# BVS POULTRY Talk

Best Veterinary Solutions, Inc.

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## MEETINGS & EVENTS:

Iowa Turkey Federation Winter Meeting
December 9-11, 2014

North Dakota Poultry Industries Convention
December 10-12, 2014
Holiday Inn | Fargo, ND

International Production & Processing Expo
January 27-29, 2015
Atlanta, GA

National Turkey Federation Annual Convention
February 11-14, 2015
Caribe Hilton | San Juan, Puerto Rico

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# Strategies to Improve Litter Quality

## INTRODUCTION

The condition or quality of litter has a direct impact on the health, performance and quality of birds and also the microbiological safety of poultry food products. The quality of litter can be defined by the combined physical, biological and chemical properties and how they impact the environment for raising birds and the resulting direct consequences on the performance and health of the birds and quality of the food products.

Of the three properties defining the quality of litter, the biological properties, or more appropriately, the microbiological properties of litter is the most important. Microorganisms in litter are directly responsible for the decomposition of uric acid that results in ammonia. Microorganisms in litter are also important pathogens to the birds and can represent a significant food safety risk. The chemical and physical properties of litter directly impact the microbiological properties. Understanding how these factors interact is key to developing strategies to improve litter quality.

## FACTORS AFFECTING LITTER QUALITY

Controlling the condition of litter in poultry houses is essential to ensure a better environment and thus better health and performance of the birds. An understanding of the physical and chemical properties of litter that affect the growth and survival of the pathogenic and ammonia producing microorganisms in litter will allow producers to implement management techniques to prevent or retard these microorganisms.

The condition or quality of litter can be affected by a number of factors. Chemical properties such as moisture content and litter pH as well as the physical friability of the litter are some of the most important factors that affect litter quality.

Litter moisture, which is more accurately described by litter water activity ($a_w$), is a measure of the unbound or available moisture in litter. This is in

*continued on page 3*

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# Poultry Talk

As I write this article it's mid-September and we've already had some light frost in parts of Minnesota! Hopefully the colder temps will hold off for awhile. It's been a great summer for growing turkeys and broilers with the cooler temps, but not so great for producing corn in the upper Midwest. We've lacked a lot needed heat units!

In mid August we had our open house at our new warehouse in Mechanicsburg, PA. It was a beautiful day for an open house. We had many of our good customers in attendance. Wes grilled turkey tenderloins for everyone, which are always great! Many thanks to our other suppliers for being in attendance and for helping us during the day, and to CEVA who helped in providing us with other food items.

As temperatures get colder and we get into fall, please keep in mind your rodent control program. We currently have a fall promotion with LiphaTech for their brand of rodenticides. Please contact the BVS sales person in your area for more details.

Also, with colder weather come increased issues with controlling ammonia in our poultry houses. As energy becomes more expensive for heating and ventilating our barns, we need to look to ways of reducing ammonia in an effort to reduce our energy costs. A couple of ways to do this is by using litter amendments such as PLT to lower pH and drop ammonia levels quickly, but this is short term. We can help our litter amendment program by using feed additives such as BioSupreme to help with additional ammonia control once the litter amendments have lost their effectiveness. By using BioSupreme at a rate of 1/4 lb. per ton we can get an additional 40-50% reduction in ammonia, along with the gut health benefits associated with yucca schidegera.

For additional ammonia reduction through the feed we have a new value added BioSupreme called EnviroSupreme, which is a combination of BioSupreme and three Bacillus's. The Bacillus's populate the litter and help with the decomposition of manure as they attack the non-pathogenic gram negative bacteria that are responsible for ammonia production. They also help with drying the litter, so you get a two fold advantage in helping with ammonia reduction, along with the benefits of the BioSupreme. Using EnviroSupreme at a 1 lb. per ton inclusion rate can help us get up to a 65-70 % reduction in ammonia. Getting at the source of our ammonia problem. For more information and pricing regarding EnviroSupreme please contact your BVS sales person. Also, we have EnviroSupreme Green, which is available as an organically approved product.

