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## Feed Quality Control That Pays

### Introduction

Much of the feed quality control process involves informal/formal communications and interactions between commodity purchasing agents, nutritionists, feed mills, producers, and veterinarians. On average 60-70% of poultry production costs are related to feed. Thus good quality and well formulated feed greatly influence the profitability of a poultry

operation. Profitable poultry production involves the following activities: 1) ingredient purchasing, 2) feed manufacturing, 3) egg and meat production, and 4) evaluation. As shown in figure 1, each activity leads to the next and have a great impact on profits. This paper will examine several Quality Control issues which will assist in receiving the best value from your investment in feed.

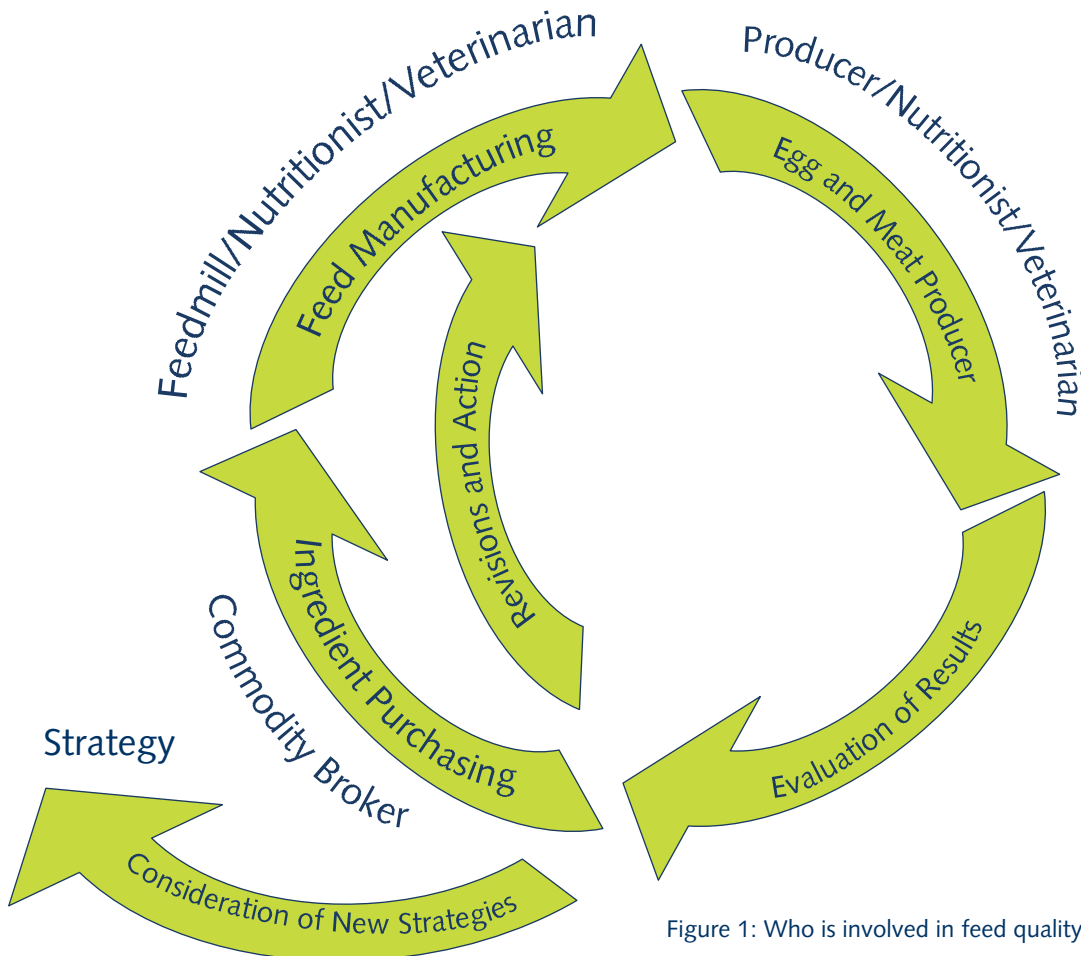


Figure 1: Who is involved in feed quality

### Quality is Everybody's Business

To produce good quality feed, commodity purchasing agents, nutritionists, feed mills, producers and veterinarians all share responsibility - each lending their expertise to ensure final results.

