

BVS Poultry

Best Veterinary Solutions, Inc.

Fall 2012



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Poult Product Ingestion at the Hatchery

By: Michelle Behl, M.S., Hatchery Specialist
Willmar Poultry Company dba Ag Forte

The application of ingestible products at the hatchery is becoming increasingly popular in the turkey industry. These products fall into two main categories: direct fed microbials and coccidial vaccinations. Direct fed microbials are used to populate the gut with healthy bacteria before the poult reaches the farm. They help fight off pathogenic bacteria from populating the gut that negatively affect performance. Coccidial vaccines are given to jump start the cycling of the parasite with milder strains. Coccidia must cycle several times through the bird to elicit immunity. The earlier cycling ceases, the less of an impact coccidiosis has on performance.

Uptake or ingestion at the hatchery is comprised to two facets. The first being the role of the hatchery personnel in ensuring that the product is applied correctly and the product is made available for the poult to consume. The second facet is the role of the poult actively deciding whether or not it wants to ingest the product. The obvious goal would be to have 100% of the poults consume the product, but short of gavaging every bird, this goal is unrealistic. Uptake targets are to have 85-90% of the poults consume the product. Uptake is verified by the presence of dye on the tongue.

Promoting Ingestion- Hatchery Interventions

There are a few techniques that the hatchery personnel can do to promote the ingestion of products. Supplemental lighting, of at least 200 ft. candles, promotes preening and subsequent ingestion of products. Supplemental heat promotes poult activity by reducing the drop in core body temperatures typically seen with applying products. One of the last measures that can be done to promote ingestion is to allow the poults to rest between servicing and product application. Poults tend to be lethargic post servicing (sexing, claw treat, beak treat, and or injection). Although

continued on page 3

BVS

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and private-labeled water
soluble vitamins and
nutritional supplements!

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Get into the Manage Zone
Contains Buffered Acids
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Omegamune[®]

Omegamune[®] Plus

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Omegamune[®] GutStart

Acid SOL

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Starter Pak

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vitamins with citric acid*

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& electrolytes*

Solulyte

Balanced Electrolytes

Organic Iodine

Vitamin E

Dry Cider Vinegar

Citric Acid 410

Acidified Copper

Vitamin B Complex

Poultry Talk

As I write this article we're getting light snow in Minnesota! We learn to take what we get in regards to the weather, because we have no control over it. With that said most of the country experienced a lot of heat and drought this past summer and into the fall. Very few areas had a great corn crop. We were fortunate in Minnesota to have record corn and soybean yields, which were not expected! Most of the country had just the opposite.

This next year will be a challenge for those of us in production agriculture with higher feed costs and other inputs on the rise as well. Hopefully production will stay in line and the markets will keep up with our rising costs.

By the time that you receive this newsletter we will have had another presidential election and possibly (hopefully) a new President. We can't continue to be under the policies of an administration that thinks that higher fuel costs are a good thing to promote alternative energy. Energy affects everything that we do. We need a clear policy..... Not more of the same nonsense. We need to quit the over regulation that has gone on with the EPA and other agencies! Those type of policies are silent taxes that end up getting passed onto everyone and are very inflationary in regards to what everyone pays for energy and

food.

As we approach the Thanksgiving holiday, I am thankful that we still live in the greatest country on the face of the earth. We do have the opportunity to change who is in public office in the voting booth. That we can debate the issues and make the changes that our country needs to make and to remain the greatest country in the world. Yes, I do believe in American exceptionalism! The United States of America is an exceptional country, which has done much to further democracy, world economics, industry, technology, and of course agriculture. We are the only country that can truly feed the world..... I only hope that over regulation doesn't make that something that we use to do.... I firmly believe that this country will not fully appreciate the American farmer until they're starving a little. We take so much for granted and expect that food will always be plentiful.

As we sit down for Thanksgiving dinner let's give thanks to God for all that He has provided to us and this great country!

I hope that everyone has a great Thanksgiving and Christmas!

Till next year and God Bless!

Randy



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Poult Product Ingestion, *continued from cover*

logistically this may be difficult to do in large commercial operations, increased uptakes are seen if poultlets have had a chance to rest prior to application.

Uptake - Poult's Role

Hatchery personnel can provide all necessary interventions such as waiting to apply the product and supplying supplemental heat and lighting to the poult, but it does not guarantee that optimal uptake will be achieved. The poult still needs to actively consume the product. There are several factors from a poult's standpoint that affect uptake. These factors include hatch timing, poult behavior, poult size, and product presentation or poult preference.

Hatch timing plays a large role in uptakes. "Green" or later hatching poultlets tend to be more lethargic and show little interest in preening. Early hatching poultlets tend to be more aggressive and often times consume the product very quickly. Although uptakes with less hydrated poultlets may be very high, the poult will not be able to be transported for long distances without adverse effects. It is a fine line between hatching green and hatching early. Hatch timing targets also vary between hatcheries. Hatcheries that must ship poultlets long distances target a more hydrated poult in order to provide hydrated product at delivery. Hatcheries that tend to have mostly local same day deliveries target a normally hydrated poult. This target helps provide a premium product to local customers as well.

Even when all things are equal, there are differences in behavior amongst poultlets of similar yield or hatch timing. Certain poultlets will peck and preen aggressively while others will passively sit there. This is due to the inherent nature of that individual poult. Therefore some poultlets may not consume any of the product and some poultlets may over consume the product. This subsequently results in uneven uptakes. Uneven uptake impacts coccidial vaccine cycling.

Breeder flock age plays a role in uptakes as well. Poultlets from younger production flocks tend to chill easier and have a tendency to pile after application, therefore reducing uptake and poult quality. This may be due to the simple fact that egg size and poult size tends to increase as the hen ages. Poultlets from younger production hens have a smaller body mass than poultlets from older production hens. Products are given based on number of poultlets and not on body weight; consequently the smaller poultlets get more product per poult than larger poultlets. The lower body mass and increased product per poult results in lower body temperatures.

Product presentation may affect uptake. Poultlets have preferences to certain product applications and product colors. Research has shown that under the same conditions, poultlets prefer gel droplet as opposed to a water spray droplet. Water

based products tend to soak into the poult's down rather quickly, while the gel droplets tend to sit on top of the down for an extended period of time. The water spray applications have a tendency to drop the body temperature of the poult as much as 2°F more than with a gel droplet. This may partially explain the droplet preference. Poultlets are partial to products that are dark green, as opposed to other colors. Although uptakes can be good with red products, uptakes are even better with green products. New products such as Spray-Vac® Spectrum, which utilizes the bird's ability to see in various spectrums, may provide superior results.

Applying direct fed microbials and or coccidial vaccines at the hatchery have been shown to have beneficial results. They are key components to an overall good gut health program. Uptake or ingestion is dependent upon the hatchery personnel and the poult itself. The hatchery personnel make the product available to the poult in the most favorable environment. The poult must decide to consume that product regardless of hatch timing, behavior, poult size, or product presentation. ●



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For more information, contact Animal Science Products, Inc. at 1-936-560-0003.

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PWT is a registered trademark of the Jones-Hamilton company in the U.S. and other countries.

INNOVAX®-ND

TSP-V-048278 2000 dose ampules
TSP-V-116951 4000 dose ampules

Marek's Disease - Newcastle Disease Vaccine

(Serotype 3, Live Virus, Live Marek's Disease Vector)

INNOVAX®-ND is a frozen, live, cell-associated Newcastle disease (ND) and Marek's disease (MD) vaccine. It provides proven protection against virulent NDV and MD. It is approved for *in ovo* injection of 18-day embryonated eggs.



Advantages:

- Provides extended protection for virulent ND and MD
- Offers effective protection in the face of NDV maternal antibodies
- Replaces a conventional live ND vaccination program in the absence of exotic ND
- Removes the potential for respiratory reactions due to live ND vaccines
- Allows the use of monovalent infectious bronchitis (IB) vaccines, improving IB protection

NEWHATCH-C2®

TSP-V-053805 10,000 dose vials

Newcastle Vaccine

(B₁, Type, C2 Strain, Live Virus)

NEWHATCH-C2® is the patented, virtually nonreactive C2 strain of B₁ Type Newcastle disease (ND) virus. It is a lyophilized vaccine approved for spray vaccination of chickens one day-of-age or older for protection against Newcastle disease.

Advantages:

- Effective against field challenge of Newcastle disease virus
- C2 strain of B₁, Type Newcastle minimizes reaction to one day-of-age vaccination in broiler chicks
- NEWHATCH-C2 eliminates problems with lingering hatchery reaction prior to field boost
- Safe to use for hatchery application



ORALVAX-HE®

TSP-V-065396 5 x 2000 dose vials
TSP-V-065398 5 x 5000 dose vials

Hemorrhagic Enteritis Vaccine (Live Virus)

ORALVAX-HE® vaccine is a high titer vaccine that safely protects turkeys 6 weeks of age or older against the immuno-suppressive effects and death losses caused by hemorrhagic enteritis.

