

Key Points in Commercial Turkey Feed Formulation and Nutrition

Proper formulation of commercial turkey feeds requires considering many factors in addition to economic return. Such factors would include body weight for age, desired body weight at market, carcass characteristics and feed conversion. This article details many key points that should be considered in the formulation of any commercial turkey feed.

Energy Density of the Diet

Hybrid commercial turkeys can be fed a wide range of dietary energy densities for each diet in a feed program. Usually, ingredient availability and economics are the key influences affecting the selection of the dietary energy density value. The 2013 Hybrid Commercial Nutrient Guidelines list for each diet an acceptable range of dietary energy density as a guideline. Diets can be formulated outside that range, but one should be careful if formulating outside that range by greater than 3% deviation from the minimum/maximum set value.

There is some concern from nutritionists that energy values of ingredients used by Hybrid to develop our nutritional guidelines differ from those used by other nutritionists. This is a common problem that is due to the ingredient energy data source used, ingredient quality, and inherent problems associated with the metabolizable energy system in turkeys. The easiest and most practical solution is for nutritionists to continue to use their own ingredient energy values because that is what they would be most familiar and comfortable for them to formulate turkey diets. Regardless of the actual energy value assigned to a particular ingredient, it is more important that all available ingredients are correctly ranked in energy density to each other. It is also important for nutritionists to properly review all formulated diets to ensure that they are correct “in practice” and commensurate with the expected physiological development of the turkey being fed that diet.

Crude Protein and Amino Acid Levels

Turkey feeds can be properly formulated using total or available (digestible) amino acids. Feed formulation using available amino acids would be more desirable when ingredient quality is poor. The 2013 Hybrid Nutrient Guidelines detail amino acid ratios relative to lysine; and these numbers should be interpreted as minimum ratios to lysine in feeds although in practical feed formulation it may be desirable to slightly decrease certain ratios. If turkey feeds are formulated to arginine, lysine, methionine, methionine + cysteine, threonine and valine; it is possible to reduce crude protein below guidelines by 0.5-1.0% (i.e.: from 27.5% to 26.5%) without negatively affecting

performance. Isoleucine and tryptophan concentration in formulated feeds should not be ignored but should only be limiting when certain ingredients are used in turkey feeds (isoleucine when blood meal is used; tryptophan when corn distillers is used). Always try to maximize the use of synthetic amino acids in turkey feeds which can safely reduce the crude protein concentration of feed and reduce litter moisture and ammonia concentrations in the barn.

The type of synthetic lysine used as an ingredient can have an effect on barn litter moisture concentration and also on the ease of formulating turkey feeds. The types of synthetic lysine available are liquid lysine, lysine sulfate or lysine hydrochloride. It is easiest to formulate turkey feeds for drier litter conditions with liquid lysine as the synthetic lysine source; although, turkey feeds formulated with lysine sulfate or lysine hydrochloride can also result in dry litter conditions. Maximum safe levels of liquid lysine (50% lysine) can be 0.63% in finished feed; lysine sulfate (50.7% lysine) can be maximum 0.62% in finished feed; or lysine hydrochloride (78.8% lysine) can be maximum 0.40% in finished feed.

Achieve Good Starts

Many believe that turkey feed should be formulated for slow, early growth to achieve better leg soundness. This is incorrect for Hybrid genetics as they are genetically selected for excellent legs, and therefore, should be fed feeds formulated for maximum body weight gain from the first day. Vitamin and trace mineral concentrations in feed have been revised for the 2013 Nutrient Guidelines. Vitamins and trace minerals should be within the ranges given in those guidelines to best achieve the genetic potential of your turkeys. It is also important not to heat over-process your feeds as to avoid excessive destruction of vitamins and the resultant poorer starts. The quality of the pellet (or crumble), particularly the first feed is critical for good starts. Too fine a feed or poor pellet/crumble durability can lead to excessive incidence of pendulous crops at an early age. Information on pellet sizes can be obtained from Hybrid Turkeys.

Sodium Concentration in Feed

Hybrid genetics differ from other competitive genetic strains of turkeys in that they require and better tolerate higher sodium concentrations in feed. Low sodium concentration (<0.15%) in feed can result in increased flock activity particularly in male turkeys as they approach sexual maturity. Many nutritionists prefer to formulate turkey feeds at low sodium concentrations to avoid excessive litter moisture concentration in the barn which can result in an increased incidence of footpad dermatitis. Hybrid genetics are very tolerant of high sodium levels in feed, and we have successfully fed feeds from 12-20 weeks of age at a sodium concentration of 0.20% without unacceptable litter moisture concentration or footpad dermatitis incidence. We recommend that

in most situations, Hybrid genetics should be fed turkey feeds that range in sodium concentration from 0.16-0.18% to best avoid hyperactivity development in flocks.

Calcium and Phosphorus Concentrations in Feed

Calcium and phosphorus have been reduced 5-10% in the 2013 Nutrient Guidelines compared to previous guidelines. These decreases should not negatively affect skeletal development and leg soundness. Implementing these changes will reduce feed cost and decrease litter moisture content in the barn. We are currently investigating further decreases in calcium and phosphorus in commercial turkeys older than 6 weeks of age which will have further benefits on feed cost and litter moisture reduction.

Miscellaneous Key Points

- (a) *Use of specialty ingredients:* There are plenty of specialty ingredients available to add to turkey feed. Proper economic and performance assessment of ingredients newly added to feed should be done before implementing to all flocks. It is important to realize that many specialty ingredients will only result in an economic return on investment under certain barn, disease and environmental conditions.
- (b) *Number of feeds in a feed program:* The number of feeds in a feed program is very much customer dependent. The number of feeds, depending on customer preference, can range from 4-20 different feeds in a program. These feeds can also be fed in different amounts or lengths of time. Because feed programs are very much customer-dependent, the 2013 Hybrid Nutrient Guidelines provide nutrient guideline information by each week of age for males and females. This information is most useful for customers wanting to develop the most desirable feed program for their situation.
- (c) *Feeding to days of age or feed amounts:* Feeding to feed amounts (kg feed per poult) is always most desirable, especially in situations where feed intake is reduced due to heat stress, overcrowding or disease. Feeding to feed amount also enables the grower to better order feed commensurate with the physiological status of the turkey. Knowing how much of each feed is to be fed before the flock is placed, enables the grower to calculate a “feed budget” in that the feed cost per poult can be estimated prior to flock placement.
- (d) *Summer versus winter diets:* Whether a summer versus winter diet program is required, is very much dependent on customer preference. Typically, the summer program may be higher in energy density to help improve growth rates in hot conditions. Practically, only the final two diets during grow-out should be adjusted as this would be when poults are most crowded. The energy density increase should be at least 3% compared to the winter diet of the same type.