### Commodity Purchasing Agents Responsibility

The Commodity Purchasing Agent's objective is to buy the best ingredient quality at the lowest price. Of course they must resist the temptation to maximize their own profits by purchasing second class quality at "bargain" prices - they must look at the "best value" for the company.

Commodity Purchasing Agents should consider the following guidelines:

- Prepare written minimum nutritional and physical specifications for every ingredient.
- Purchasing contracts should clearly specify the penalties if ingredient specifications are not met.

- Maintain the right to reject ingredients if ingredient specifications are not met.
- Become familiar with suppliers' quality control, quality assurance, and quality track record.
- Ask for representative samples before you agree to buy new types of ingredients or consider new suppliers. Proper analyses (toxins, nutritional, etc.) should be done depending upon the nature of the ingredient.
- Most of the time, if not always, question the quality of ingredients offered at low prices.

### Nutritionist and Feed Mill's Responsibility

The feed mill is a key player in controlling the quality of the feed. The check-list used by Commodity Purchasing Agents could also be used by the feed mill manager to evaluate ingredients at the feed mill. A written and well implemented quality assurance manual/program is essential for audit purposes by customers, government agencies, and for HACCP or ISO 9000 certification. Feed mills should routinely sample incoming ingredients and immediately reject poor

Physical Conditions	Soybean Meal	Meat & Bone Meal
Color	Light tan to Light Brown	Dark tan to Light Brown
Odor	Fresh, but not burned	Fresh and clean
Texture	Homogenous, without excessive fines or coarse particles	Fine Granules
Uniformity	90% to pass U.S. No. 10 screen	99% to pass U.S. No. 10 screen
<b>Chemical Analysis</b>		
Crude Protein, % min.	47.5	50.0
Fat, % min.	1.25	8.0
Moisture, % max.	12.0	6.0
Fiber, % max.	3.5	2.4
Flow Agent, % max.	0.5	
Calcium, % min.		8.0
Available Phosphorous, % min.		4.0
Antioxidant added		Yes/No

quality ingredients before unloading. An example of ingredient specification standard is shown in Table 1. The nutrient composition of ingredients should be constantly evaluated and the nutritionist should utilize the nutrient analysis records in their feed formulation matrix. Proper feed mixing and pelleting is an essential part of the feed mill's responsibility.

Feed mills could use the following guidelines to evaluate the physical characteristics of bulk shipments;

**Color and odor:** Color should be typical of the particular ingredient with a fresh and clean (not burned or soured) smell.

**Moisture and Temperature:** The flow characteristics of an ingredient during the unloading is a good indicator of its moisture content and heat status during transportation. Sticky, wet and moldy spots caused by high moisture and over heating during transportation will affect the free-flowing characteristics of an ingredient.

**Texture and Uniformity:** Ingredients should have a homogenous and uniform texture without excessive coarse particles. Uniformity of an ingredient could be checked by passing a representative sample through U.S. screen No. 10, for example.

**Foreign Material:** Dirt, insect infestations, bird droppings, feathers, should not be common and if

present, the delivery should be rejected.

## Feed Mill Production Check-List

**Buy Smart:** Control your source of raw ingredients. You are the customer - know what you are buying and from who. Inspect each load of ingredients and reject if need be.

**Micro Scale Check:** Scales used for micro-ingredients and drugs should be checked monthly for accuracy. Inaccurate scales may cause increased cost (drugs and micro-ingredients are expensive) and/or poor performance.

**Bulk Scale Check:** Bulk scales should be checked monthly to ensure the feed will be mixed accurately with no wasted ingredients. This also reduces / controls the level of shrink experienced.

**Clean-out Fat/Tallow Tanks:** Tanks should be thoroughly cleaned out at least once per year. Cleaning fat tanks is commonly ignored, resulting in rancid fat which negatively affects health and performance of flocks.

**Slide Gates Check:** Regular checking and maintenance will help to control accurate amounts and regular flow of ingredients.

**Accurate Mixing:** Accurate mixing of feed involves using the exact amounts which the feed formulas call for. Furthermore, the mixer must be capable of mixing the ingredients properly. Overfilling or under-filling the mixer will affect the final feed outcome.

**Mixer Profiling:** A profile is required to determine how well the feed is getting mixed. Mixer profiling involves taking a series of samples at specific time intervals (for example - every 10 seconds). Sodium

is most commonly used as a marker during analysis. Nutrient analysis of the sample will allow us to calculate the Coefficient of Variation (CV). A CV of <5% is excellent, 5 to 10% is adequate, and >10% is poor.

