Aviagen® Turkeys

Bulletin

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Feed Physical Quality Testing Using a Shaker Sieve

Introduction

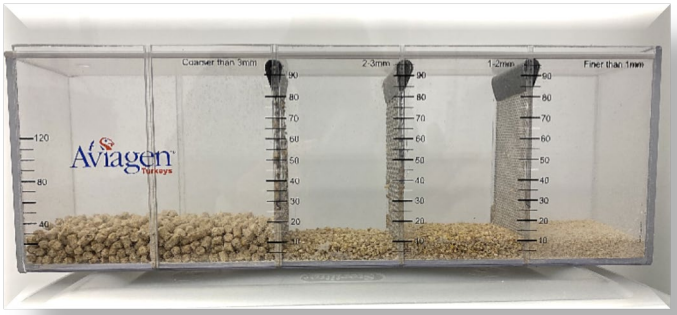
Feed physical quality can have a significant impact on growth performance of the modern commercial turkey. Work conducted in Aviagen Turkeys trial facilities demonstrated that liveweight was altered by feed form as much as 12% and feed conversion by as much as 36% for males grown to 140 days of age.

In this trial, males that were given a diet of 100% high quality pellets weighed 50.0 lbs (22.7 kg) with a FCR of 2.71. When the diet was 50% pellets, and 50% fines the males weighed 43.9 lbs (19.9 kg) with a FCR of 3.69.

Field Assesment of Feed Physical Quality

It is important to understand the physical quality of feed in the field. This can be assessed by determining the size of the feed particles presented to the birds by use of a shaker sieve. This device shown in **Figure 1** can help the farmer or service person define the size distribution of pellets or crumbles. This method of measuring physical feed quality will provide a quantitative comparison between feed deliveries or flocks.

Figure 1 Shaker Sieve



Taking the Sample

The first step in analyzing the feed is gathering a sample that is representative of the feed that is being fed to the flock. The method of taking the feed sample is important as this can have a major impact on the result. Feed samples must be taken from multiple places and then mixed together as follows:

- Take sufficient samples for a total of about 1 lb (450g)
- Take samples from:
  - Three Feeders or Feed Pans – 1/3 away from the hopper, 1/3 farther down the line, the end of feed line
  - Feedline Hopper
- Mix all samples together then pour out onto a flat surface
  - *Pouring the sample on a large paper or two pieces of paper overlapped will allow the paper to be used as a funnel to pour the final sample into the sieve.*
- Separate the sample into quarters.
  - *The sieve lid serves as a good tool to divide the sample.*
- Take two opposite quarters to test in the shaker seive.
- Discard the remaining two quarters.

Using the Shaker Sieve

The shaker sieve is divided into four compartments allowing the objective estimation of the percentage of feed particles of different sizes. The feed sample is poured into the largest compartment and particles smaller than 3mm will be shaken down through the filters with the small fines (less than 1mm) ending up in the bottom.

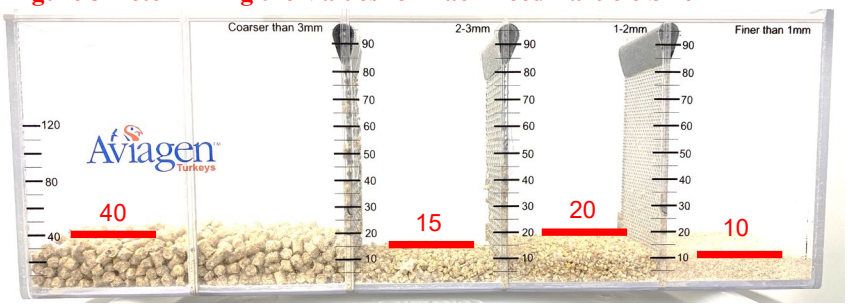
The procedure for using the feed shaker sieve is demonstrated in **Figure 2**. There is also a video of the process on the Aviagen Turkeys website, www.aviagenturkeys.com.

Figure 2 How to Use the Feed Shaker Sieve

Calculating the Results

Once the sieving process is complete, set the shaker sieve on a flat surface and ensure the feed is level within each compartment. Determine the values for each feed size by comparing the top of the feed to the scales along the left side of each compartment, see **Figure 3**. *Note that the scale for the "Coarser than 3mm" feed is different than the others. This is to factor in the larger size of this compartment.*

Figure 3 Determining the Values for Each Feed Particle Size



Once the values for each feed particle size are determined, use the procedures outlined in **Table 1** to calculate the percentage of each size. A simple spreadsheet is available to carry out the calculation upon request.

Table 1 Calculating the Percentage of Each Feed Particle Size

Particle Size	Sieve Value	Calculation	% of Total
Coarser than 3mm	40	40 / 85 =	47%
2-3mm	15	15 / 85 =	18%
1-2mm	20	20 / 85 =	23%
Finer than 1mm	10	10 / 85 =	12%
Total	85		

Instructions:

1. Add the values of the four feed particle sizes together to obtain the total value.
   $40 + 15 + 20 + 10 = 85$
2. Divide the value of each feed particle size by the total value to calculate the percentages.
   Coarser than 3mm - $40 \div 85 = 47\%$

Particle Size Profile

Trials have shown that for every 10% increase in the amount of fines (particles less than 1mm) there can be a 1 lb (450 grams) decrease in body weight at 140 days. The aim of feed manufacturing and delivery should be to minimize the percentage of fines in the feed.

Ideally, pelleted feed should have over 70% particle sizes at least 3mm, and less than 10% particles below 1mm. The recommended sizes for Crumbled Starter Feeds are detailed in **Table 2** below.

Table 2 Recommended Particle Size Distribution for Crumbled Starter Feed

Diet	Coarser than 3mm	2 to 3mm	1 to 2mm	Finer than 1mm
Starter 1	**0%**	**30 – 40%**	**45 – 55%**	**0 – 10%**
Starter 2	**10 – 15%**	**35 – 45%**	**25 – 30%**	**0 – 10%**

The percentages calculated from the Shaker Sieve should be compared with the appropriate recommended particle size distribution.

The example shown in **Table 1** is for pelleted feed and therefore should have at least 70% in the "Coarser than 3mm" category and less than 10% "Finer than 1mm". The actual values in the example are outside the recommended range which should trigger additional action, see **Table 3.**

Table 3 Pelleted Feed Example vs Recommended Particle Size

Particle Size	Actual in Example	Recommended
Coarser than 3mm	47%	70%
Finer than 1mm	12%	10%

Actions Following Sieve Analysis

If results of the sieve analysis are outside the recommended profile, discussions should be held between farm staff and feed manufacturing. Factors causing feed particle size degradation should be identified and corrected. Following are some possible contributing factors:

- Feed manufacturing processes
- Post-manufacturing feed movement to finished feed storage bins or to transport vehicles
- Feed delivery to the farm: distance, vehicle design (augers or pneumatic)
- On-farm feed distribution equipment
- Feeder system management: depth settings and practices for clearing feed pans of fines

These investigations may identify a need to consult with feed milling experts who can offer insight into:

- Proper grinding equipment settings
- Proper conditioner settings with regard to timing, temperatures and steam quality
- Proper pellet mill maintenance and operation (rates, pellet die specifications)
- Proper cooler operation (rates and temperatures)

Feed particle size can have a tremendous impact on turkey performance. When used properly, the feed shaker sieve can provide useful information to address feed quality issues.

Contact your Aviagen Turkeys representative if you would like a feed quality evaluation at your facility or to enquire about purchasing a shaker sieve.

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