

Increasing feed mill throughput – A practical example

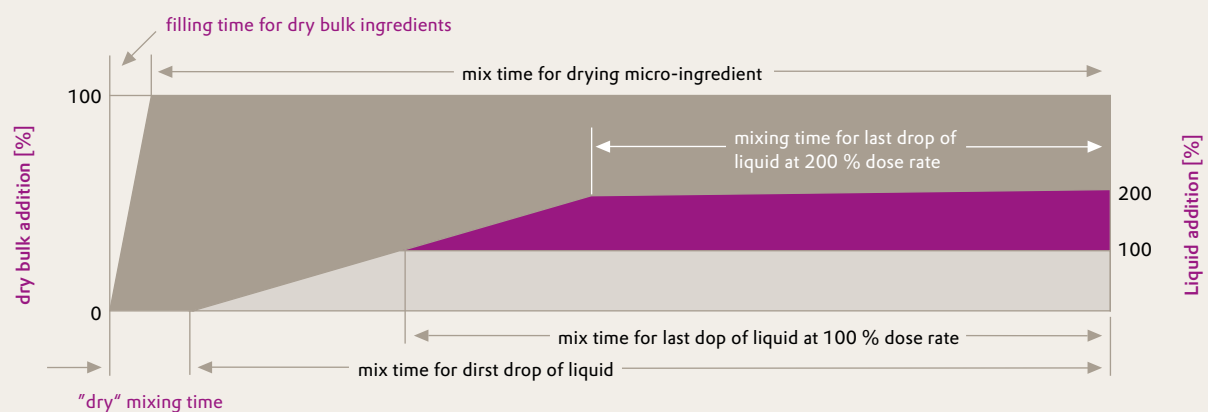
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One of the biggest issues facing feed production today is feed mill capacity. This is particularly true for fully integrated poultry or swine producers, who view the feed mill as a cost center, compared with a traditional feed producer who views the feed mill as a profit center. As such, integrated feed mills are frequently asked to do more with what they have or even with less. This puts tremendous pressure on the managers of these mills to identify ways to de-bottleneck their operation without investing a tremendous amount of capital.

Evonik has recognized this as an area of concern, and likewise an opportunity for us to help many of our customers. As part of our value-added technical services, we have feed mill consulting services, which are available to our customers for help and insight on how to do more with less in today's feed mills.

One way to increase throughput without significant investment is to minimize the use of liquids in feed. While a certain amount of liquids positively impacts final feed quality by reducing dust and prevention of de-mixing during storage and transport, an excess can increase total mix time (or reduce dry mix time) and reduce homogeneity of mix: Figure 1 compares the mix time for dry micro-ingredients with the mix time of increasing amounts of liquids added via the same system. If a liquid is added, the mix time for such liquid is clearly shorter than it should be unless total mix time is increased. The addition of a second liquid (here exemplified by doubling the amount from 100 to 200 %) further decreases the available time for proper mixing.

Figure 1
time sequence for addition and mixing of dry bulk and liquids



We were recently able to help a customer gain over 1,500 tons per week by switching them from a liquid to a dry methionine source. At the time, the customer was producing 10,285 tons per week (2,057 tons per day). To produce this amount of feed, the feed mill staff was working 3 shifts per day, 5 days a week plus one more shift on a 6th day.

At the request of this customer, we conducted a feed mill performance audit, which revealed opportunities to improve mill performance and reduce mix time with a relatively simple change. Basically, the audit showed that their feed mill processes were good, but their total mix time was 7 minutes per batch, which was limiting the tonnage that this mill could produce. The prolonged mix time was due to the 4 different liquids (liquid MHA-FA, liquid Lysine, choline chloride, and fat) that were being used in the diets produced at this mill. So, it became apparent that any opportunity to reduce total mix time would essentially serve as a means to expand this mill's capacity and be very beneficial for this customer.

It was concluded from the audit that total mix time could be reduced by 55 seconds by switching this customer from liquid MHA-FA to dry DL-Methionine (DL-Met). In doing so, they would only need to dose 3 liquids compared with the 4 that they were currently dosing. This change would increase their capacity by 311 tons per day (1,555 tons per week) resulting in a total mill capacity of 11,840 tons per week (2,368 tons per day). However, since this company only needed to produce 10,285 per week, this change also meant that they would be able to produce the required amount of feed within their 3 shifts per day, 5 days a week work time. Best of all, they

could achieve this with very little capital expenditures while being able to cut out overtime and reduce total man hours.

As a dry micro-ingredient, DL-Met can be weighed and dosed via the micro-scale along with several other dry ingredients. These dry ingredients can be weighed during the fill time for dry bulk ingredients, such as corn and soybean meal. As a result, no time is lost due to preparing these dry ingredients for the mix. Conversely, liquids cannot be pre-measured unless a liquid scaling system is used, which means that they must be measured and dosed at the same time. Furthermore, their dosing cannot begin until the dry bulk and micro-ingredients are in the mixer, otherwise the liquids will end up on the walls and ribbons of the mixer, which creates buildup and additional problems later.

The final result was a reduction in total mix time by 55 seconds, and while this may not seem like much time, this reduction allowed the customer to produce an additional 1,555 tons of feed per week. Finally, considering that the mill only needed to produce 10,285 tons per week, these improvements in capacity utilization allowed the customer to reduce man hours and eliminate overtime. These changes also resulted in over US \$ 500,000 in annual cost savings for this customer or over US \$ 1,500 per day! Undoubtedly, this case study shows that no matter how small the change, such as switching from a liquid to dry source for certain nutrients, the benefit can be big. If you would like to learn more about Evonik's Technical Services and how our Feed Mill Consulting Services can help your operation, contact your local Evonik Degussa office.

Table 1

Comparison of customer feed mill performance before and after increase in feed mill throughput using different methionine sources

	Mix time/batch (minutes)	Potential batches per week ¹	Total feed per week (tons) ²	Total feed per year (tons)
Using liquid MHA-FA	7	1028	10,285	534,820
Using DL-Met	6.08	1184	11,840	615,680
Additional potential tonnage:			1,555	80,860

¹ One batch equals 10 tons of mixed feed.

² Calculated as: (1440 minutes/Mix time per batch)*5 days* 10 tons per batch.



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