**Pellets and Steam:** Daily check the steam and quality of pellets. Steam is applied to the mash feed in the conditioner before entering the pellet mill. Too much steam can cause the mill to “choke” and more energy will be needed to make pellets. Too little steam will result in poor pellet quality and too many fines. Steam, therefore is important to both quality of pellets and the efficiency of the mill.

**Pelleting:** Proper temperatures applied for the proper duration is essential to produce good pellet quality, both from a physical as well as a microbiological standpoint. Conditioning temperature above 180°F (82°C) is preferable. Proper cooling of feed is essential - an area often overlooked.

**Clean-out Storage Bins and Delivery Trucks:** A thorough cleaning should be done every month to reduce the chances of toxin buildup and of cross-contamination.

**Finished Feed Analysis:** A regimented schedule should be followed which includes weekly analysis of a series of feeds determined by either the volume of the particular feeds or the frequency of production. Furthermore, retention of feed samples at the feed mill (usually a minimum of three to six months) is critical when tracing possible nutritional or contamination problems.

**Manual Mixers/Hand-adds:** Manual mixing requires that every ingredient added be checked by the operator.

**Medication Inventories:** Inventories of medication should be checked at the end of each production shift against the actual usage. If they do not balance then a search should commence to check where the error occurred and the situation corrected.

**Maintenance and Clean-Up:** Regular scheduled clean-up and up to date maintenance are important.

**Storage:** Proper storage of ingredients and finished feed is essential, high temperature and humidity negatively affect feed ingredients.

**Clean out Trucks:** Make it routine that trucks are cleaned out thoroughly on a scheduled basis.

**Delivery Schedule:** Sometimes mistakes happen and feed could be delivered to the wrong farm. However, properly labeled feed bins, and good communication between farm, feed mill and truck driver should keep everyone informed as to what feed is to go where and when.

## Producer Responsibility

**Clean Feed Bins and Feed Lines:** Between each flock remove caked feed which may contain molds, bacteria, and other potential problems.

**Record Keeping:** Keep good records regarding rate of gain, feed consumption, mortality, water consumption, egg production, cull egg type and %, hatch records, etc. Analysis of these production statistics will alert the producer to potential problems and ensure that diagnostic or corrective action is taken quickly to minimize the impact.

**Proper Management:** It is imperative that proper management be used (i.e. temperatures, ventilation, litter quality, vaccinations, etc.). The best feed will not produce good flocks if the management is not proper.

**Communicate Problems:** Producers should inform their nutritionist and veterinarian about their flock's performance and how it deviates from previous experiences and from the breed standards.

## Nutritionist and Veterinarian Responsibilities

The nutritionist needs to work with a realistic computer matrix. Feed formulations should consider the source/nutrient composition of ingredients and adjust the feed formulation matrix to that ingredient. For example, the NRC tables are a good starting point for nutrient composition and metabolizable energy values of ingredients. However, variation in fat or fiber content of a specific ingredient will affect the metabolizable energy content.

The nutritionist and veterinarian are often asked to decide whether feed, disease, management or a combination of factors are responsible for the performance/production problems. To resolve field problems, veterinarians and nutritionists have the following responsibilities:

- Be involved in the design and implementation of quality control programs at all levels of feed and egg and meat production.
- Decide whether feed is implicated strongly enough to warrant removing it. If, for example, birds do not consume the feed, the wise choice is to remove the suspect feed immediately and replace with fresh feed.

- Request that the feed mill and the producer submit their feed (retainer feed from the feed mill and feed from the farm) to the laboratory for nutrient, mycotoxin, and drug analysis.
- Check feed mill production and manufacturing records such as inventory records of feed ingredients and drugs, mixing time, scales and meters for proper calibration, delivery records, etc.
- The nutritionist should inform the veterinarian and the producer of major changes in feed composition and what the possible outcome is.
- Evaluate production records and trends. For example, when did the problem begin, its extent (all houses or isolated incidence), severity, etc.

Whether a production problem is caused by nutrition or health, the reason might not be obvious. Both areas must be investigated simultaneously which requires that the nutritionist and the veterinarian work as a team.

## Conclusion

To produce good quality feed, commodity purchasing agents, nutritionists, feed mills, producers and veterinarians all share responsibility, each lending their expertise to ensure the best final results.

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