New in this edition of BVS Poultry Talk, you'll see an ad listing all of the products that BVS currently handles that are approved for organic poultry production. These approvals are from OMRI, PCO, or Oregon Tilth. We will continue to update this list as BVS adds more products for organic poultry production. This is a growing segment of our business and we intend to pay close attention to the needs of our organic poultry producers in the U.S.!

I hope that everyone has a great fall! Till next time and God Bless!
Randy

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# Strategies to Improve Litter Quality, *continued from cover*

contrast to water that is bound to the nutrients and other compounds in litter and is not available for microorganisms. Researchers at the University of Maryland have found that the water activity of the litter surface correlates with the incidence of salmonella on the farm and on the carcasses of broilers. Therefore, controlling litter surface water activity is an important method to reduce the incidence of salmonella and other microorganisms in the litter environment.

Litter pH is another critical factor affecting litter quality. The pH of litter is alkaline and typically ranges from 7.5-8.5 due to the accumulation of ammonia and fecal material. It has been well established that most microorganisms grow best at pH values near 7.0 while few grow below 4.0. Reducing litter pH as a means to control microorganisms would require reducing and maintaining the litter pH below 4.0. Unfortunately this is not practical given the neutralizing capacity of litter. However, maintaining the litter pH at 7.0 will result in less ammonia volatilization since more ammonia will be in the ionized form ($NH_4^+$) at this pH.

Friability is a physical property of the litter that directly impacts litter $a_w$. Friability is a measure of how easily the litter will crumble or break-up. Practically speaking, the more friable the litter, the easier it is to break-up and less likely to mat and hold water on the surface.

## MANAGEMENT PRACTICES TO IMPROVE LITTER QUALITY

Given the importance of litter as a critical step in the overall process of poultry production, producers are searching for management practices to improve litter conditions. Implementing management strategies that directly affect the physical and chemical properties of litter will, in turn, affect the microorganisms in litter and result in improved litter conditions. This will ultimately ensure better bird performance and health, and safer food products.

The most direct way to impact litter quality is to reduce litter $a_w$. Proper management of ventilation, drainage around the houses, drinkers and fogging / sprinkler systems will help to minimize litter $a_w$. Low litter $a_w$ will reduce the growth of pathogenic and ammonia producing microorganisms.

Another way to impact litter quality is to improve litter friability. Practices such as removing the crusted or caked litter and tilling litter between flocks will help to improve the friability of the litter. Selecting litter materials that won't mat and will release moisture will also help to maintain better friability. The more friable the litter, the lower the litter $a_w$.

Litter treatment products offer producers another way to affect the physical and chemical properties of litter. At present, a number of commercial litter treatment products have been reported to reduce ammonia levels in poultry houses but few products have been shown to improve and maintain the microbiological quality of litter. Current chemical treatments on the market have the advantage of rapidly lowering the pH of the litter. These products will control ammonia and possibly microbial activity for an initial period but these treatments are quickly neutralized by the alkaline conditions of litter and therefore may only be effective for a short period of time.

