Feed Physical Quality Testing using a Shaker Sieve

Aviagen Turkeys Ltd ®

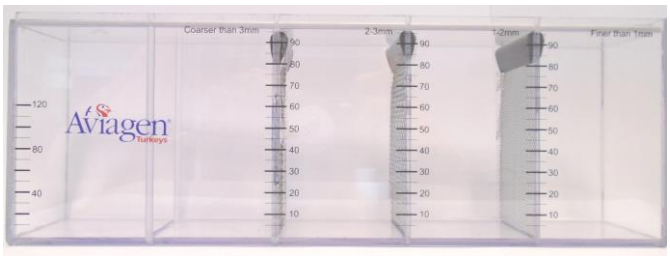
Introduction

The impact of feed physical quality on the performance of the modern commercial turkey can have a significant impact on flock performance. Recent work conducted in Aviagen Turkeys' trial facilities showed that feed form can effect liveweight to 140 days by as much as 12% and FCR by 36%.

Field Assessment of Feed Physical Quality

When looking to exploit maximum performance from commercial birds it is vitally important to understand the physical quality of feed in the field. This is practically assessed by the size of the feed particles presented to the birds. It is often difficult to assess this on the farm where subjective opinions can lead to much discussion. The shaker sieve is a useful, portable tool for quantifying the particle size distribution at farm level and allowing comparison with the recommended particle size distribution. This will allow quantitative comparison between feed deliveries or flocks. The shaker sieve can be used for all feed forms: crumbles, pellets and mash.

Figure 1: Example of a shaker sieve

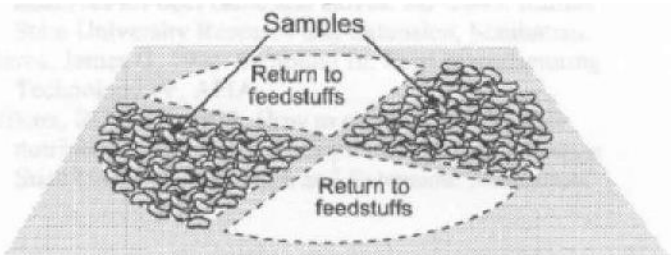


Method

The method of taking the feed sample is important as this can have a major impact on the result. The aim is to get a sample that best represents the physical feed quality presented to the flock.

- Samples should be taken from the feeders not just the feed hoppers.
- Samples should be taken from three equally spaced points along the feeding system**.**
- Samples should be mixed, laid out and quartered.
- Two opposite quarters should be then taken for testing.
- The remaining quarters should be discarded or returned to the feedstuff.

