



How to Make an Egg

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Dr. Justin Fowler
Extension Poultry Nutritionist

Modern laying hens have been genetically selected for a rapid laying cycle that makes each bird able to produce 260+ eggs per year, with over 72 million table eggs being eaten worldwide -- making the laying hen one of the single most important providers of high-quality human nutrition. There is a certain "recipe" for making an egg, and it might include things that you haven't considered go into making your omelet each morning.

Energy:

It takes about 2-3 pounds of feed to produce a dozen eggs, and 70-85% of the dry matter of that feed goes to meeting the bird's energy needs. Energy in food is measured in "calorie" units. And a mature white leghorn can require around 300,000 calories of energy per day to live, move, and lay an egg (For the sake of simplicity, we would say the bird needs 300 *kilocalories*). Humans, by contrast, need an approximate 2,000 kilocalories per day, on average.

The bulk of any poultry diet is going to be carbohydrates. The starch found in cereal grains such as corn, wheat, rice, barley, etc. provide the greatest contribution to meeting the energy needs in any poultry diet.

Protein:

The building blocks of all life are proteins. The DNA that makes every species on Earth unique from one another are really just instructions for how to put proteins together. The albumin (or egg white) is an example of a protein. The maintain their normal bodily functions, as well as lay an egg, a laying hen requires around 18 grams of protein per day.

The good thing is that those 18 grams will come from foods humans simply won't eat, from the by-products of making other things that we *will* eat. We might all enjoy things like soybean or canola oil for frying, baked goods, or distilled products, but none of us want to eat the soybean meal, bakery by-product meal, or dried distiller's grains that are leftover. However, there is plenty of nutrition in these products that would be lost to the human food-chain and wasted if it weren't for animal species (like poultry) who convert it into lean meat and nutrition eggs for us.

Fat:

Fatty-acids are the long-term storage form for energy. One gram of fat has more than twice the calories as the same one gram of a carbohydrate or protein. Not only that, but oils improve the handling qualities and palatability of a feed. The most common sources of fat for poultry diets comes from: rendered poultry fat, recycled animal/vegetable oils, or soybean oil. Laying hens require about 5 grams of fat in their feed each day to remain productive.

Importantly, the fatty-acid content of an egg can be directly influenced by what the laying hen eats. Therefore, it is possible to supplement their diets with fish meal, flaxseed, or camelina meal and provide ~150 mg of Ω -3 per egg -- which has been shown to reduce cardiovascular disease, rheumatoid arthritis, and certain cancers in humans.

Vitamins/Minerals:

Poultry require most of the same vitamins that we do: Vitamins A, D, E, and K, plus the B-vitamins. In addition to these, laying hens have an extra special requirement for the mineral Calcium. Every bird needs about 1% of their diet to be Calcium and 0.5% to be available Phosphorus, but laying hens are unique. They need extra Calcium to go to the production of egg shells. A Leghorn in full production can require as much as 4.5 grams of Calcium every day from ingredients such as limestone, oystershell, or meat and bone meal.

Water:

Most people wouldn't think of water as a "nutrient", but it is actually the most important component. The feed is only about 10% moisture, but the meat/eggs we want to collect from the birds are 65-75% moisture -- and birds will typically consume about twice the amount of water than feed.

Without at least ~1 cup of water each day, a bird may experience dehydration which, especially under hot conditions, will lead to poor egg production.

The final recipe card would read something like this:

300 kcal of energy (mostly from a cereal grain)
18 g of protein (mostly from by-product meals)
5 g of fat (can come from animal and/or vegetable sources)
4.5 g of calcium (limestone, oystershells, etc.)
About 1 cup of water

Mix all ingredients in the digestive tract of a laying hen. Let it bake for ~25 hours.

And from this recipe, you can expect to receive a nutritious source of protein (6 grams worth), plus an avenue for Ω -3 fatty-acids that don't include needing to eat fish.