## ENVIRO Supreme – A Biological Approach

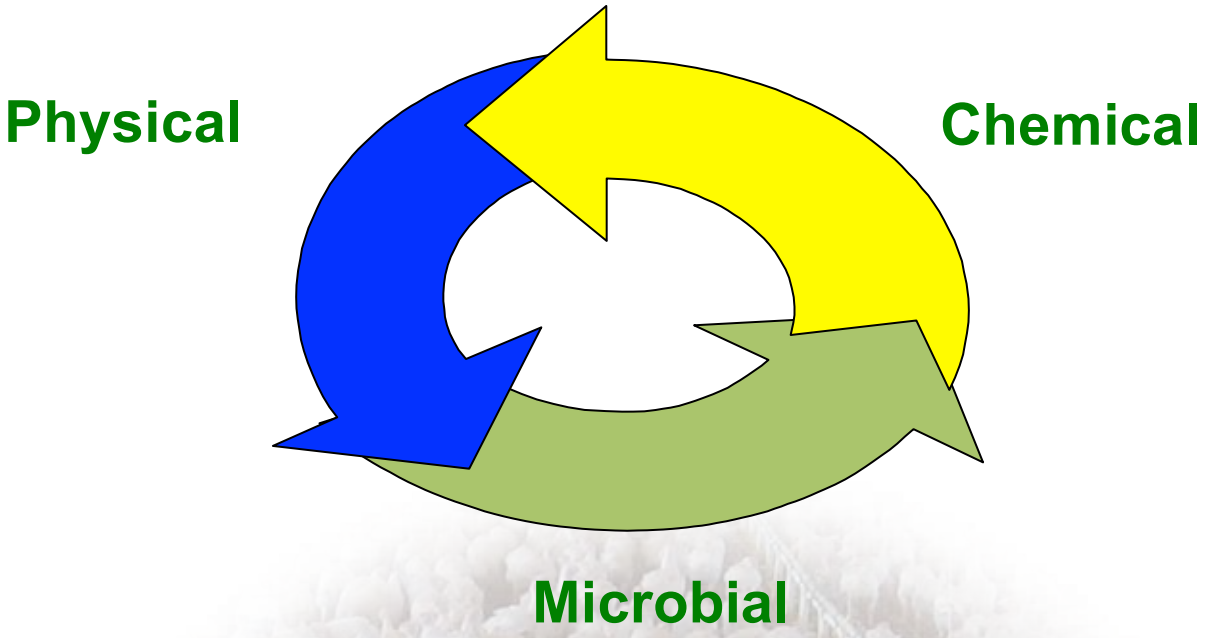
Research on the use of microorganisms as biological control agents indicates that this is a fundamentally sound concept. Unlike chemical treatments, biological treatments can reproduce in the litter and maintain an effective concentration of the microorganisms in the litter.

ENVIRO Supreme is built from the combination of specific strains of *Bacillus subtilis* and *Bacillus licheniformis* and the *Yucca schidigera* in BioSupreme. This unique and powerful product targets the litter environment with an immediate and proactive approach. This is crucial when time is of the essence for veterinarians, nutritionists and production managers to make positive impacts. **Immediate:** the *Yucca schidigera* provides the ability to immediately minimize the noxious odors and ammonia that are already present in production environment through a binding action by the *Yucca schidigera*. **Proactive:** the continual feeding of ENVIRO Supreme allows the *Bacillus* spp. to accumulate in the environment as they are shed in the feces, providing a long term approach to maintaining quality litter conditions.

The immediate and proactive approach of ENVIRO Supreme allows the product to respond to the continually changing and challenging environment of typical poultry production conditions. Additionally, 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. Adding to the cost effectiveness of ENVIRO Supreme is the need for only one micro bin at the feed mill. A huge advantage for space limited feed mills.

Overall, the best litter management technique may be to utilize multiple techniques to build not one, but rather a series of strategies to effectively control litter quality. ENVIRO Supreme offers the unique opportunity to implement two interventions strategies in one product while taking both an immediate and proactive approach to managing environmental litter conditions. The synergistic mode of actions of the *Bacillus* and *Yucca schidigera* products make ENVIRO Supreme a product of immense value to poultry producers.

# *Maintaining Litter Quality Demands a Program Approach*

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- **Extends litter life**

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**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

# NEWCASTLE CLONED N-79

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**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

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**Advantages:**
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- Consistent high potency titers to en sure protection of every vaccinated bird, flock after flock
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### Newcastle Vaccine
($B_1$, Type, C2 Strain, Live Virus)

**NEWHATCH-C2®** is the patented, virtually nonreactive C2 strain of $B_1$ 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:**
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- C2 strain of $B_1$, 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

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## 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 hs 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 occuring 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

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*Not all products mentioned above are OMRI Listed. Approval for use in organic production is subject to approval from company's/grower's organic certifier.

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# Who's Getting into Your Barn?

## Tips for controlling barn access

By Chanelle Taylor[1], Dr. Michele Guerin[1], Dr. Gregory Bedecarrats[1], Sarah Thompson[2] and Dayna Sills[2]

[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 farms[2], 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.