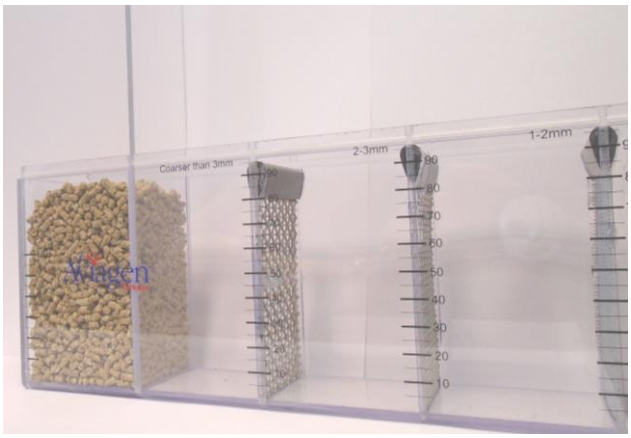
Figure 2: Quartering of Sample



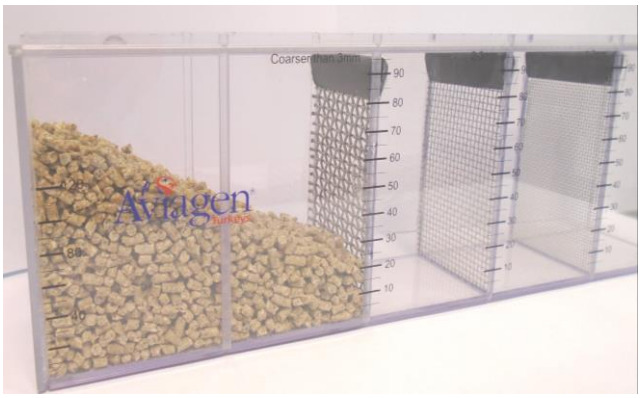
Operation of the Shaker

1. Remove lid and slide lid vertically into the groove in the centre of the first compartment (coarser than 3 mm).

2. Fill only the left compartment with the feed sample.



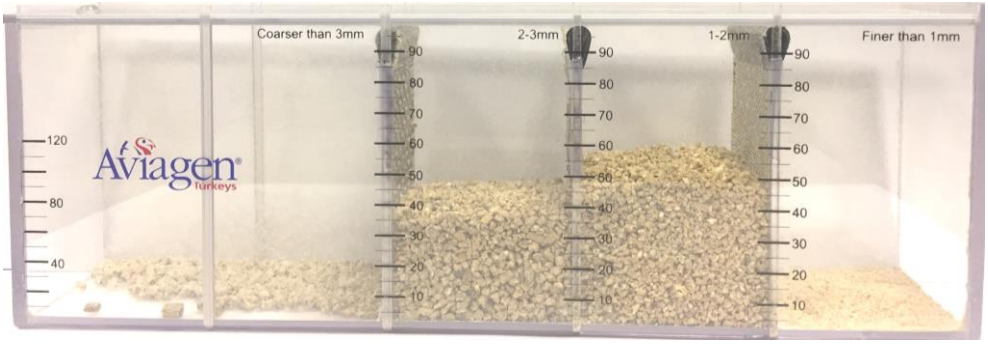
3. Take the lid out of the vertical groove and slide lid back to close the shaker.



4. Turn sieve so that is stands vertically upright with the largest compartment at the top.

5. Shake the sieve for two minutes, making sure you shake vigorously as the fine particles have to move all the way to the last compartment.

6. Stop Shaking. Return sieve to sideways position so that the numbers can be read. Make sure the feed is level in each compartment.



7. Record the values for each compartment using the left scale of each compartment.
   Note:
   a. Broad-scale for the first (coarser then 3mm) compartment.
   b. Narrow-scale for the 3 other compartments.

8. Calculate percentages in each compartment as follows:
   a. Add the values of all four compartments together resulting in a total value.
   b. Divide the value of each section by the total value to produce percentage.

For example:

The values from the shaker sieve are found to be as follows:

> 3 mm	**55**
> 2 mm	**10**
> 1 mm	**10**
< 1 mm	**20**
TOTAL	**95**

The percentage of each particle size within the feed is therefore:

> 3 mm	**(55/95)%**	**= 58%**
> 2 mm	**(10/95)%**	**= 10.5%**
> 1 mm	**(10/95)%**	**= 10.5%**
< 1 mm	**(20/95)%**	**= 21%**

A simple prepared spreadsheet is available to carry out the calculation if preferred (please refer to the Excel spreadsheet provided with this document). The calculated percentages should then be compared with the recommended particle size distribution, see **Table 1.**

Particle Size Profile

The recommended particle size distribution for crumbled feeds is shown in Table 1. Trials have shown that with every 10% fines (< 1 mm) can result in up to 500 g loss in body weight at 140 days of age and therefore the aim should be to minimize the amount of particles (< 1 mm) in the feed.

Table 1: Recommended particle size distribution for crumbled starter feed:

Particle Size	<1mm	1 to 2mm	2 to 3mm	>3mm
Starter 1	**0 – 10%**	**45 – 55%**	**30 – 40%**	**0%**
Starter 2	**0 – 10%**	**25 – 30%**	**35 – 45%**	**10 – 15%**

The level of fine particles (<1mm) must be kept below 10% in pelletized finisher diets. The shaker sieve can also be used to assess the particle size profile of mash feed.

Actions Following Sieve Analysis

If the results of the sieve analysis are outside the profiles above (**Table 1**), then discussions should be held with the farm and feed mill to identify the factors contributing to feed degradation and to provide solutions. There are a number of possible contributing factors to consider:

- Feed manufacture at the mill.
- Movement of finished feed from the end of the feed production line to finished product storage bins and onto transport vehicles.
- Haulage and system of conveyancing to the farm, in terms of distance and vehicle design.
- Conveyance from on-farm feed storage bins to feeder pans as this can often result in degradation of feed texture.
- Finally, feeder management in terms of incorrect setting of feeders reducing physical feed quality, or failure to clear feed pans of fines exacerbates the effect of poor feed form.

As part of these investigations it may be necessary to bring in further specialist advice to improve pelleting procedures at the feed mill. Key points to consider would be:

- Grinding (for pellets and mash).
- Conditioning of meal prior to pelleting (especially steam quality).
- Correct use and maintenance of pellet press and adequate cooling.

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