KEMIN

Technical Literature

1900 Scott Avenue • Des Moines, Iowa, USA 50317 • tel: 515.559.5100 • www.kemin.com/ag

TRIAL 1 – MILLSAVOR™ LIQUID CONCENTRATE IMPROVED POULTRY FEED PELLETING PERFORMANCE

ABSTRACT

The advantages of pelleting swine and poultry feed are well documented. However, the costs associated with making highly digestible, durable and low-dust pellets vex feed mill operators worldwide. The purpose of this evaluation, the first of a series of pelleting demonstrations, was to determine if MillSAVOR™ Liquid Concentrate would perform similar to or better than a competitive pelleting aid in a large commercial broiler feed mill. In the final analysis, this evaluation determined MillSAVOR Liquid Concentrate was significantly better than the competitive product.

KEYWORDS: *Feed Milling, MillSAVOR, Pelleting, Throughput, Efficiency, Durability*

INTRODUCTION

One of the biggest costs associated with manufacturing broiler feed is the cost of pelleting. The advantages of pelleting feed are well known in the feed industry, and the cost of pelleting is more than covered by the improvements in performance and efficiency. However, whenever feed mills can find ways to reduce the cost of pelleting, they quickly adopt this technology. Milling aids, steam quality and new pellet dies are all technologies employed to reduce the cost of pelleting. MillSAVOR Liquid Concentrate fits into the milling aids category.

This piece summarizes the first large scale evaluation of MillSAVOR Liquid Concentrate in a poultry feed mill in the United States. During this evaluation, the use of MillSAVOR Liquid Concentrate improved tons per hour, reduced amps per ton and reduced motor load when compared to a competitive milling aid. In addition to improving key milling performance measures, the use of MillSAVOR Liquid Concentrate improved pellet durability index and did not negatively impact the accumulation of fine feed particles.

MATERIALS AND METHODS

This evaluation was conducted in a large poultry feed mill with weekly pelleted production of more than 6,500 tons. This feed mill makes a variety of pelleted feeds including starter, grower and finisher feeds. For this evaluation, the feed mill made mostly pelleted broiler grower feed.

Kemin Product Application Department (PAD) installed a temporary application system for applying MillSAVOR Liquid Concentrate during this evaluation. For most of this evaluation, the system applied MillSAVOR Liquid Concentrate at variable levels. In this evaluation MillSAVOR Liquid Concentrate was applied at a rate of 1.5 and 2.0 ounces per ton of feed (48.9 and 65.2 mL per metric ton of feed) along with 20 pounds of water per ton of feed (10 liters per metric ton of feed). The purpose of treating with 1.5 ounces per ton (48.9 mL/metric ton) was to determine efficacy at the lower level. Each batch of feed was eight (8) tons (7,258 kg), and batch cycle time was 10 minutes. This mill features two pellet lines, each with a capacity of 40 tons (36.3 metric tons) per hour. Maxi-Mil® I (Anitox Corp., Lawrenceville, GA) was applied using the current Maxi-Mil® application system. The MillSAVOR formulation was applied using the PAD temporary system.

Day one of this evaluation (May 8, 2018), the feed mill operators made finisher feed in the morning using the existing Maxi-Mil system. The rate of application was 2 ounces per ton of feed (65.2 mL per metric ton of feed). During this 160-ton production run, baseline data were gathered for mill production parameters when using Maxi-Mil. Beginning at noon, the mill switched to starter feed. For 5 hours, the mill made starter feed, using Maxi-Mil at the rate of 2 ounces per ton of feed (65.2 mL per metric ton of feed), and during this extended run, baseline data were measured. After the five-hour production run using Maxi-Mil, the research team switched and began adding MillSAVOR Liquid Concentrate to the starter feed. The mill continued making starter feed until approximately 10:00 pm. One item of note, during the MillSAVOR Liquid Concentrate phase of this evaluation making starter feed, the production team made the decision to keep tons per hour around 55 in order to prevent roll-slip.

On day two of this evaluation, the feed mill made only finisher feed. During the entire second day, the only product applied to the feed was MillSAVOR Liquid Concentrate. For the first three hours, the application rate was 2 ounces per ton of feed

(65.2 mL per metric ton of feed). For the next 5 hours, the application rate was dropped to 1.5 ounces per ton of feed (48.9 mL per metric ton of feed) to determine if we could match the day one performance of Maxi-Mil.

For the final day of this evaluation, the feed mill made only withdrawal feed. For the first three hours, the research team applied Maxi-Mil at the rate of 2 ounces per ton of feed (65.2 mL per metric ton of feed). For the next three hours, the feed received MillSAVOR Liquid Concentrate at the rate of 1.5 ounces per ton of feed (48.9 mL per metric ton of feed) again to test if this lower rate of application would match the performance of Maxi-Mil.

During the pelleting evaluation, pellet samples were gathered after the cooler. Samples were taken at 10-15-minute intervals and were evaluated for fines and pellet durability index (PDI). One of the requirements for an effective pellet milling aid is to improve mill throughput in these products without increasing fines or reducing PDI. During this evaluation, samples of all pellets were evaluated for percentage of fines, and pellets were subjected to an aggressive PDI test. For the PDI test, a HOLMEN® NHP 100 tester was used to measure the durability of the pellets.

RESULTS AND DISCUSSION

Feed Mill Performance

The main parameters related to milling efficiency recorded during this evaluation were tons per hour, amperage and motor load. There are many other measures of pellet mill performance, however, the three measured were most significant to this customer. Table 1 summarizes each of these parameters when making starter feed. As with most mills, starter feed is crumbled after pelleting, so we did not capture feed to measure PDI or fines. The application rate was 2 ounces per ton of feed (65.2 mL per metric ton of feed) for both Maxi-Mil® I and MillSAVOR Liquid Concentrate.