***References***

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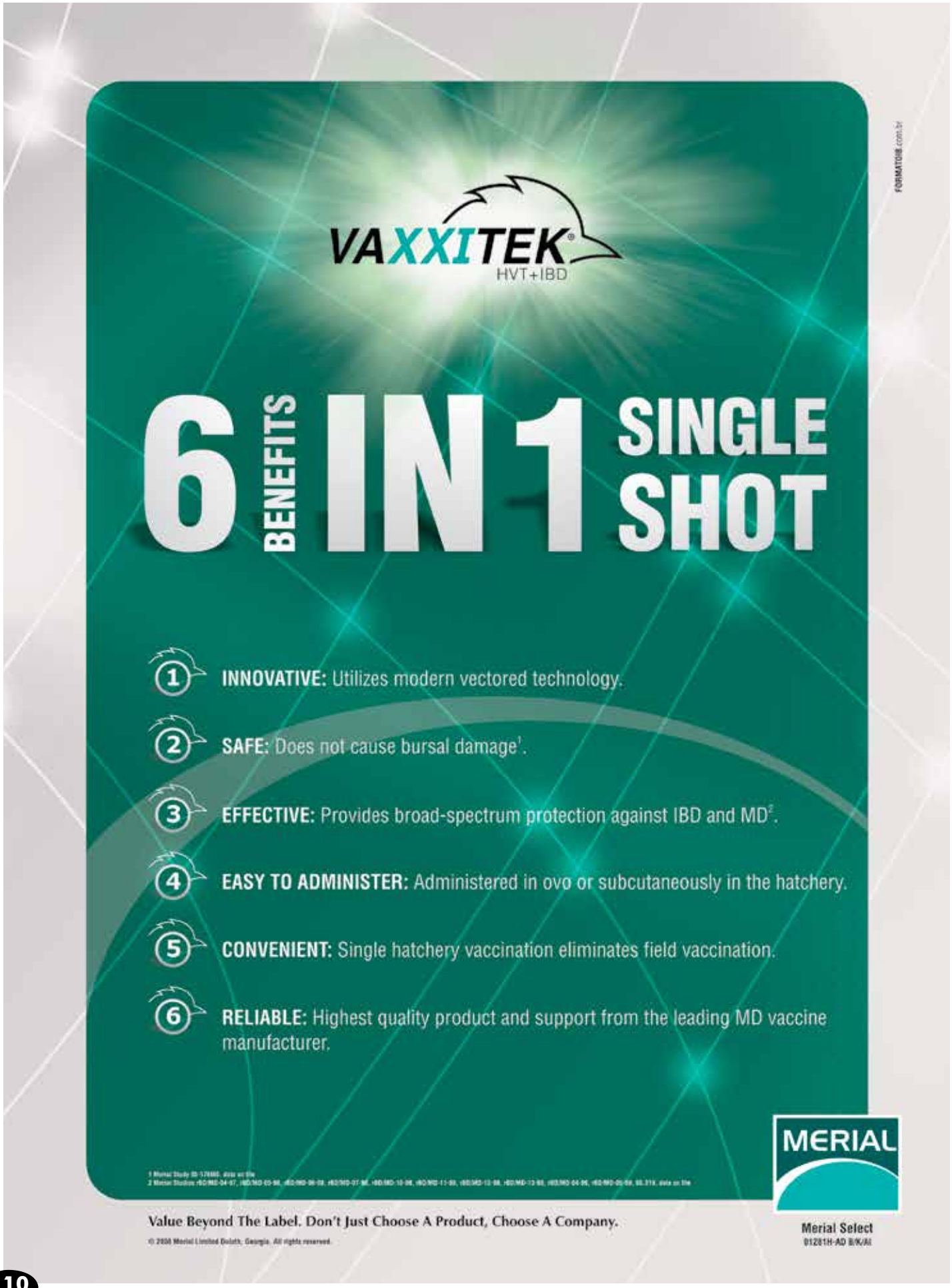
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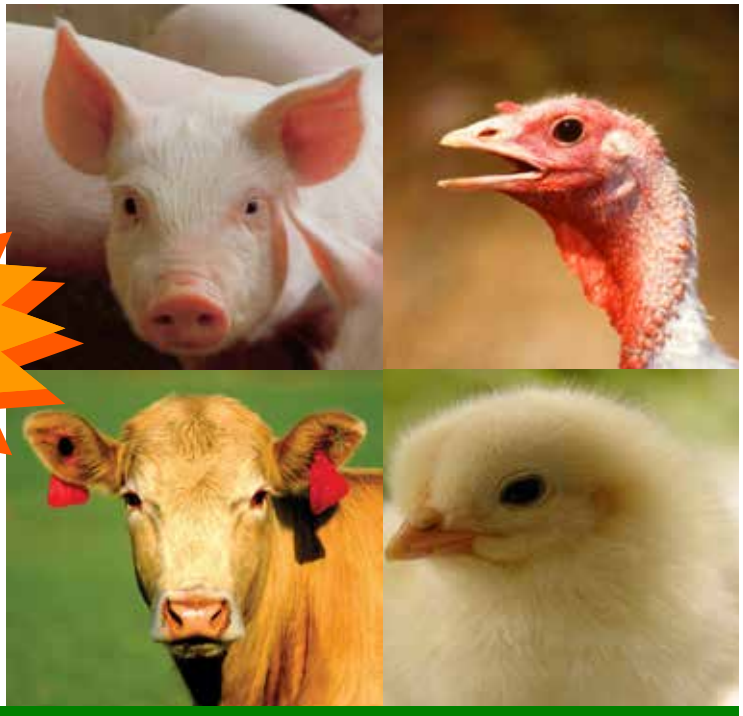

