FEED PREPARATION: KEY AREAS OF OPPORTUNITY

Production of rearing and laying diets involves selection of good quality ingredients, formulating these ingredients accurately to the correct nutrient specification and manufacturing the feed to a uniform particle size (grist) which will support efficient feed intake.

The starting point is sourcing the right raw materials.

RAW MATERIALS

- Establish the quality of the raw materials sourced through routine analyses.
- Invest in quality raw materials, for example, in many instances domestically sourced cereal is better quality than cheaper imported material. The cost differential is minimal relative to the benefits on improved productive performance.
- Analyse incoming raw materials on receipt for key parameters such as moisture, bulk density, and protein levels. Compare the results relative to agreed target and be prepared to reject loads which do not meet the minimum quality criteria.
- Pay particular attention to materials which may contain harmful toxins, such as corn which can contain mycotoxins.

FEED FORMULATION

- Formulate the diets accurately by characterising the raw materials used in the feed.
- Observe trends in routine raw material analyses data rather than depending on 'one-off' spot analyses results.
- Adjust the raw material matrix within the formulation system based on the most up-to-date raw material analyses results. For example, some cereals can alter in crude protein and amino acid density significantly, which requires adjustments of the raw material matrix to maintain the crude protein and amino acid content of the feed.
- Formulate diets based on digestible nutrients, e.g., digestible amino acids as opposed to total amino acids or just crude protein.
- Incorporate a coarse limestone (2-4mm) as well as finer limestone (1-2mm) in layer feeds to support egg shell quality. Increase the proportion of coarse limestone relative to finer limestone in layer diets from 60% in the first stage diet to 75% in the last stage diet.
- Measure the feed consumption of the flock and formulate diets to meet the nutritional needs of the flock based on this intake. This is especially important during periods of high temperatures—use higher density diets when feed intakes reduce. Increase amino acid density by at least 10% to 15% and energy density by 1% to 2%. Increase the proportion of oil to provide more effective energy and increase the vitamin levels in the diets by 20% (where legally permitted) with emphasis on B group vitamins and Vitamin C.

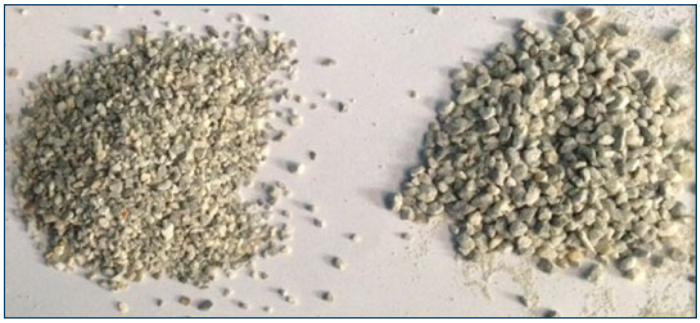

Figure 1: Fine (left) and coarse (right) size limestone.

FEED MILLING

Provide the feed in a suitable format. This will support efficient feed intake and digestive function. Layer diets are generally manufactured in a mash format and early stage rearing diets are provided in a crumb.

- Grind the feed components to a uniform particle size which will meet the particle size profile required in the finished product. Generally, roller mills will provide a more uniform grist than hammer mills.
- Monitor the grist profile of the material exiting the grinder routinely, if the particle size does not meet the target profile, then the grinder settings may require adjusting and/or the grinder is excessively worn.
- Check the hammer grinder screen and beaters for excessive wear and punctures. Any perforations in the screen will allow excessively large particles to pass through to the finished product. See Figure 2 below.
- Replace excessively worn screens and beaters routinely in order to achieve a consistent particle size profile.
- Check the grist profile of material exiting the roller mill against the target particle size profile. If the particle size is significantly different to target then check that the aperture (gap) between the rollers is set correctly across the length of the rollers and inspect the roller mill for excessive wear.

Figure 2. Excessively worn beaters (left) and punctured screen (right).

- Provide the rearing starter diet in a crumb rather than a mash format as a good quality crumb will encourage more efficient intake which is essential for early development.
- Ensure a good quality crumb by crumbling a good quality, durable pellet. Use a crumbler machine consisting of two fluted rolls driving at differential speeds.
- Check the particle size of the crumbed feed exiting the crumbler, typically the gap between the rolls is set at two thirds of pellet diameter.
- Sieve the crumbed feed to remove over and under sized particles to the target particle size profile. Crumbs are passed over a series of sieve ‘decks’ to separate excessively large and small particles, leaving the desired particle size range (1 to 3 mm).

WEIGHING AND MIXING

- Ensure all weighers are routinely calibrated and comply to quality standards. Weighing of low inclusion materials such be conducted with a sufficiently sensitive weigher.
- Mix the feed components to create a uniform blend of all raw materials to ensure uniform consumption of all nutrients by all the birds.
- Load liquid materials into the mixing sequence after mixing dry components. The order of loading the mixer should be:
  - » Major ingredients
  - » Minor ingredients such as minerals and premixes
  - » Additives
  - » Liquids
- Dry mix materials for a smaller proportion of the total mix time relative to the wet mix.
- Conduct routine mixer efficiency testing to ensure the mixer is operating to acceptable standards e.g., coefficient of variance = 5% to 10%.

FINISHED FEED

- Assess finished product analyses data routinely and compare to target levels and acceptable boundaries/tolerances.
- Conduct routine analyses on essential components: Moisture, crude protein, oil, fibre, ash, minerals.
- Compare finished feed analyses results to targets and set boundaries of tolerance for analyses to fall within.
- Interrogate analyses results which fall outside of boundaries and investigate reasons for such results and conduct repeat analyses if required. Feed which fails to meet the required target(s) on repeat analyses should not be fed to the flock.
- Assess feed particle size profile relative to target. Ensure finished products meet the target profile (see figure 3 below).
- Aim for: >3mm: 15%, 2–3mm: 40–50%, 1–2mm: 30–40% and <1mm 5–10%.

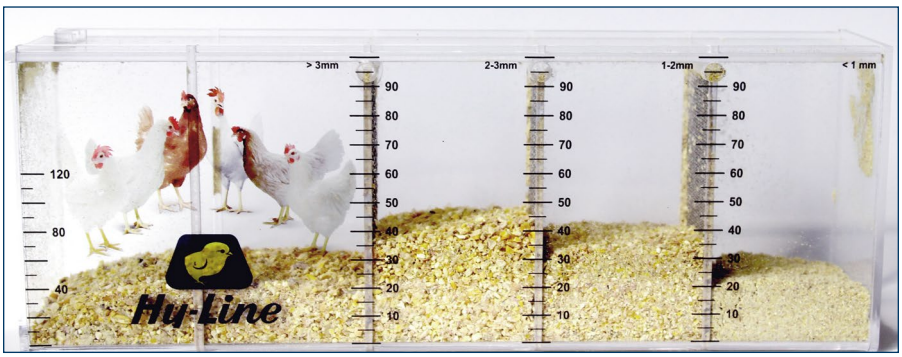

Figure 3. Hy-Line sieve shaker.