Advantages:

- Safe and efficacious: produced with a stable and avirulent strain of type II avian adenovirus of pheasant origin
- Produced under federal quality control standards, ensuring purity and sterility
- Consistent high potency titers to ensure protection of every vaccinated bird, flock after flock
- Recommended administration at 6 weeks of age or older helps assure no maternal antibody interference



NEWCASTLE CLONED N-79

TSP-V-066953 1000 dose units

Newcastle Disease Vaccine

(B₁ Type, clone-selected LaSota Strain)

(Live Virus, Chicken Embryo Origin)

Newcastle Cloned N-79 is a live virus vaccine of chicken embryo origin containing a clone-selected B₁ Type, LaSota strain Newcastle disease virus. This virus has the ability to stimulate protection against a wide variety of Newcastle field strains while causing a milder reaction, in healthy chickens and turkeys, than other LaSota strain vaccines.

Advantages:

- Clone-selected LaSota strain stimulates strong immunity against Newcastle disease, while producing only mild reactions
- Product of choice for immunization of turkeys against Newcastle disease
- May be used to revaccinate broilers in areas with strong Newcastle disease challenge



BVS is the exclusive distributor and marketer of Schering-Plough turkey vaccines in the U.S.

PM-ONEVAX®-C

TSP-V-065417 1000 dose units

Pasteurella multocida Vaccine

(Avirulent Live Culture, Avian Isolate)

PM-ONEVAX®-C vaccine. The seed culture used to make this vaccine has been laboratory tested for protection of chickens against challenge with the X-73 (Type 1) strain of *P. multocida* and in turkeys against challenge with the P1059 (Type 3) strain of *P. multocida*.

Advantages:

- A temperature sensitive mutant of the CU strain that produces stronger takes than the M-9 strain, but less than the CU strain
- Offers protection against naturally occurring field strains of *P. multocida*
- Easy wing-web administration in broiler breeders, layers and turkey breeders



ART VAX®

TSP-V-065236 1000 dose units

Bordetella avium Vaccine

(Avirulent Live Culture)

ART VAX® vaccine is a live bacterial vaccine containing a chemically induced mutant of *Bordetella avium* which is immunogenic for turkeys when vaccinated by spray cabinet at day of age; then revaccinated in the drinking water at 2 weeks of age.

Advantages:

- Approved for spray administration at day of age followed by drinking water at 2 weeks of age
- Proven efficacy in preventing coryza in turkeys
- Time proven. This vaccine strain has been used effectively in the field for over twenty years
- Mild reaction
- Freeze dried product of proven quality and stability



M-NINEVAX®-C

TSP-V-065378 1000 dose units with diluent and wing-web stabbers

Pasteurella multocida Vaccine

(Avirulent Live Culture, Avian Isolate)

M-NINEVAX®-C vaccine is a live bacterial vaccine containing the mild avirulent M-9 strain of *Pasteurella multocida*, Heddleston Type 3-4 cross, in a freeze-dried preparation sealed under vacuum.

This vaccine strain has been shown to offer protection against fowl cholera in chickens and turkeys. The seed culture used to make this vaccine has been laboratory tested for protection in chickens against *P. multocida* serotype 1 and in turkeys against challenge with *P. multocida* serotype 3.

Advantages:

- Strong protection against *P. multocida* serotype 1 (chickens) and serotype 3 (turkeys)
- Mild. Less reactive than competitive products
- Safe. Avirulent live culture will not revert to virulence, will not cause mortality
- Specially formulated diluent provides excellent reconstitution stability



STUDY RESULTS: CAGED LAYING HENS

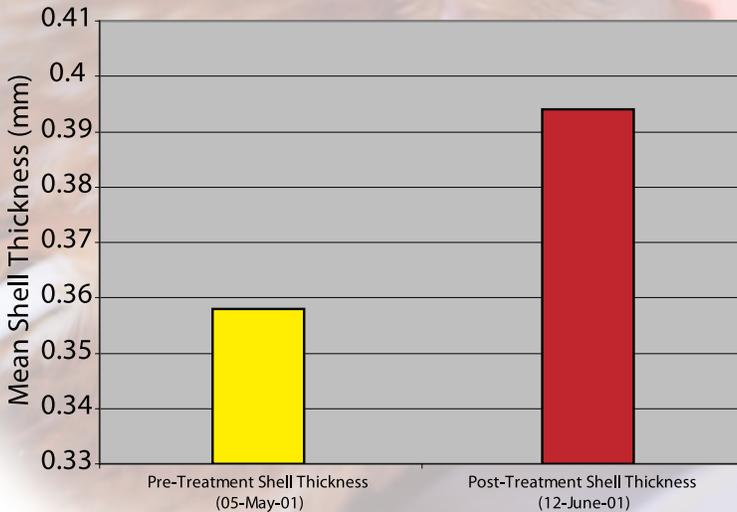
Source of diatomaceous earth used in studies: **RED LAKE DIATOMACEOUS EARTH**



Effect of 2% Red Lake Earth in Poultry Feed on Egg Shell Thickness

Andy Maganga BSc. MPM, Ecorational Technologies Inc.

Egg Shell Thickness Before and 2 Weeks After the Start of Red Lake Earth Inclusion in Feed



Caged Layer Birds were fed diets containing 2% Red Lake Earth for a period of four months.

Results: Eggs collected from RLE fed birds had significantly thicker shells (0.394 mm) two weeks after the start of inclusion compared to the thickness of eggs collected from the same flock 4 days before the start of inclusion (0.358 mm).



Read the full study at www.absorbentproductsltd.com/RLE-Egg-Shell-Thickness-Study.pdf or SCAN THE QR CODE above.

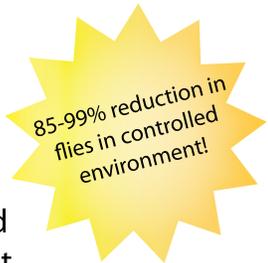


Effect of Addition of 2% Red Lake Earth® Diatomaceous Earth to Caged Layer Poultry Diets on House Fly Populations

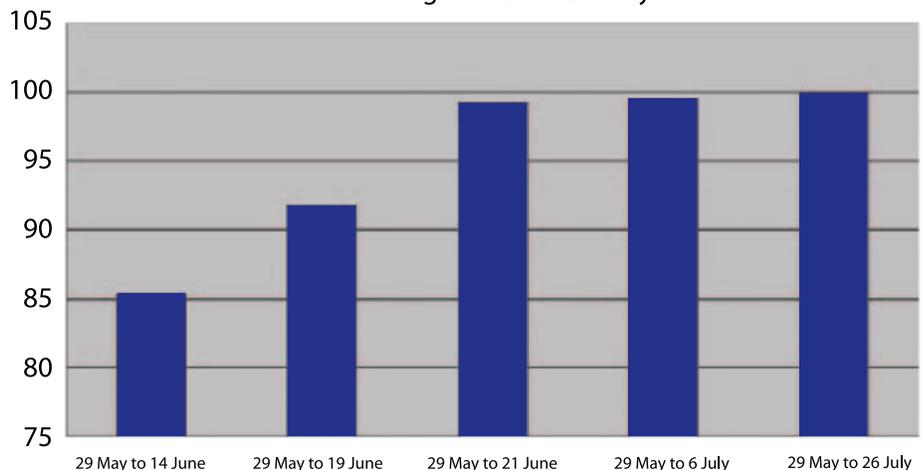
Andy Maganga BSc. MPM, Ecorational Technologies Inc.

Caged Layer Birds were fed diets containing 2% Red Lake Earth (RLE) for a period of four months.

Results: Significant reduction in fly populations in controlled environment (barn housing DE-fed birds).



Percent Decline in Fly Populations in Treatment Barn after Reaching a Peak on 29 May



Read the full study at www.absorbentproductsltd.com/RLE-House-Fly-Study.pdf or SCAN THE QR CODE above.

BARN FRESH for use in ORGANIC PRODUCTION

STUDY RESULTS: BARN FRESH VS. HYDRATED LIME & LIMESTONE (Ca)



For additional protection, TRY Barn Fresh Plus with Moisture Activated Scencing Agent and Antimicrobial to help control the growth of bacterial odors.