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# I'd like you to meet my pet, Peeve (commentary)

By Dr. Richard Raymond
Published on: July 29, 2014

IF I ever get another pet, I am going to name it Peeve. Then, I could introduce it to others as "my pet, Peeve."
However, that would sound like I have only one pet peeve, when I actually have several. Here are a few of them:
* When the groups that complain the loudest for change don't say "thank you" when that change occurs. Instead, they complain some more that the change was not enough.

A prime example here is the recent announcement by Cargill that it will no longer use growth-promoting antibiotics in turkeys raised on its independently owned farms. There will be a three-part U.S. Department of Agriculture verification process in place, and Cargill's webpage advises visitors to look for a seal that says: "Raised by independent farmers. Producers are trained on animal handling practices," and "No antibiotics used for growth promotion; antibiotics only used for treatment and prevention of illness." The first response I read from a consumer advocacy group was a statement by Keep Antibiotics Working claiming that Cargill left open a loophole by "failing to extend its pledge to (include) antibiotics used for routine disease prevention." Well, if Cargill were to extend that pledge to include ionophores to prevent coccidiosis, I would take it to mean that the company could see up to a 50% increase in turkey mortality. Another major and well-financed consumer advocacy group asked me if I thought the label had been USDA approved. There was no mention of the move to reduce antibiotic use, just a concern that Cargill did not go through all the proper steps for label approval.
* Speaking of labels, I continue to be amazed by inaccurate and/or misleading labels. I was just at a local farmers market and was simply appalled by the labeling and blatant attempts to mislead. Of course, labels at the market do not fall under the purview of any government agency, so the vendors can state whatever they think will appeal to the unknowledgeable public and maybe charge a little bit more. The signage up front says: "All locally grown" and "Support and trust your local farmers." I saw a label on chicken breast declaring that the chickens were "cage free and no hormones used." Readers know that hormones are outlawed in chicken production, but John Q. Public probably does not. While cage free has a nice ring to it, my guess is that 99.9% of all broilers are "cage free" except for when they are shipped to the slaughterhouse. The price for the cage-free, no-hormones-added chicken breast was $1.50/lb. more than the chicken breast in the grocery store just down the street.

There was a truckload of bison meat with a sign declaring, among other things, that no antibiotics or hormones were used. I will have to check with my good friend Dave Carter, but I think he told me once that those two substances are banned in bison production except to treat an infection.

