



Dealing with Long-Term Storage of Bagged Animal Feed

OVERVIEW

Anyone who has worked in a retail farm supply store can share great stories related to customer interactions. We sincerely appreciate our customers, their loyalty to our brands and their passion for their livestock and poultry. Questions are great – but some questions are more challenging than others. When it comes to bagged animal feed, the most common questions retail feed customers ask are related to quality:

1. How do I know this feed is fresh?
2. What can I expect for a shelf life of this feed?
3. What should I do if this feed is moldy?
4. My last bag smelled like rancid butter, will this bag smell bad, too?

Millions of dollars in retail profit are lost each year due to returned feed. And, this is a shame because the two main issues related to bagged feed quality are avoided with a good mold inhibitor and an effective antioxidant program. Mold and off-odors are the first indication of poor feed quality. So, how do feed manufacturers ensure their retail partners do not face angry customers with feed quality issues?

Mold – A Growing Concern

The most common reason for customers to return bagged feed is mold. Even when care is taken to ensure all ingredients are dry and only the highest quality raw materials are sourced, mold can become an issue once the feed is bagged and shipped. The three most common reasons for mold growth are heat, moisture and time – and bags are the perfect environment for all three.

Warehouses are seldom climate controlled, and summer heat can often approach 120°F (50°C). Poly woven or poly lined bags provide a barrier against humidity and rain, but also maintain an enclosed environment for moisture migration inside the bag. And finally, buying truckloads of feed and storing for seasonal sales is a great cost saving measure; but, feed can often remain in storage for 4, 5 even 6 months.

Rancidity – Wow! What's That Smell?

As noted above, purchasing managers seek to only buy the highest quality ingredients. However, load-to-load variation impacts overall quality, especially with fats and oils. Even when high quality fats are used, as noted with mold, heat and time conspire against stable feed. Oxidation of fats, oils and feeds quickly leads to off-odors and off-flavors thereby reducing quality and palatability of the final product.

For operations with large fat storage tanks, one bad load – or a dirty storage tank – can lead to problems with the next several loads. Totes or Intermediate Bulk Containers (IBC's), often remain in supplier facilities for 2-3 months before they are shipped to feed mills and can arrive in poor condition. Oil seeds encounter the same issue as fats and oils as they are some of the slowest moving commodities for many suppliers.

Bagged feed has the added issue of long storage time and continually changing temperature conditions from the truck, to the warehouse, to the retail outlet and finally to wherever the final customer stores the bags – both before and after opening. No wonder high energy chick starter and horse feeds rich in flaxseed come back to your feedstores because “your feed just doesn't smell right.”



Controlling Mold Growth

Kemin, a pioneer in mold control, developed a full line of organic acid blends, each designed to control mold growth in feed and feed ingredients. **Myco CURB® Dry** Mold Inhibitor was developed specifically for controlling mold growth in bagged feed. Myco CURB Dry is a proprietary combination of three powerful organic acids and acid salts along with surfactants to aid feed preservation. In the simplest way we can explain the mode-of-action, moisture produced during mold growth activates Myco CURB Dry. Once the acid-salt bonds are hydrated (water added), the acids activate to stop mold growth. In this way, a small inclusion of Myco CURB Dry can control mold growth in a ton of feed, ever after the feed is bagged.

Kemin works with customers to design programs to help control mold growth in specific feed formulations. To best control mold growth, working with Kemin directly generates the best long-term results. However, if you know you have a low level of mold, the inclusion levels in the chart below (**Table 1**) is a good guide for application rates.

Table 1. Guidelines for application rate of **Myco CURB® Dry** per ton of bagged feed based on moisture¹

Storage Duration	Moisture Content, Percent by Weight		
	Below 15.5%	15.5 – 20.0%	20.1 – 30.0%
Up to 4 weeks	2 lbs./ton	4 lbs./ton	8 lbs./ton
Up to 6 months	4 lbs./ton	8 lbs./ton	12 lbs./ton
Up to 12 months	6 lbs./ton	12 lbs./ton	16 lbs./ton

Managing Oxidation

With over 50 years of experience in antioxidant formulation, Kemin has developed a full line of liquid and dry antioxidant systems designed for treatment of a wide variety of fats, oils and complete feed. **RENDOX® Liquid** Antioxidants are formulated to match the unique fatty acid profile of commonly used rendered fats and oils. Each RENDOX product contains a unique, synergistic blend of antioxidants, metal chelators and oil-based carriers, which help prevent lipid oxidation – thereby prolonging shelf-life and the nutritional value of fats and oils.

RENDOX® Liquid Antioxidant Systems					
Product	Standard Inclusion Rate	No Ethoxyquin Added	Animal Fats	Vegetable Oils	Blends
RENDOX® AET	2 lbs./ton		X		X
RENDOX® AT 20	1 lbs./ton	X	X		
RENDOX® CQ	2 lbs./ton	X		X	
RENDOX® RG	0.5-1.0 lbs./ton				X
RENDOX® AC	1-2 lbs./ton	X	X		

ENDOX® Dry Antioxidants are specifically developed by Kemin scientists for the treatment of finished feeds and vitamin/trace mineral (VTM) premixes. Each ENDOX product contains a unique combination of an inert carrier, coated with research-backed synergistic blends of synthetic antioxidants, metal chelators and surfactants. This ensures active ENDOX particles adequately distribute to improve shelf-life and protect feed from oxidation, vitamin degradation and more.

ENDOX® Dry Antioxidant Systems					
Product	Active Ingredients	Matrix	Standard Inclusion Rate		
			Feed	Dairy Cattle ²	Beef Cattle ³
ENDOX® Dry	EQ, BHA, BHT and citric acid	Complete Feeds	0.25 lb/ton	3.4 g/head/day	1.7 g/head/day
ENDOX® 5X Concentrate	EQ, BHA and citric acid	Vitamin/Mineral Premixes	27 g/ton	1.3 g/head/day	0.6 g/head/day

¹ For your specific feed formulations, contact the Kemin technical team at (800) 752-2864 or email at KeminAg@kemin.com.

^{2,3} Inclusion rates for dairy and beef cattle are calculated rates.