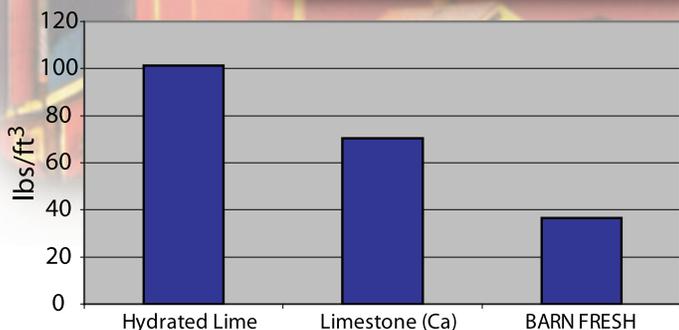


OMRI
Listed
for use in organic production



Hydrated Lime vs. Limestone (Ca) vs. Barn Fresh Bulk Density Testing

tested by Absorbent Products Ltd.



Barn Fresh provides nearly 3x more coverage per bag!

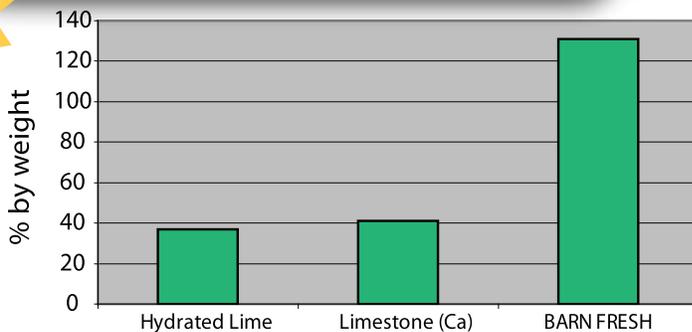
When compared to Hydrated Lime and Limestone (Ca), Barn Fresh provides significantly more coverage per bag, offering more value for your dollar!

Hydrated Lime vs. Limestone (Ca) vs. Barn Fresh Absorption Testing

tested by Absorbent Products Ltd.

Barn Fresh absorbs over 3x more liquid!

Barn Fresh absorbs substantially more liquid than both Hydrated Lime and Limestone (Ca)!



Barn Fresh can be used in large poultry and livestock operations.

Barn Fresh is non-caustic, non-toxic and is safe to use on concrete, wood, metal, rubber or dirt surfaces.

DIRECTIONS FOR USE:

For best results begin with initial application -

Large Surface Areas: Use an applicator designed for applying granular product to large area (drop-style fertilizer spreader or small tractor seeder/spreader). Sprinkle a light layer of Barn Fresh (like a light layer of sugar or salt) throughout the entire penned area. Re-apply Barn Fresh as needed.

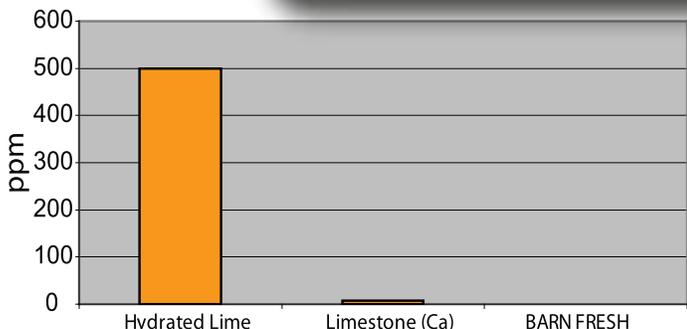
Marked, soiled or heavily wet areas: Sprinkle a handful of Barn Fresh directly on "marked" area. Let sit, there is no need to remove.

APPLICATION RATE: Apply at a rate of up to 40 lbs per 500 ft² (18 kgs per 45m²) to the entire surface area being treated. Repeat applications around feeding and watering stations and where manure and moisture accumulates on a one to two week rotation.

Hydrated Lime vs. Limestone (Ca) vs. Barn Fresh Ammonia Odor (after 24 hours)

tested by Absorbent Products Ltd.

Zero ammonia detected after 24 hours!



After 24 hours, zero ammonia was detected when using Barn Fresh!

For more information visit www.absorbentproductsltd.com/BarnFresh or SCAN THE QR CODE above.

PRODUCT INFORMATION



BIOSUPREME®

Is a natural feed ingredient for livestock and poultry used to control odors, ammonia and other gas emissions, which can be detrimental to livestock performance. Is a 100% natural product, manufactured from pulverized *Yucca schidigera* plant, which is native to Baja California, Mexico.

Our Food Safety Management System is the most important basic principle in our production and in the marketing of our products. This innocuous process must comply with strict international standards for quality and organic certification as well as an integrated system of checks and balance to assure quality and continuous improvement (HACCP, ISO 22000:2005, GMP+, B2 and B3).

BIOSUPREME is produced by Baja Agro International S.A. de C.V., the only manufacturer of *Yucca schidigera* extract, that harvests the plant in its own ranches and those of its associate farms. This assures the highest quality products offered on the international market.

SPECIFICATIONS

Content	Pure <i>Yucca schidigera</i> ⁽¹⁾ powder
Appearance	Free flowing powder
Color	Light beige
Odor	Sweet
Density	550 – 650 g/L
pH (10% AQ solution)	4.0 ± 0.5
Toxicity	Non toxic
Shelf life	Min 48 months at room temperature
Heat stability	Excellent
pH stability	Excellent
Packaging	55 lbs (25kg) Box

ANIMAL FEED INGREDIENT

APPLICATIONS

Improvement of animal feed

Research in several universities, in addition to many successful trials and studies that have been conducted on farms worldwide, show that the use of *Yucca schidigera* extract in animal feed improves the health conditions of turkeys, broilers, chicken layers, ducks, geese, quails and pheasants by reducing the emission of ammonia and odor.

Synergy

Research indicates that there are additional secondary benefits from inclusion of *Yucca schidigera* extract in feeds, specifically, an increase in animal weight gain and better feed utilization.

Gas reduction

Reduces ammonia and other irritant gases in confined buildings, this creates healthier living conditions, including lower stress levels, helping to improve feed utilization and growth rates.

Odor reduction

Reduces waste odor, creating a better environment for animals, employees, visitors and neighbors.

Economical

Is one of the most cost-effective products to add for improved performance, allowing producers to maximize returns.

SUGGESTED USAGE LEVELS

POULTRY	onces per ton
Turkeys	4 - 16 oz
Boilers	4 - 16 oz
Chiken Layers	4 - 16 oz
Ducks	4 - 16 oz
Geese	4- 16 oz
Quails	4- 16 oz
Pheasants	4- 16 oz



BIOSUPREME® L

FOR USE IN DRINKING WATER

SPECIFICATIONS

Content	<i>Yucca schidigera</i> ⁽¹⁾ concentrate liquid extract
Appearance	Dark Brown
Color	Sweet
Odor	Sweet
Density	1.10 ± 0.05 (25° C/25° C)
pH (10% AQ solution)	4.0 ± 0.2
Toxicity	Non toxic
Shelf life	Min 24 months at room temperature
Heat stability	Excellent
pH stability	Excellent
Packaging	2.5 gallons plastic jugs

APPLICATIONS

Animal drinking water

Adding to the drinking water of poultry will reduce the level of ammonia in the animal's digestive track and in the litter thereby reducing the level of ammonia in the poultry houses.

Broiler beds

Spraying over broiler beds will reduce the ammonia and other toxic gases, as well as accelerate the organic matter degradation of the litter.

SUGGESTED USAGE LEVELS

Broiler beds

Spray 6 oz per 1000 square feet twice a week over the litter until odor and toxic emanations are reduced.

Recommendations

The use of **BIOSUPREME L** can be stopped when desired ammonia or odor level is achieved, but it is recommended that **BIOSUPREME** be added in the animal's feed on a continuous basis to reduce noxious ammonia levels.

To obtain an even product distribution, it is recommended to dilute **BIOSUPREME L** in water at a ratio of 10 to 1, or as needed.

Application in animal drinking water

Broilers, turkeys, chicken layer, ducks, geese, quails and pheasants. 8 oz per 1000 gallons of water.

(1) *Yucca schidigera* is approved by the U.S. Food and Drug Administration as a natural food adjuvant under Title 21 CFR 172.510.

(2) Due to the natural composition of the extract, its contents may vary throughout the year; therefore, this is an average approximate analysis.



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INNOVAX®-ILT Vaccine



Professional producers know that ILT can have a great impact on time, labor and production costs. And most methods of protection against ILT can present other problems for your flock.

But healthy day-old chicks treated with INNOVAX®-ILT show no adverse reaction to the vaccine. Because INNOVAX-ILT does not use conventional live ILT virus, the potential for vaccine induced outbreaks is eliminated.

So protect your flock from ILT without adverse reaction. With INNOVAX-ILT.