Maybe the one sign that really upset me the most (and made my wife tell me to calm down) was regarding halibut fillets. Remember the "all locally grown" and "trust your local farmers" signage? Well, the market was in a mountain town in Colorado. Not only was I pretty sure that the halibut was not grown locally, but the sign said it was grown using "sustainable agriculture practices." I conceded that maybe there is a halibut fish farm in Colorado, so I asked the guy standing by the trailer if the fish was farm grown. Thinking he knew where I was heading with my question, he responded: "Absolutely not. These fish were line caught in the Atlantic Ocean off the coast of Alaska." Truly, he said the Atlantic, but before I could ask him how catching fish in the ocean was sustainable agriculture, my wife dragged me out the gate. Oh, and the price for this line-caught fish using sustainable agricultural practices? A whopping $24/lb. Halibut at the grocery store down the street would run you $14/lb. People must be gullible to buy into this malarkey; otherwise the guy would not be there wasting his time (which reminds me that another one of my pet peeves is when people who know better take gullible people's money).
* Fear mongering that will affect the price of the food I buy. I could come up with dozens of examples for this, but one also occurred as my wife was dragging me from the farmers market. There, at the gate, was a young man in his 20s (looking like he came right out of Woodstock) who asked if I am a registered voter in Colorado. I should have just walked on by, but no, I like to talk, so I said yes. He asked me to sign a petition to get genetically modified organisms (GMOs) banned in all of Colorado.
I asked him if he had ever gone to bed hungry because he could not afford food.
He said we are all going to die from cancer caused by GMOs.
I advised him that thousands will die from starvation.
He said that was not his problem; that was a Republican problem.
I guess I had better stop this list of pet peeves before it gets out of hand.

**Dr. Richard Raymond is a former U.S. Department of Agriculture undersecretary for food safety.*

Feedstuffs/foodlink.com: Volume:86 Issue:31

# BIOSUPREME®

## ANIMAL FEED INGREDIENT

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 *Yucca schidigera*(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 |

## 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 | *Yucca schidigera*(1) concentrate liquid |
| Appearance | extract |
| Color | Dark Brown |
| 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.

BAI-HP-BSP-BSL-EN-01

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# PoultryGrit

**Cherry Stone is 100% crushed quartzite which makes it the hardest, sharpest grit available and helps the gizzard to be faster & more efficient. Cherry Stone won't dissolve or upset the mineral balance of feed or neutralize digestive juices. And birds are attracted to the pink-gray color! Available in 50 lb. bags or 2,000 lb. bulk bags.**

- Poultry Grit #1
- Average Size 1/16"
- For turkeys age 1-5 days
- For chickens age 1-3 weeks

- Poultry Grit #2
- Average Size 3/16"
- For turkeys age 6-21 days
- For chickens age 4-7 weeks

100% Natural Quartzite
50 lb. bag

- Poultry Grit #3
- Average Size 5/16"
- For turkeys age 3-8 weeks
- For chickens age 7+ weeks

- Poultry Grit #4
- Average Size 3/8"
- For turkeys age 8+ weeks
- Also great for hobby crafts!

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# ProOxine®(AH) Disinfecting Solution

