



Application of liquid enzymes at Anwar Sierad

by L. C. GOH*

The fast uptake of enzymes in the Asia/Pacific Region can be contributed to two key factors; firstly, research has yielded a greater understanding of enzymes eliminating or substantially reducing the anti-nutritive effect of animal feeds. Secondly, enzyme carrier systems have been developed that can confer thermostability to the component enzymes, thereby allowing them to withstand the rigours of conventional feed manufacturing processes.

Enzymes in the granular form are incorporated as micro-ingredients, either directly or as a component of the premix, added to the mixing stage of feed manufacture at the batch mixer. This is a simple, accurate and a widespread practice.

Recent developments in feed manufacturing technology have resulted in increased processing temperatures and pressure; i.e. the expanders. This has provided benefits such as improvements in feed hygiene, production efficiency and pellet durability. However, the higher processing temperatures have also brought attention on the thermostability of some of the more heat labile feed ingredients such as vitamins, amino acids and enzymes.

When processing conditions exceed 85°C, it is generally advisable to apply enzymes as liquids, post-pelleting and post-screening, thereby avoiding

exposure to high temperatures and also eliminating the possibility of a high percentage of enzyme activity returning with the screened fines for re-processing.

The need at Anwar Sierad for liquid Avizyme

In 1996, PT Anwar Sierad of Indonesia began using expanders for the manufacture of broiler feeds and layer feeds, to achieve an improvement in feed hygiene and quality.

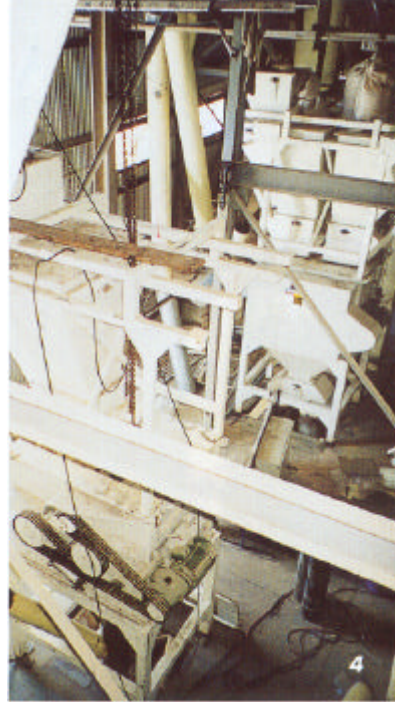
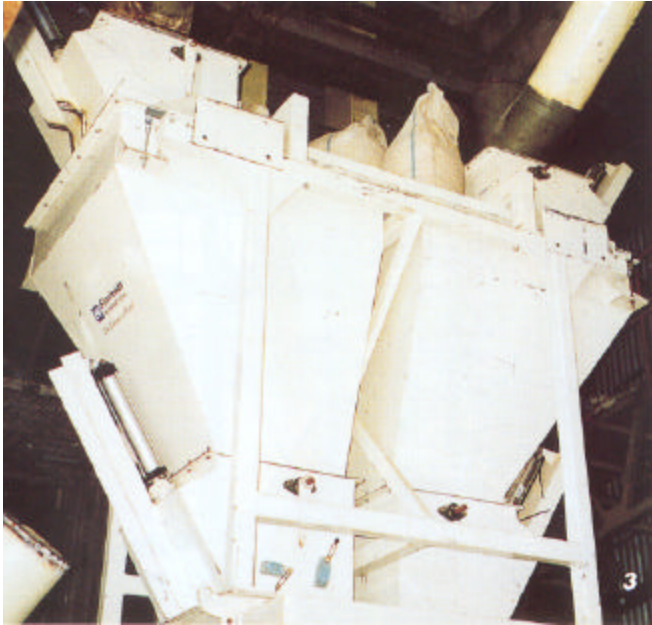
PT Anwar Sierad then introduced liquid Avizyme (Avizyme 1510) to further improve the quality of their corn/soya based poultry feeds. Avizyme 1510 improves the digestibility of the diets by degrading the resistance starch of corn as well as releasing nutrients encapsulated by the cell walls of the ingredients used in the diet. Avizyme 1510 improves energy utilisation from the diet. This allows producers to reformulate the diet to reduce cost whilst maintaining bird performance. An alternative approach is to add Avizyme 1510 to an existing formulation for economic improvements in bird performance and to improve liveweight uniformity.

With the expanders exposing the feed to temperatures of around 110°C, there was a need to apply the liquid enzyme after pelleting to avoid excessive enzyme loss.

How was it done?

In consultation with PT Anwar Sierad, the following key design features were identified for the installation of the Post Pelleting Application (PPA) systems:

- Accurate weight based metering and control for both the dry and liquid flow rates



- 1: Bin tops, spoutwork, turnheads and pellet sieves prior to PPA installation.
- 2: Initial work started with structural steel modifications to support the PPA equipment. Bucket elevators have been extended.
- 3: Twin weigh hopper arrangement with top and bottom catch gates, above the mixer.
- 4: Overview of PPA equipment during installation to manage Avizyme 1510 treatment for pellet lines 1, 2 and 3.
- 5: Arrangement showing twin weigh hopper above the Forberg mixer and diverter below it. Liquid and air lines routed in supporting tray to spray nozzles installed on top centre of the mixer.

- Uniform and prolonged exposures of the feed pellets while in suspension to a wide spray pattern.
- Post application mixing of pellets when sprayed.
- Flexibility to change application rates effectively while maintaining accuracy and without the need for recalibration.
- Minimal creation of fines.
- System reliability and repeatability.
- Customer specification.
- Hygiene and safety.
- Cost

As a wide range of feed types and different manufacturing capacities are adopted by PT Anwar Sierad, the PPA system selected as being the most suitable to meet the requirements was the batch type system.

The batch system is possibly the most flexible and accurate of liquid addition systems. The system provides the flexibility to apply multiple liquids and combine multiple product forms.

The existing mill setup was inadequate for the direct installation of the batch mixers, as insufficient headroom was available. This led to the existing steelwork structure being extended, with the bucket elevators and pellets sieves being repositioned (see pictures 1, 2 and 3).

For the batching and mixing of the dry flow of pellets, a Forberg mixer was installed and the pellets were diverted to a weigh hopper above the mixer (see picture 4). Two weigh hoppers are installed in order that the system can alternate between different diets or product forms (see picture 5).

The Finndose system was used for the dosing and metering of the liquid enzymes. Each enzyme activity has a dedicated dosing pump and flow meter. The three separate enzyme activities are combined just prior to the spray nozzle at a specially designed spray manifold. The combined enzyme solution is then sprayed into the fluidised zone of the mixer to achieve maximum distribution and homogeneity.

After the mixing cycle is completed, the mixer discharges its load to the respective transfer elevator and finished product conveyor to its designated storage bin for outloading.

Mr Hingki Suswanto, Technical Manager at Sierad Feedmills said they observed some increase in hen day production in laying hens with reduced feed intake from using the liquid Avizyme, resulting in lower costs of egg production.



SUMMARY

With the growing trend of conditioning feeds at higher temperatures (>85°C), heat sensitive nutrients will have to be applied to the finished feed in liquid form in the future. Liquid applications to the finished feed also offers the feed producer the flexibility to customise diets at the last possible moment in the manufacturing process prior to outloading.

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