For more information, contact your Intervet/Schering-Plough Animal Health sales representative or vaccine distributor.

innovax[®]
ILT

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6 **BENEFITS** IN 1 SINGLE SHOT

- 1 INNOVATIVE:** Utilizes modern vectored technology.
- 2 SAFE:** Does not cause bursal damage¹.
- 3 EFFECTIVE:** Provides broad-spectrum protection against IBD and MD².
- 4 EASY TO ADMINISTER:** Administered in ovo or subcutaneously in the hatchery.
- 5 CONVENIENT:** Single hatchery vaccination eliminates field vaccination.
- 6 RELIABLE:** Highest quality product and support from the leading MD vaccine manufacturer.

¹ Merial Study 05-170MS, data on file
² Merial Studies (03,MD-04-07, (02,MD-05-08, (03,MD-06-06, (03,MD-07-08, (03,MD-10-09, (03,MD-11-08, (03,MD-12-08, (03,MD-13-09, (02,MD-04-09, (03,MD-05-09, 06,319, data on file)



Value Beyond The Label. Don't Just Choose A Product, Choose A Company.

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Waterline delivered turkey vaccines -
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HE Vac (1,000 & 5,000 dose)

Ery Vac FD (1,000 dose)

Nitro-Chol (1,000 dose)

Snick Guard (1,000 dose)

Autogenous Vaccines



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Barnes Paper

- ✓ "A" & "B" Flute Brooder Guard Feed Paper
- ✓ 12" Water Line Paper
- ✓ Jumbo Corrugated Feed Lids
- ✓ Disposable Feed Lids
- ✓ Red & Gray Plastic Feed Lids
- ✓ Egg Cases and Egg Flats



Significant Profit Losses Seen from Ammonia-Caused Performance Decline

Ammonia is the most common cause of performance loss on broiler and turkey farms in terms of body weight gain and feed conversion. Extensive research has shown that ammonia levels as low as 25 PPM can cost growers at least 19 points of weight per bird which equates to a loss of \$209 per house. Interior ammonia levels are rarely below 50 PPM so the costs of ammonia quickly add up. The ammonia levels that cause a loss of weight and feed conversion are much lower than the ammonia levels necessary to cause visual changes in a bird. Performance is greatly reduced by exposure to 50 PPM, but birds do not show signs of blindness until ammonia exceeds 100 PPM. Unfortunately, many growers and live production personnel do not respond to ammonia until they see

blind birds. However, by the time blind birds are present, the damage has already been done in terms of performance. Proper litter management is the best way to prevent ammonia losses.

The Source of Ammonia Troubles

Ammonia is readily released from the litter as a gas at a rate determined by the surface area and litter temperature. Aggressive litter handling during downtime or tilling during the grow-out increases surface area which releases more ammonia. This is why houses with fine, dusty litter can have such high ammonia concentrations at bird level. It is important to keep litter moisture and other litter characteristics in the middle

of the bell curve (not too dry and not too wet) in order to reduce the speed at which ammonia is released from the litter surface. Ammonia levels an inch beneath the litter surface are an indicator of what the litter will release over the next few days. Very fine, dusty litter often has deep litter ammonia concentrations over 600 PPM, whereas properly de-caked litter with a larger particles rarely exceeds 150-200 PPM of deep ammonia. Excessive moisture within a house or improper de-caking and litter handling will encourage ammonia production and release. Proper litter management, litter amendment use and ventilation to maintain ammonia levels below 25 PPM should be followed at all times to prevent performance losses.

Male broiler response to low levels of atmospheric ammonia

NH ₃ (ppm)	BW ¹ (g)	Weight depression		Feed/gain ¹	Mortality ¹ (%)	Yield ² (%)	
		(g)	(%)			Overall	Breast meat (pectoralis major + minor)
4 Weeks							
0 (near)	1,421 ^x	–	–	1.53 ^x			
25	1,395 ^x	26	2	1.52 ^x			
50	1,178 ^y	243	17	1.62 ^x			
75	1,128 ^y	293	21	1.62 ^x			
7 Weeks							
0 (near)	3,211 ^x	–	–	1.93 ^x	5.8 ^{xy}	73.2 ^x	19.8 ^x
25	3,202 ^x	9	0.3	1.91 ^x	2.8 ^{xy}	73.0 ^x	19.7 ^x
50	3,004 ^y	207	6.4	1.98 ^x	10.6 ^{yz}	72.7 ^x	19.0 ^x
75	2,920 ^y	291	9.0	1.97 ^x	13.9 ^z	72.4 ^x	19.0 ^x
SEM	(61.6)			(0.11)		(0.31)	(0.34)

^{xz} Means within a column lacking a common superscript differ (P ≤ 0.05).

¹ There were 4 observations per mean for the near 0 treatment and 3 observations per mean for the 25, 50, and 75 ppm treatments. In the first trial, mechanical problems with ammonia control required 3 chambers (one each of the 25, 50, and 75 ppm treatments) to be discontinued.

² Yield observations per mean for the near 0, 25, 50, and 75 ppm treatments were 160, 107, 151, and 144, respectively.

Table 1. Performance Losses due to Ammonia Exposure the First Four Weeks of Grow-Out, (Miles et al. 2004)

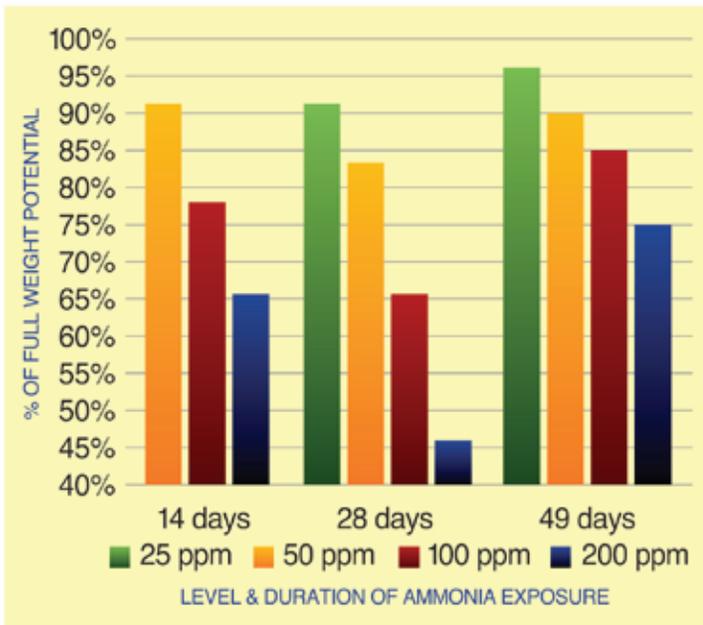


Figure 2. Body Weight Changes with Ammonia Exposure (Miles et al 2002)

Ammonia’s Impact on Bird Performance

While high levels of ammonia can be detrimental to bird performance at any stage, poultry are most susceptible to ammonia insults during the first four weeks of life. Several studies over the last few years have shown the costly impact of ammonia exposure on bird performance.

In one study (see Table 1), birds exposed to 50 PPM of ammonia for the first four weeks and no ammonia thereafter were 6.4% lighter and birds exposed to 75 PPM were 9% lighter than birds exposed to only 25 PPM. Ammonia levels of 75 PPM or greater during the first four weeks of life are quite common (even in the summertime) in houses not using a litter amendment at the beginning of each flock.

Controlling Ammonia with Litter Management

Prevention of ammonia release is the key to maximizing bird performance. This is done through proper litter management during the down time and in the grow-out house and proper usage of a litter amendment to lower litter pH and convert volatile ammonia into a stable fertilizer: ammonium sulfate. Using an acidic litter amendment just prior

to bird placement or immediately after tilling brings ammonia levels down below 25 PPM houses to be minimally ventilated for relative humidity control. On farms where birds are released from the brood chamber before they are 14 days old, the litter amendment should be applied in the whole house to prevent production losses from ammonia.

