. Protein quality is based on the presence of essential amino acids in the feed ingredients. In developing a poultry ration, the nutritionist will include a variety of feedstuffs that are high in protein. The reason for this is that no single feedstuff is able to provide all the amino acids needed. When the proteins from different feedstuffs are used, however, the ration can be formulated to contain all the necessary amino acids. The main sources of protein in poultry rations are animal proteins such as fish meal, meat and bone meal, and plant proteins such as soybean meal, cottonseed meal and corn gluten meal.

Minerals

The mineral portion of the feed is inorganic matter. Minerals, especially calcium and phosphorus, help build bones and make them strong and rigid. Laying hens also require minerals for eggshell formation. Other minerals are needed in trace amounts for all metabolic functions.

Grains are low in minerals, so supplements are necessary. Calcium, phosphorus and salt are needed in the greatest amounts. Bone meal and defluorinated and dicalcium phosphates supply additional calcium and phosphorus. Ground limestone and oyster shell are good calcium sources. Trace levels of iodine, iron, manganese and zinc are also included in mineral supplements.

Vitamins

Vitamins occur in feeds in small amounts, but they are absolutely necessary for growth, reproduction and the maintenance of health. They occur in feedstuffs in varying quantities and in different combinations.

Some vitamins are produced by microorganisms of the intestinal tract. Vitamin D can be produced by sunlight on the bird's skin. Other vitamins must be sup-

plied in the ration because they are not formed by the birds.

Vitamins are often separated into two groups: (1) fat soluble and (2) water soluble.

Fat-soluble vitamins: A, D, E, K

Water-soluble vitamins: C, Thiamin, Riboflavin, Pantothenic acid, Niacin, Pyridoxine, Choline, Biotin, Folic acid, B₁₂

Vitamin A is necessary for the health and proper functioning of the skin and lining of the digestive, reproductive and respiratory tracts. Vitamin D plays an important role in bone formation and the metabolism of calcium and phosphorus. The B vitamins are involved in energy metabolism and in many other metabolic functions.

Many necessary vitamins are partially supplied by feed ingredients such as alfalfa meal and distillers' dried solubles. A vitamin premix, however, is included in the commercial ration to provide additional supplements such as vitamin A, B₁₂, D₃, E, K, riboflavin, niacin, pantothenic acid and choline.

Feeding the Right Ration

Commercial poultry feeds contain numerous similar feed ingredients. Several different types of rations are available, however. (As an example: starter, grower, finisher and layer rations) These are designed to meet the specific needs of different types of birds. To know which ration is best for your flock, you need to know the answers to these questions:

1. What age birds are you feeding?
2. What kind of birds are you feeding?
3. Are the birds being raised for meat or to produce eggs?

Table 1 (page 3) lists the principle types of rations fed to chickens and also recommends levels of protein, fat and fiber for each ration.

Two Mistakes in Feeding

The most common mistake is feeding the wrong feed. Do not give young birds a layer ration. The calcium level is excessively high for young birds. Do not mix scratch grain with a complete commercial ration. Cracked corn, for example, is low in protein. By mixing cracked corn with a complete commercial grower ration, you dilute (reduce) the protein level as well as the vitamin and mineral content of the diet. The birds will not grow as well or lay many eggs and will also be less resistant to disease. Nutrient deficiencies may lead to feather picking, lameness, sores or even death.

The second most common mistake is not feeding enough of the appropriate type feed. Table 2 (page 4) lists reasonable estimates of feed consumption and kinds of feed required by healthy chickens given good care.

Feed: An Investment

Seventy percent of the cost of raising chickens goes for feed. This is an investment rather than an expense because the better the birds are fed, the more productive they will be.

A poultry ration should provide nutrients that chickens need. Naturally, the type of feed that is best for your flock changes with age and production purposes (meat or eggs).

The importance of giving plenty of cool, clean water cannot be over-emphasized. Remember, water is a major part of both eggs and meat. Provide your flock with fresh water and a complete balanced ration, and they will reward you and your family with fresh eggs or meat.

Nutrient Requirements

For more detailed information on the nutrient requirements of poultry and feed formulation, you may consult the following references.

Nutrient Requirements of Poultry. 1994. National Academy Press, 2101 Constitution Avenue, NW, Lockbox 285, Washington, DC 20055.

Leeson, Steven, and John D. Summers. *Commercial Poultry Nutrition*. University Books, P.O. Box 1326, Guelph, Ontario, Canada N1H 6N8.

Scott, Milton B., Maldon C. Nesheim, and Robert J. Young. *Nutrition of the Chicken*. M.L. Scott & Associates, Ithaca, NY.

Pesti, Gene M., and Bill R. Miller. *Animal Feed Formulation – Economics and Computer Applications*. College of Agricultural and Environmental Sciences, University of Georgia, Athens, GA 30602.

Table 1: Common Percentages of Nutrients Found in Poultry Rations.

	Protein %	Calcium %	Phosphorus %	Fat %	Fiber %
Broilers					
starter 1 to 3 wks	22	0.9	0.6	6.0	2.5
finisher 4 to 7 wks	19	0.8	0.5	7.0	2.5
Pullets					
starter 1 to 6 wks	20	0.9	0.5	4.0	3.0
grower 7 to 18 wks	17	0.8	0.5	3.5	4.0
Laying Hens					
layer 19 wks >	16-18	3.3-4.0	0.5	3.5	3.50

Table 2: Amount and Type of Feed Required for One Chicken by Age and Purpose.

Layers (Brown Egg Type)

Age	Total Amount of Feed (lbs)	Ration Type
Day old to 6 weeks	4	Starter
7 weeks to 18 weeks	46	Grower
19 weeks to 70 weeks (onset of lay to termination)	104	Layer

Layers (White Egg Type)

Age	Total Amount of Feed (lbs)	Ration Type
Day old to 6 weeks	3	Starter
7 weeks to 18 weeks	12	Grower
19 weeks to 70 weeks (onset of lay to termination)	80	Layer

Broilers (Meat Type)

Age	Total Amount of Feed (lbs)	Ration Type
Day old to 3 weeks	2	Starter
4 weeks to 7 weeks	7	Finisher

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