Table 1. Summary of average mill performance data for starter feed production.

Treatment	Ton/Hour	Amps	Amps/Ton	Motor Load
Maxi-Mil® I	56.3	488.9	8.68	97.7
MillSAVOR Liquid Concentrate	54.5	481.7	8.84	86.4

When making the starter feed on day one, the operators of the mill attempted to maintain production of 55 tons per hour. Because feed milling is as much art as it is science, they produced 56.3 tons per hour with Maxi-Mil and 54.3 tons per hour with MillSAVOR. This resulted in greater amps per ton for MillSAVOR, but the motor load was over 10% less when using MillSAVOR.

Table 2 combines data from the first and second day of the evaluation, when the mill was making finisher feed. The finisher feed made with Maxi-Mil was made the first day during the first few hours of operation. The MillSAVOR feed was made the second day, and two different application rates were used, as noted in the data.

Table 2. Summary of average mill performance data for finisher feed production.

Treatment	oz/ton (mL/mt)	Ton/Hour	Amps	Amps/Ton	Motor Load
Maxi-Mil® I	2.0 (65.2)	54.6	484.9	8.88	96.8
MillSAVOR Liquid Concentrate	2.0 (65.2)	57.4	480.4	8.37	96.1
MillSAVOR Liquid Concentrate	1.5 (48.9)	55.1	483.3	8.78	96.7

During day two, the operators attempted to maintain a motor load of 96-97% - they did a very good job. As a consequence, the advantages of MillSAVOR over Maxi-Mil appeared. At an application rate of 2 ounces per ton (65.2 mL/MT), the mill produced 2.8 more tons per hour and used less amperage and used 0.51 fewer amps per ton of feed. Even when the application rate of MillSAVOR was dropped to 1.5 ounces per ton (48.9 mL/mt), the mill used 0.10 fewer amps per ton when compared with Maxi-Mil applied at the higher rate.

Table 3 summarizes the data from the final day of the evaluation. This feed was all withdrawal feed and was harder to pellet as demonstrated by the lower rate of production when compared with finisher feed. Maxi-Mil was applied at 2.0 ounces per ton (65.2 mL/MT) and MillSAVOR was applied at 1.5 ounces per ton (48.9 mL/MT). During this run, the operators again attempted to maintain a motor load of 96-97%.

1900 Scott Avenue • Des Moines, Iowa, USA 50317 • tel: 515.559.5100 • www.kemin.com/ag

Table 3. Summary of average mill performance data for withdrawal feed.

Treatment	oz/ton (mL/mt)	Ton/Hour	Amps	Amps/Ton	Motor Load
Maxi-Mil® I	2.0 (65.2)	44.4	488.7	11.02	97.6
MillSAVOR Liquid Concentrate	1.5 (48.9)	47.2	482.3	10.23	96.8

During day three, even at a lower application rate, MillSAVOR Liquid Concentrate helped increase the tons per hour from 44.4 to 47.2. The amperage also was lower, so the amps per ton were 0.79 lower when withdrawal feed was treated with MillSAVOR Liquid Concentrate.

Pellet Durability Index and Feed Fines

The starter feed was crumbled, so these parameters are not evaluated. Table 4 summarizes the data related to fines sifted from the feed and pellet durability index (PDI) of finisher feed made during this evaluation.

Table 4. Summary of average pellet characteristics for finisher feed.

Treatment	oz/ton (mL/mt)	PDI	Fines
Maxi-Mil® I	2.0 (65.2)	67.0	23.3%
MillSAVOR Liquid Concentrate	2.0 (65.2)	58.9	26.3%
MillSAVOR Liquid Concentrate	1.5 (48.9)	65.4	21.0%

One of the big concerns when increasing pellet mill throughput is the fear pellet quality will suffer. Because tons per hour increase, there is a concern pellets will not retain enough heat or face enough pressure to adequately compress the pellet. In our evaluation, the use of MillSAVOR Liquid Concentrate improved pelleting throughput but did not negatively impact accumulation of fines or reduce PDI when compared with either Maxi-Mil® I or the control feed. While we did see an increase in fines and a reduction of PDI when MillSAVOR was applied at the rate of 2 ounces per ton, the application rate of 1.5 ounces showed no change from Maxi-Mil applied at 2.0 ounces per ton.

Table 5 summarizes the data related to fines sifted from the feed and pellet durability index (PDI) of withdrawal feed made during this evaluation. When making withdrawal feed, MillSAVOR Liquid Concentrate treated feed generated fewer fines and gave a better PDI even when used at less than the recommended level.

Table 5. Summary of average pellet characteristics for withdrawal feed.

Treatment	oz/ton (mL/mt)	PDI	Fines
Maxi-Mil® I	2.0 (65.2)	63.4	24.2%
MillSAVOR Liquid Concentrate	1.5 (48.9)	65.0	23.7%

CONCLUSIONS

In this evaluation, it was shown MillSAVOR Liquid Concentrate provided equal to or better improvements in pellet milling efficiency when compare to Maxi-Mil® I. Regardless of the feed type, starter, finisher or withdrawal, the application of 2 ounces of MillSAVOR Liquid Concentrate outperformed Maxi-Mil® I. Even when used at 1.5 ounce per ton of feed, the amps per ton and tons per hour were improved with MillSAVOR Liquid Concentrate. Additional parameters measured were fines and PDI. The goal is not to impact these parameters during the improvement in performance. This evaluation showed MillSAVOR Liquid Concentrate did not have a negative impact on these measures.

Maxi-Mil® I is a registered trademark of Anitox Corp., Lawrenceville, GA
HOLMEN® is a registered trademark of Tekpro Ltd, in England, Willow Park, North Walsham, Norfolk, NR28 0BD