Taking Action Against Ammonia: The Bottom Line and Smart Steps

20 years of research has shown the effects of ammonia on bird weight (Figure 2). At 50 PPM, birds lost ½ lb in weight causing a substantial production loss for any grower or integrator. According to this same study, birds challenged with ammonia lost 8 points of feed conversion. With feed at \$325+/ton, the loss of feed conversion on 20,000 birds will cost \$1,690. The loss can reach as high as \$84,500 per week for a million bird complex. In addition to applying a litter acidifier according to manufacturer’s directions, simple steps have been defined to avoid ammonia-induced performance losses:

- Take ammonia readings no more than one inch above litter.
- Remove all cake between flocks, but do not till.
- Pre-heat properly before bird placement to complete the ammonia purge from the litter.
- Maintain relative humidity between 50-70% during minimum ventilation.
- Properly manage water lines to avoid wet litter. ●



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Net Weight: 4.0 oz. (113.4 grams)

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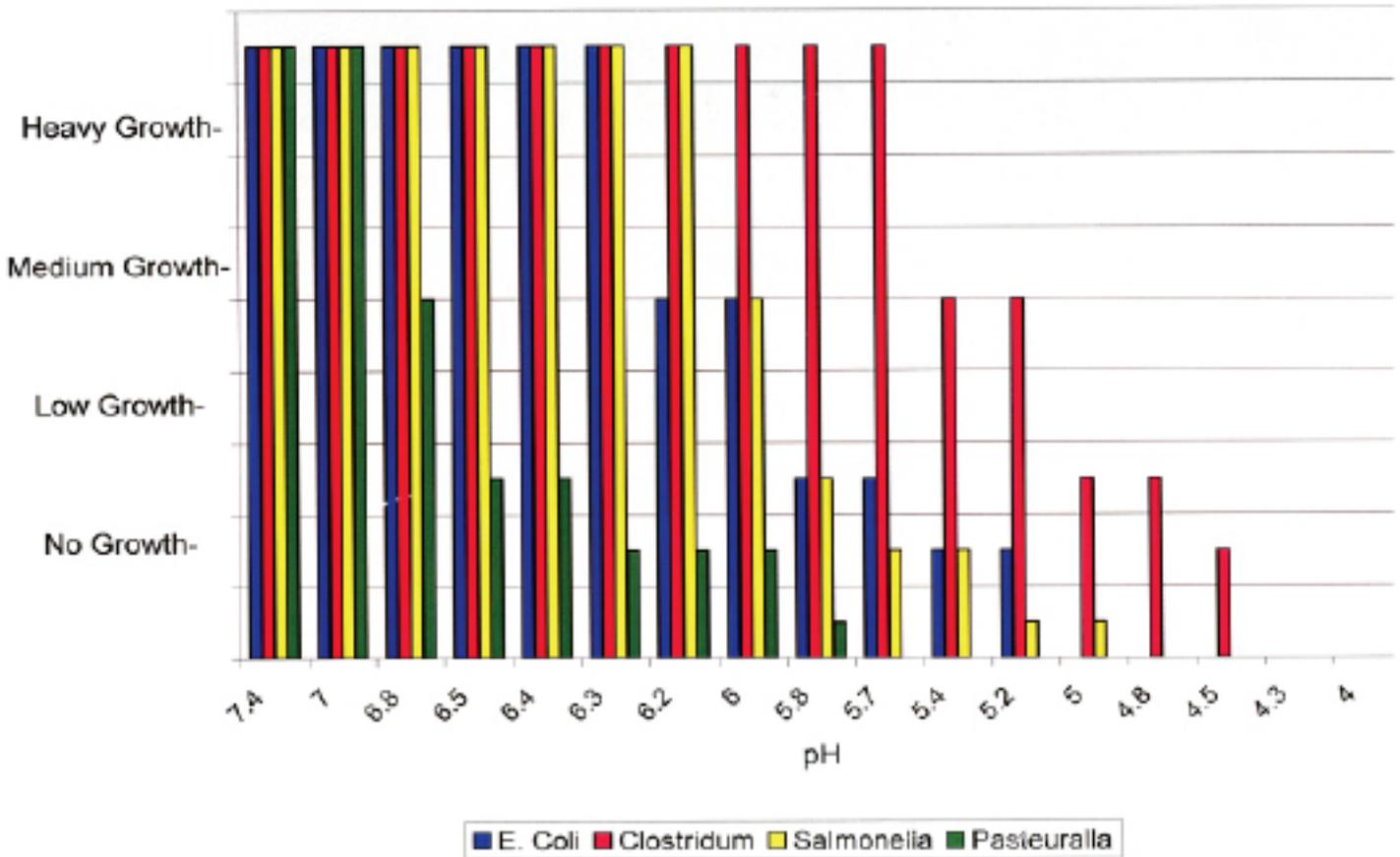
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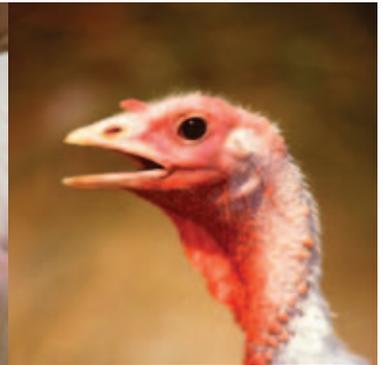
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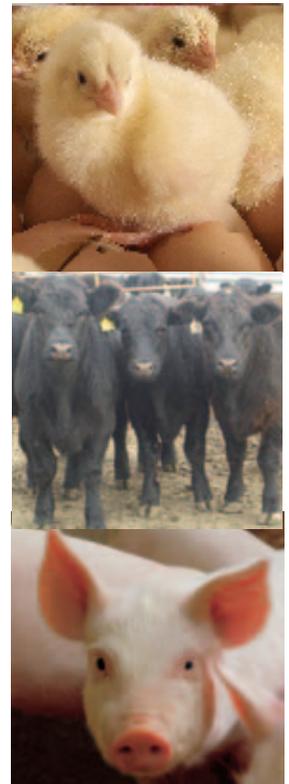
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What you need to know about rodent control

By Wiebe van der Sluis

Elimination of rats and mice from livestock and poultry barns is extremely difficult. Most of the time they reproduce faster than you can eliminate them. Therefore it is preferable for producers to prevent infestations from occurring.

Rats and mice have long been a problem on farms where food and nesting sites are plentiful. These animals consume and contaminate food destined for livestock and other animals, as well as humans. **Each rat** on a farm will eat, spoil or damage approximately **€20 worth of grain per year**, says Brian Lang of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). He studied the rodent problem and wrote an interesting paper on it. In the following we take with permission a closer look at some of his findings and advice for control.

Why control Rodents?

The adaptability and agility of rodents make getting rid of them particularly difficult and damage comes in many forms:

- **Damage to buildings** - Mice and rats will damage wood and electrical wiring, which can be a fire hazard.
- **Destruction of insulation** - Many facilities show serious deterioration within five years, resulting in increased energy costs, re-insulation costs and poorer feed conversions by animals.
- **Feed consumed** - **100 rats will consume over one tonne of feed in one year.**
- **Feed contaminated** - A rat can contaminate 10 times the amount of feed it eats with its droppings, urine and hair. A rat produces 25,000 droppings per year. a mouse 17,000.
- **Biosecurity** - Rodents are recognized as carriers of

approximately **45 diseases**, including **salmonella, pasteurellosis, leptospirosis, swine dysentery, trichinosis, toxoplasmosis and rabies.**

Understanding rodents

Mice and rats have tremendous breeding potential. Under ideal situations, **a pair of rats and their offspring can produce 20 million young in three years. Mice reproduce even faster.** One female mouse can give birth to five to 10 litters per year, yielding five to six young per litter. The gestation period is a mere 19 to 21 days. These babies are sexually mature in six to 10 weeks. The average female mouse lives to be nine months. One female rat is capable of producing another 22 breeding females in a year (assuming a 50:50 male/female ratio of offspring), which matures in three months after

parturition.

Rats and mice have poor eyesight but excellent senses of smell, taste, touch and hearing. They do not like open areas and prefer contact with walls and other objects. They do not range far from the nest. **The maximum range for rats is 45 metres (148 feet), for mice nine meters (30 feet).** Rats are extremely apprehensive about new objects and will avoid them for several days. Leaving a trap out for about five days is necessary to ensure acceptance. Mice quickly accept new objects. These tendencies become very important when designing baiting or trapping programmes.

Is it a rat or a mouse problem?

Since rats and mice require different control strategies, therefore determine whether the problem is rats or mice (*Table 1*). The simplest way to differentiate between the types of infestation is by examining the droppings. Mouse droppings are black and rice-kernel size, whereas rat droppings are black and bean-sized.

Rats and mice are considered to be omnivorous. Given a choice, they prefer cereal grains. However, when food

Signs of rodent infestation:

- Sounds - Gnawing, climbing noises in walls, squeaks.
- Droppings - Found along walls, behind objects and near food supplies.
- Burrows - Rat burrows are indicated by fresh diggings along foundations, through floorboards into wall spaces.
- Runs - Look for dust-free areas along walls and behind storage material.
- Gnawing marks - Look for wood chips around boards, bins and crates. Fresh gnawing marks will be pale in colour.
- Rodent odours - Persistent musky odours are a positive sign of infestation.
- Visual sighting - Daylight sighting of mice is common. Rats are seen in daylight only if populations are high. Quietly enter your barn at night, wait in silence for five minutes and listen for the sound of rodent activity. Look around with a powerful flashlight; rat eyes will reflect the light.
- Smudge marks - These may be found on pipes or rafters where dirt and oil from their fur leave a greasy film. It is a generally accepted rule of thumb that there are approximately 25 mice or rats for every one that is seen.

