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Technical Literature

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TRIAL 3 – 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 third 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 third 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 nearly 10,000 tons. This feed mill makes a variety of pelleted feeds including starter, grower and finisher feeds. They have three pellet lines, and the operators of this feed mill were quick to explain the “personalities” of each of the pellet mills. 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 2.0 ounces per ton of feed (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). Each batch of feed was 6 tons (5,440 kg), and batch cycle time was 6 minutes. This mill features three pellet lines, each with a capacity of 40 tons (36.3 metric tons) per hour. The MillSAVOR formulation was applied using the PAD temporary system.

Day one of this evaluation (March 24, 2019), the feed mill operators completed four runs of 100 tons of grower feed during their 12-hour day shift, for a total of 400 tons of feed. The first one hundred tons were pelleted on pellet line number 1. This batch served as the control and helped to establish the performance baseline for this pellet mill. After completing the control run on pellet line 1, the operators pelleted one hundred ton of treated (MillSAVOR) feed on pellet line #1. After making the feed for pellet line one, the same process was employed for pellet line two. One hundred tons of untreated (control) feed was pelleted on pellet line #2 and was followed by one hundred tons of treated (MillSAVOR) feed. Data were gathered for all feed, both control and treated.

On day two of this evaluation, the feed mill made both grower and finisher feed. In the morning, they completed three runs of 100 tons of grower feed. The first batch of 100 tons was untreated and served as the control. This feed was directed to pellet line #3. The second batch of grower was treated with MillSAVOR and again was sent to pellet line #3. The final batch of grower feed was treated (MillSAVOR) feed on pellet line #2, a repeat of the evaluation from Day 1. After making three batches of grower ration, they completed two runs of 100 tons of finisher feed for a total of 200 tons. The first 100-ton run

was untreated (control) feed and was directed to pellet line #2. The final run of finisher feed was treated (MillSAVOR) feed and was also pelleted on pellet line #2.

During the pelleting evaluation, pellet samples were gathered after the cooler. Samples were taken at 10 to 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 conditioner temperature, tons per hour, amperage, amps per ton and motor load. There are many other measures of pellet mill performance; however, these five measures were most significant to this customer. Table 1 summarizes each of these parameters when making grower feed. The application rate was 2 ounces of MillSAVOR Liquid Concentrate per ton of feed (65.2 mL per metric ton of feed).

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

Treatment	Conditioner Temp	Tons per Hour	Amps	Amps per ton	Motor Load, %
Day One – Pellet Line #1					
Control	173.60	34.20	350.25	10.24	77.88
MillSAVOR Liquid Concentrate	176.43	35.00	325.56	9.30	72.11
Improvement	*2.83*	*0.80*	*-24.69*	*-0.94*	*-5.76*
% Improvement	*1.6%*	*2.3%*	*-7.6%*	*-10.1%*	*-8.0%*
Day One – Pellet Line #2					
Control	171.33	35.96	409.44	11.39	90.56
MillSAVOR Liquid Concentrate	178.56	40.01	393.56	9.84	87.11
Improvement	*7.22*	*4.06*	*-15.89*	*-1.55*	*-3.44*
% Improvement	*4.0%*	*10.1%*	*-4.0%*	*-15.8%*	*-4.0%*
Day Two – Pellet Line #2					
MillSAVOR Liquid Concentrate	176.17	40.68	380.33	9.35	84.17
Improvement (over day one)	*4.83*	*4.73*	*-29.11*	*-2.04*	*-6.39*
% Improvement (over day one)	*2.7%*	*11.6%*	*-7.7%*	*-21.8%*	*-7.6%*
Day Two – Pellet Line #3					
Control	180.86	35.76	405.86	11.35	90.57
MillSAVOR Liquid Concentrate	179.88	40.20	407.00	10.12	90.38
Improvement	*-0.98*	*4.44*	*1.14*	*-1.23*	*-0.20*
% Improvement	*-0.5%*	*11.1%*	*0.3%*	*-12.1%*	*-0.2%*

Table 2 summarizes the mill performance data from the 200 tons of finishing feed made during this evaluation. The finishing feed was pelleted on pellet line number 2.

Table 2. Summary of average mill performance data for finisher feed production during day 2 on pellet line number 2.

Treatment	Conditioner Temp	Tons per Hour	Amps	Amps per ton	Motor Load, %
Control	178.00	34.01	391.10	11.50	86.60
MillSAVOR Liquid Concentrate	172.67	36.10	376.44	10.43	83.33
Improvement	*-5.33*	*2.09*	*-14.66*	*-1.07*	*-3.27*
% Improvement	*-3.1%*	*5.8%*	*-3.9%*	*-10.3%*	*-3.9%*

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Pellet Durability Index and Feed Fines

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 this evaluation, the use of MillSAVOR Liquid Concentrate improved pelleting throughput but did not negatively impact accumulation of fines. In all cases, we observed increased PDI when compared with the control feed.

Table 3 summarizes the data related to fines sifted from the feed and pellet durability index (PDI) of grower feed made during this evaluation.

Table 3. Summary of average pellet characteristics for grower feed.

Treatment	Fines, %	PDI (30 seconds)	Mixer Moisture	Conditioner Moisture	Steam Moisture	Cooler Moisture
Day One – Pellet Line #1						
Control	21.6%	71.2%	13.2%	15.7%	2.5%	13.4%
MillSAVOR Liquid Concentrate	21.1%	74.0%	13.3%	15.2%	2.1%	13.6%
% Improvement	*-0.4%*	*2.8%*	*0.1%*	*-0.5%*	*-0.4%*	*0.2%*
Day One – Pellet Line #2						
Control	5.8%	74.3%	13.2%	15.5%	2.3%	13.2%
MillSAVOR Liquid Concentrate	5.5%	80.4%	12.8%	15.5%	2.8%	13.6%
% Improvement	*-0.3%*	*6.1%*	*-0.4%*	*0.0%*	*0.5%*	*0.4%*
Day Two – Pellet Line #2						
MillSAVOR Liquid Concentrate	7.0%	82.0%	13.3%	14.9%	1.5%	13.7%
% Improvement (over day one)	*1.2%*	*7.7%*	*0.1%*	*-0.6%*	*-0.8%*	*0.5%*
Day Two – Pellet Line #3						
Control	4.9%	82.7%	13.0%	15.6%	2.6%	13.7%
MillSAVOR Liquid Concentrate	7.2%	83.0%	13.9%	16.0%	2.1%	13.9%
% Improvement	*2.2%*	*0.3%*	*0.8%*	*0.4%*	*-0.4%*	*0.2%*

Table 4 summarizes the mill performance data from the 200 tons of finishing feed made during this evaluation. The finishing feed was pelleted on pellet line number 2.

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

Treatment	Fines, %	PDI (30 seconds)	Mixer Moisture	Conditioner Moisture	Steam Moisture	Cooler Moisture
Control	5.8%	81.5%	13.4%	17.3%	3.9%	13.7%
MillSAVOR Liquid Concentrate	6.1%	83.0%	13.8%	17.4%	3.6%	14.2%
% Improvement	*0.2%*	*1.5%*	*0.4%*	*0.2%*	*-0.2%*	*0.5%*

CONCLUSIONS

In this evaluation, it was shown MillSAVOR Liquid Concentrate provided improvements in pellet milling efficiency when compared to control feed. Regardless of the feed type, grower or finisher, the application of 2 ounces of MillSAVOR Liquid Concentrate enhanced milling performance. Additional parameters measured were also improved. The goal is not to impact pellet durability during the improvement in performance. This evaluation showed MillSAVOR Liquid Concentrate did not have a negative impact on PDI.

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