Table 1 - Physical and behavioral characteristics of adult rats and mice.

Characteristic	Norway Rat	Mouse
Size (including tail)	42 cm (16.5 in.)	16 cm (6 in.)
Average weight (adult)	500 gm (18 oz)	20 gm (0.7 oz)
When active	nocturnal	nocturnal
Sight	poor (1.5 m) (4.9 ft)	poor (1 m) (3 ft)
Smell, touch, taste	excellent	excellent
Hearing	highly accurate	highly accurate
Range from nest	45 m (148 ft)	9 m (30 ft)
Fear of new objects	3-7 days	3-5 hr
Water requirements	daily	2-4 days without
Food per day	28 gm (1 oz)	3 gm (0.1 oz)
Water	57 gm (2 oz)	3 gm (0.1 oz)
Favourite foods	rolled oats, meat, fish, vegetable oil	grains, rolled oats, sugar, raisins
Droppings	bean size	rice size
Minimum width for entrance (hole diameter)	12 mm (0.5 in.)	6 mm (0.2 in.)
Can chew through (given edge to gnaw on)	rubber, aluminium, cinder blocks, plastic, wool	same as rats

supplies are scarce, they will eat almost anything. Rats and mice eat every day. Rats usually drink every day, but mice can survive several days without water.

Rodent control principles

Rodent control requires an integrated pest-management strategy involving many techniques. The producer's first objective should be to prevent, or at least greatly reduce, rodent numbers through management programmes that **eliminate entrance** to the facility, **nesting sites** for the rodents, **food supplies and water**.

To control mice and rats, we have to understand their habits and biology first. Mice and rats are similar in their habits and biology, although there are some differences between the two:

- Both are highly reproductive and extremely capable of surviving in all kinds of conditions.
- On farms, mice and rats will be near a food source such as barns, granaries, livestock buildings and silos.
- Rats and mice can climb and jump. Rats can jump vertically as high as 91 cm and horizontally as far as 122 cm.
- Mice and rats can climb brick and other rough walls, and travel along utility wires.
- Rats can cross (sneak in) through openings as small as 1 cm and mice can squeeze through openings of 0.6 cm, or less, in diameter.
- Both mice and rats are active at night, particularly right after dusk.
- Rats are smart and tend to avoid new objects. Therefore, it may take a few days for traps and baits to work.

Rodent-proofing farm buildings

Proper construction and maintenance of buildings helps prevent rodents from entering your barn. Examine your building at least once a year for possible entry ways for rodents. Cracks around door frames, under doors, broken windows, water and utility hook-ups, vents and holes surrounding feed augers are all potential points of entry. Use coarse steel wool, hardware cloth or sheet metal to cover any entrances. Do not use plastic, wood or insulation, as rodents simply gnaw their way through.

A well maintained structure is the first defence against rodents. Most rodents enter the barn directly from the fields, then the population builds. It is also important to maintain **good sanitation outside the barn to not attract rodents**.

Eliminate vegetation for one metre (three feet) around buildings, clean up spilled feed, remove loose wood, garbage, etc. Rodents do not like to be exposed. Maintain sound housekeeping, eliminate loosely piled building materials, old feed bags or anything else that a rodent can hide in or under. Look for entrances into double wall or roof constructions because most rodents like to nest there in the insulation. Block off all entrances into walls and destroy all nesting material.

Control of existing population

If there is already a rodent problem inside the barns, prevention alone will not solve the problem. In this case, consider a population-reduction programme. Traps - For small populations, snap traps or box traps are very useful for eliminating rodents. **Rats prefer fresh bacon, fish and meat, while mice favour cheese, peanut butter or seeds.** Try several baits to find out which your rodents prefer. Rats are distrustful of anything new in their environment, so leave baited non-set traps out for four to five days to allow them to get used to the traps. Ensure that previous baits have been taken before actually setting the traps.

Locate traps close to walls, behind objects, in dark corners, where you see droppings or gnaw marks. When trapping next to a wall, set the trap at right angles to the wall with the trigger and bait closest to the wall. Orient multiple-catch traps

with the entrance hole parallel to the wall. Live traps can work very well near runways used by mice and rats.

For barns and poultry houses with moderate infestations, set 50 to 100 traps. The trapping programme should be short and decisive to prevent trap shyness. Odours from humans or previously caught rodents do not cause trap shyness. Glue Boards - Glue boards are very effective against mice and are the method of choice in locations where toxic baits are a concern. **Glue boards will not work well if there is too much dust.** They are only recommended where dust can be kept away from them. Check glue boards and traps daily and remove and dispose of dead mice and rats. Wear rubber gloves when handling them to prevent any chance of disease infection.

Rodenticides (toxic baits) - There are two basic types of rodenticides: **acute poisons and anti-coagulants**. Use rodenticides when control of moderate-to-large rodent populations is necessary. Many of the newer anti-coagulant products, i.e. **bromadiolone** and **brodifacoum** require single feedings by rodents to cause mortality. Occasionally, rodents may develop a bait shyness after being made sick but not killed by a rodenticide. **The shyness develops to the bait carrier, e.g. grain, and not to the rodenticide.** Simply use another formulated product or different attractant if bait shyness develops. **For rats, pre-bait using baits without the poison** for about one week to get them accustomed to the bait. Place baits in areas of high rodent activity. Many people under-bait in their control programme. Baits should be 1 to 2 metres (3 to 6 feet) apart for mice and 7 to 10 metres (23 to 33 feet) for rats. Remove all uneaten baits and properly dispose of them after the poisoning programme.

When using rodenticides safety measures should be taken. Ideally, cover all baits to prevent consumption by children, cats, dogs and poultry. This can be done by placing baits in bait stations or bait boxes that allow ready access by rodents but prevent larger animals from gaining access.

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Who's Getting into Your Barn?

Tips for controlling barn access

By Chanelle Taylor¹, Dr. Michele Guerin¹, Dr. Gregory Bedecarrats¹, Sarah Thompson² and Dayna Sills²

¹ UNIVERSITY OF GUELPH
² POULTRY INDUSTRY COUNCIL

Keeping barns safe and secure is one of the best things you can do to keep the health and welfare of your birds in check. Once poultry facilities are contaminated by pathogens, such as bacteria and viruses, it can be extremely difficult and costly to correct. Therefore, it is imperative to **stop micro-organisms from entering the barn** in the first place.

“We want to make sure to keep whatever bacteria and viruses that are inside the barn area inside and anything that is outside, keep it outside,” says Dr. Mike Petrik.

According to experts, the most effective ways to control access to your barn are to:

- **set up protective zones around the barn**
- clearly **identify** where those zones are **by using signs and/or barriers**
- **set up an enclosed area (or anteroom)** that:
 - ✓ **can be kept clean**
 - ✓ **serves as a buffer zone** between the exterior and interior of the barn
 - ✓ **prevents the entry of unauthorized people and animals**

Biosecurity Matters

Farmers should also set up a protective zone around the barn with clearly identified access points.¹ This “**Restricted Access Zone**” (RAZ), should be a highly restricted area that is tightly controlled. The RAZ should be within a “Controlled Access Zone” (CAZ), which encompasses the entire property where poultry are housed.¹

Give employees, service personnel, and

visitors clear directions about where to go and what to do when entering the CAZ and RAZ.¹

The RAZ should also have **visual and physical barriers** (e.g., signs, doors, locks, etc.) to prevent easy entrance. It should be obvious to anyone entering the RAZ that these barriers surround areas where tightly controlled biosecurity protocols are in place and that they need to proceed with caution and look for instructions on how to enter appropriately.



“The farmer is the most common person to cross this barrier,” says Dr. Mike Petrik, so it is critical that the farmer follows – and enforces – these protocols.

Instructions can be posted in the anteroom with readily available **booth and clothing**, as well as **hand washing stations** to maintain proper biosecurity. This anteroom will also prevent wild and domestic animals from entering the barn.¹

Keeping it Consistent

Everyone who enters the barn (including family members, permanent or temporary employees, service personnel and visitors) must understand the importance of these barriers. Helping them understand why these are important, will help increase compliance and reduce the “overlooking”

of procedures.¹

Farmers should also strive to maintain a **logbook** inside the anteroom to monitor who is entering the barn, when they enter, and where they came from. This is crucial for tracking diseases in case of an outbreak.¹

“**Many pathogens are brought into the barn on clothing, footwear, dirty equipment, and hands**,” says Dr. Lloyd Weber. “Stations that contain barn-specific clothing where anyone entering the barn can change out of their street clothes into clothing that is only worn in the barn – to prevent the introduction of outside pathogens – should be set up and maintained.”

Lastly, separate barn-specific footwear and clothing (including a hat) and effective hand sanitation reduce the possibility of carrying bacteria that can be harmful to humans, such as *Salmonella*, into the farmhouse. Barn-specific clothing and equipment (e.g., shovels, tools, writing materials, buckets) will also prevent pathogens from spreading from your barn to neighboring poultry farms², which will thereby reduce the risk of disease transmission and outbreaks on other farms.³

If you keep your procedures and instructions quick and easy, employees and visitors will do it, says Sandy Brock, a broiler hatching egg producer. ●

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Reprinted from *canadianPOULTRYmag.com*, September 2012

Why Products Like CID 2000 Work Best To Clean and Maintain Water Lines



Most recent studies have shown that using a stabilized peroxide product work the best to clean water line between flocks. However it is important to know what type of peroxide product you are using and why some products work better than others.

Most end users classify all combinations of stabilized peroxide under the same umbrella whether it is a 34% stabilized peroxide or a 50% stabilized peroxide product. Most end users also classify stabilized hydrogen peroxides that are combined with acetic / peracetic acid (peroxyacetic acid) products under the same type of umbrella.

This is where we want to draw the distinction. When comparing straight stabilized peroxide products like Proxy-Clean or Cid Clean to a Peracetic Acid product like Cid 2000 that combines stabilized peroxide and acetic / peracetic acid, products like Cid 2000 are the clear choice to clean and maintain clean water lines.

CID 2000

Since Cid 2000 combines an oxidizer (hydrogen peroxide) with an acid (acetic / peracetic acid) it can remove both organic matter AND descale water lines at the same time.

PROXY-CLEAN or CID CLEAN

Since these products only have an oxidizer (hydrogen peroxide) they can only remove organic matter from your water lines. If you have 'hard water' which usually means high mineral content, iron and / or a high pH you will have scale build up. If you want to descale your water lines you will need to use a separate Acid based product following the use of Proxy-Clean or Cid Clean. This will cost you more time and money.

There are very few places that do not have hard water caused by high mineral content or iron that creates a scale build up issue in your water lines.

WHY YOU CAN NOT IGNORE SCALE

It has been well documented how biofilm is created and how much of a role it has in creating an unfavorable environment for your water lines. However, it is just as if not more important to pay attention to scale / mineral build up in your water lines. Bacteria produce carbohydrates (sugar) that allow them to attach to pipes; minerals also create deposits on the pipes; minerals like Iron also create deposits on the pipes and are used as a nutrient source by the bacteria. Mineral deposits also serve as attachment sites and form a structural matrix with bacteria / biofilm. Dissolving the mineral deposits destabilizes the structural integrity of the biofilm and assist in physical removal of organic matter from water lines and drinking systems. If you ignore the scale buildup you are leaving behind a major vector for bacteria and biofilm attachment and development that will compromise your drinking water.

SYNERGY IS THE KEY

The combination of ingredients in products like Cid 2000 creates a very unique and powerful product. The addition of the Peroxyacetic Acid (PAA) creates a powerful activated peroxygen compound which boosts the hydrogen peroxide oxidation potential 10 to 12 times in products like Cid 2000. Although Cid 2000 type products have less stabilized peroxide by percentage (20%) than products like Proxy-Clean or Cid Clean (50%) the oxidation potential of the peroxide is greater because of the combination of ingredients. This can also be seen in terminal disinfectants. For example products that combine glutaraldehyde and quaternary ammonia are much more powerful and broad spectrum than glutaraldehyde or quaternary ammonia on their own.

This is one of the reasons why products like Cid 2000 can be used at a 2% dilution compared to using products like Proxy-Clean or Cid Clean at a 3% dilution.

CID 2000

Cid 2000 has shown to be effective at a 2% / 1:50 dilution rate. It also has shown to be effective when left in the water lines for 12 to 24 hours depending on your build up. It takes less product and less time to use a product like Cid 2000. Saving you time and money.

PROXY-CLEAN or CID CLEAN

Proxy- Clean or Cid Clean type products have shown to be effective at a 3% / 1:33 dilution rate. These products also need to be left in the water line for 24-48 hours depending on your build up. It takes roughly 30% more product to clean water lines compared to products like Cid 2000 and these type of products only remove organic matter and cannot descale your water lines.

It is important to use these products at the 2% (Cid 2000) or 3% (Proxy-Clean / Cid Clean) dilution rate for them to work the best. Properly using any product plays a huge role is how that product will work on your farm!

Both Cid 2000 and Proxy-Clean or Cid Clean are completely safe for your equipment when used at label rates. The fact Cid 2000 only has 20% stabilized peroxide compared to 50% stabilized peroxide like Proxy-Clean or Cid Clean creates a safer and more user friendly product for the end user.

START CLEAN and STAY CLEAN with CID 2000. It is the clear choice for cleaning and maintaining proper water lines.

-Ross Thoreson
Best Veterinary Solutions





Brands of a feather flock together

Bayer recently acquired the KMG line of insecticides. So now some of your favorite brands will come from a familiar partner. Once again, Bayer has upped our commitment to bringing you high quality insecticides along with the proprietary research to bring you more.

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Transforming
livestock production 

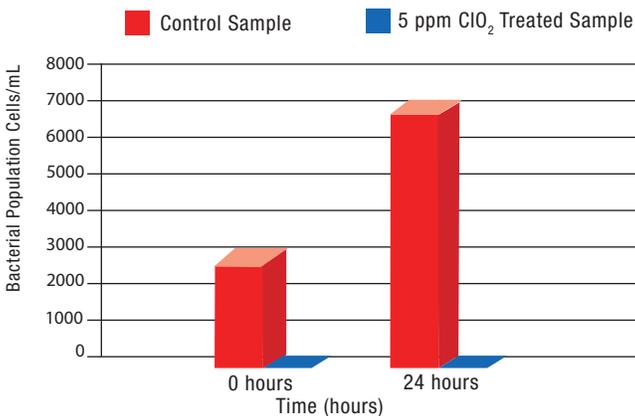
ProOxine® (AH) Disinfecting Solution For Animal Drinking Water

ProOxine® is the most effective tool for water management in animal facilities. ProOxine® keeps the bacteria level down in the water lines, and prevents biofilm from developing thus keeping the animals healthier by keeping down the pathogen level that could potentially travel from one animal to another. ProOxine® makes drinking water more palatable to poultry and livestock and therefore they drink more. Additionally, ProOxine® is highly effective in keeping water systems free of build up.

Efficacy of ProOxine® against Biofilm

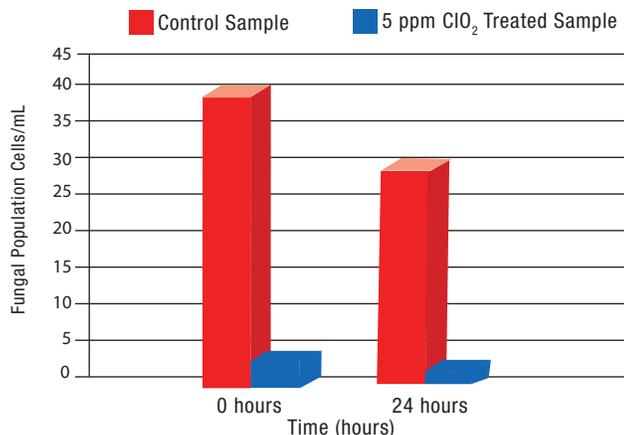
CONTROL EFFECT OF 5 ppm ClO₂ AGAINST BIOFILM BACTERIA

On Bacteria	Control Sample	5 ppm ClO ₂ Treated Sample
0 Hour	3000	30
24 Hours	7000	2



CONTROL EFFECT OF 5 ppm ClO₂ AGAINST BIOFILM FUNGI

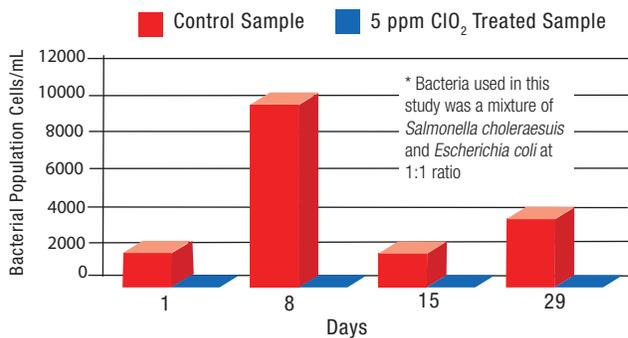
On Fungi	Control Sample	5 ppm ClO ₂ Treated Sample
0 Hour	40	4
24 Hours	30	2



Efficacy of ProOxine® against Salmonella and E-coli

REDUCTION OF BACTERIAL POPULATION* IN WATER AFTER CONTACT WITH 5 ppm CHLORINE DIOXIDE

On Bacteria	Control Sample	5 ppm ClO ₂ Treated Sample
1 Day	2000	20
8 Days	10000	2
15 Days	2000	2
29 Days	4000	2



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Oxine® Versus Tech-Grade Sodium Chlorite Products

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Norman, OK

INTRODUCTION:

Chlorine dioxide has become the sanitizer of choice in various industries, from food to animal care, because it is a very effective biocide. Chlorine dioxide products are available in different forms and sizes, and can be purchased from various sources. There is a glut of technical information on these products in the marketplace, which is being circulated by sellers of this technology. Often, the information on chlorine dioxide from these different sources is conflicting causing confusion to the consumer. The purpose of this technical bulletin is to clear up some of this confusion.

Chlorine dioxide is a very reactive molecule called a radical. The science behind its functionality is quite complex and many of the circulated documents reflect inadequate understanding of its chemistry. For example, the attached document “Chlorine Dioxide Chemistry 101, [Sockett, D.C.; May 2012]” published by NuClO₂, Inc., alias, Oxxion Corporation, has many inaccuracies that can lead to inefficient product use and an unsafe work environment. The paper claims superiority of their product, OxyMer™, over Oxine® (AH) – a product manufactured by Bio-Cide International. We, as the manufacturer of Oxine®, respectfully submit the following information in response to the OxyMer™ document.

ABOUT BIO-CIDE INTERNATIONAL

Bio-Cide International Inc. (BCI) is an Oklahoma based manufacturer of chlorine dioxide. The company manufactures its products using a proprietary method (known as the Solvay process) that it has perfected over the last 40 years. With this process, BCI is able to manufacture formulations that are of very high purity. This expertise in manufacturing also makes BCI the only chlorine dioxide producer whose products are FDA approved for human pharmaceutical use. There are many other companies that market chlorine dioxide products. However, the majority of these companies simply repackage purchased commodity or technical grade sodium chlorite that is primarily produced for industrial use.

CHEMISTRY OF CHLORINE DIOXIDE PRODUCTS:

Chlorine dioxide product-chemistry revolves around the following central reaction where the precursor (NaClO₂) is activated to obtain the active chlorine dioxide:



Many believe that the precursor should be blasted with acid to obtain maximum ClO₂ instantaneously, thinking that this will enhance the antimicrobial effect. This approach, although used in certain applications, has no tangible benefit over controlled activation processes. One does not need more than the requisite amount of free ClO₂. The production of ClO₂ should be balanced in a way that the CT is maximized over the contact time (T) with the substrate. This approach has many advantages in terms of maximization of biocidal effect, biofilm removal and residual effect, as well as minimization of corrosivity on metals and elastomers. However, it is not possible to sustain-release chlorine dioxide consistently with commodity-quality chlorite salts because of the lack of special buffering system in these products. Using a proprietary technique, Oxine[®] solution is buffered at a pH between 8.0 – 8.5. Most other chlorite products are buffered at a pH of 11-12. Therefore, the higher pKa acids perform poorly with tech-grade products, whereas their performance is excellent with the Oxine[®] product.

The intermediates (such as HClO₂) generated in this reaction, , act as a reservoir for replenishing ClO₂ as it gets used up in the system. Heavy activation of the chlorite system completely destroys that equilibrium. An analogy will be distribution of water from consistent rainfall in an area versus flash flooding of that area, or perhaps like cooking on a gas grill versus lighting the gas tank on fire. This “crash-and-burn” approach is disadvantageous compared to the Oxine[®] activation method wherein a consistent steady-state stream of chlorine dioxide is maintained for the entire period of contact time for the solution.

However, if one still needs to perform a heavy activation of Oxine[®] using a strong acid, it is very much possible. And because of Oxine[®]'s low pH, the reaction efficiency will be better than other chlorite products.

EFFICACY

There are many products that are repackaged in small configurations by individuals who recently learned the merits of chlorine dioxide. Sodium chlorite is available in the commodity market for bulk industrial applications, such as pulp-paper bleaching or sewer treatment. However, these products are not always suited for food or animal use. The companies that repackage tech-grade chlorite often do not have relevant data to support their applications. They usually cite publically available data that is generated by others using a different chlorite source than the one used for their product. Such extrapolation of data is often not valid.

Ironically, the data cited in the OxyMer™ publication is a study that was commissioned by Bio-Cide International for their Oxine[®] product at The University of Oklahoma [*Tanner, R. S.; Comparative*

Testing and Evaluation of Hard-Surface Disinfectants; Journal of Industrial Microbiology]. This study also compares antimicrobial effectiveness of Oxine® with a tech-grade sodium chlorite product. It is demonstrated in this case that Oxine® is much more potent than tech-grade sodium chlorite when tested on *pseudomonas aeruginosa*, *staphylococcus aureus* and *saccharomyces cerevisiae*, which serve as indicator organisms for an array of bacteria and fungi.

OxyMer™ publication proclaims that only 25-50ppm free ClO₂ content was generated in a 500 ppm solution of Oxine®. It is well known that very low concentrations of free chlorine dioxide i.e., in the range of 2-10 ppm, are highly potent. Species such as the *cryptosporidium* are reduced by 3-logs using 2.7 to 3.3 ppm chlorine dioxide as published in *EPA Guidance Manual, Alternative Disinfectants and Oxidants (April 1999, Chapter 4, Page 19)*. So why activate so heavily? The key is to maintain the nominal concentration of the free chlorine dioxide in a system where it is constantly utilized.

It is also important to mention that the method used to measure free ClO₂ concentration mentioned in the OxyMer paper is unreliable, since test strips are not the best way to measure free ClO₂ in this range. Iodometric drop-titration or spectrophotometric methods are the best ways to measure free ClO₂ concentrations.

OXINE'S REGULATORY QUALIFICATIONS:

Bio-Cide International has an established history of pioneering major regulations related to chlorine dioxide use in water, food and pharmaceuticals. BCI filed the most important surface disinfection regulation (21CFR178.1010) with the Food and Drug Administration in 1984. Thereafter, dozens of regulations were submitted by BCI to FDA, EPA, USDA, FSIS, NSF and OMRI, to expand the use of this chemistry in direct-food and other applications. Millions of dollars were spent on toxicology and efficacy studies to ensure that the Oxine® product delivers all its label claims.

Bio-Cide International is a member of the Chlorine Dioxide Panel of the American Chemistry Council, the Antimicrobial Exposure Assessment Task Force, European Biocide Products Directive, and many other government consortiums, which are leading agencies that guide the development and sale of safe and effective antimicrobials worldwide. Under the auspices of these agencies, BCI's Oxine® brand has been constantly improved. It is manufactured and packaged under strict ISO 2008:9001 guidelines as a state-of-the-art product.

COMPARISON:

OxyMer™ comes as a set of two solid salts, sodium chlorite and sodium hydrogen sulfate. Whereas solids may seem convenient for use, there are disadvantages associated with them.

- i) Solid sodium chlorite during its manufacturing is mixed with stabilizers to minimize its fire hazard. Stabilizers that are at least 20% (by total weight) of the chlorite salt consist

of various salts, such as calcium carbonate, that can shield bacteria from antimicrobial activity. Liquid solutions of chlorite, on the other hand, do not contain substantial amounts of stabilizers.

- ii) Homogeneous dissolution of tablets or flakes require extra care; otherwise, the concentration gradients are formed, causing inconsistent activation of product.
- iii) The biggest disadvantage with these products is the cost factor. For example, let us analyze the cost of use for the OxyMer™ product. A set of Oxymer™ (A&B) sells for \$22 (on Animart.com). The two components are mixed together to produce 1 gallon of 0.3% solution. On the other hand, one can purchase 1 gallon of 2% Oxine® product at about the same price that will make 6.7 gallons of 0.3% product. This makes OxyMer™ at least 500% more expensive than Oxine®.

CONCLUSION:

We advise all our customers to be aware of the imitation products that have no proven track record and that yield inadequate or inconsistent results. Please ensure that you purchase your chlorine dioxide product from an authorized source and that the product is properly certified for quality and performance. An easy way to check authenticity is to look for the EPA registration number on the product label. The presence of this number on the label ensures that the data for that product was evaluated by the government agency. Additionally, please ensure that the product has a label claim for disinfection that is detailed on the label. A disinfectant without an EPA registration number is deemed illegal.

Any questions regarding this document may be directed to the author at: nkhanna@bio-cide.com, phone: 405.329.5556



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