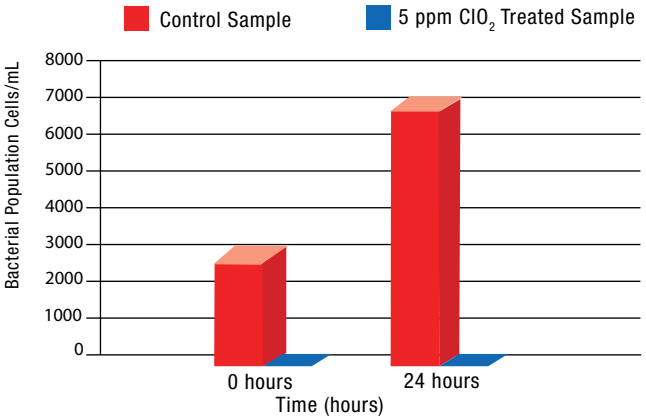
## For Animal Drinking Water

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

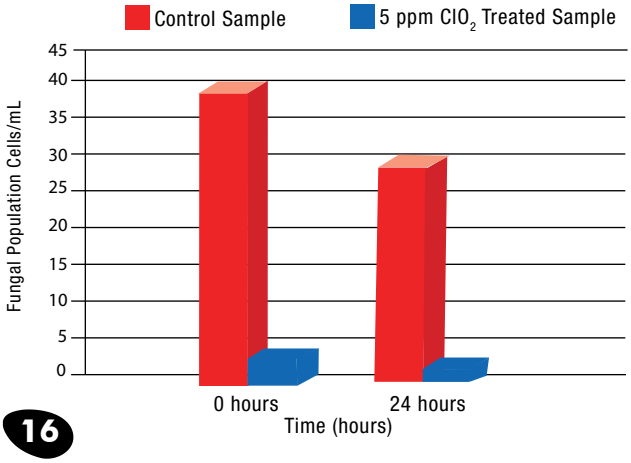
#### CONTROL EFFECT OF 5 ppm $ClO_2$ AGAINST BIOFILM BACTERIA

| On Bacteria | Control Sample | 5 ppm $ClO_2$ Treated Sample |
|---|---|---|
| 0 Hour | 3000 | 30 |
| 24 Hours | 7000 | 2 |




#### CONTROL EFFECT OF 5 ppm $ClO_2$ AGAINST BIOFILM FUNGI

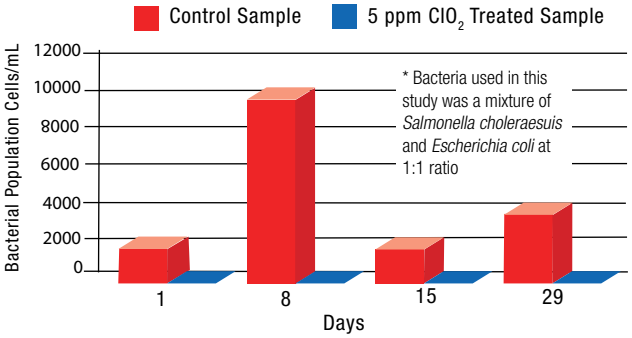
| On Fungi | Control Sample | 5 ppm $ClO_2$ Treated Sample |
|---|---|---|
| 0 Hour | 40 | 4 |
| 24 Hours | 30 | 2 |




### 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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## The world's leading disinfectant Virocid has become even more powerful.

Thanks to the extraordinary cleaning power of **Kenosan**, the world's most powerful disinfectant **Virocid** is able to penetrate deeper and disinfect even more thoroughly than you were used to.

Kenosan combines ultra-strong adhesion power and deep penetrating cleaning action at very low dilutions! The high-level formulation guarantees a unique cleaning result in the most heavy-duty circumstances in the pig, poultry and dairy houses. Even the most thick and dried up dirt (manure, litter, etc.) like in farrowing crates, fattening pens, turkey or broiler rearing houses, milking parlours etc. stands no chance against the penetrating and dissolving power of Kenosan. The cleaning action also gets amplified by extended contact time due to the sticky foam that remains attached upon all types of surface.

CID LINES
innovative hygiene solutions

www.cidlines.com

## Virocid® proven effective against PEDv at 1:400 (1/3 oz / gal) at an EPA accredited lab"

Porcine Epidemic Diarrhea virus (PED virus or PEDV) is a coronavirus that infects the cells lining the small intestine of a pig, causing porcine epidemic diarrhoea, a condition of severe diarrhea and dehydration. Older hogs mostly get sick and lose weight after being infected, whereas newborn piglets usually die within five days of contracting the virus.

The PED virus terrorizes North and Central America. Virocid® leads the way to keep the swine industry more healthy and clean!

Virocid® was tested against the PED virus and passed it succesfully at 1:400, tests were done by an EPA accredited lab.

In today'spig industry, an efficient and thorough cleaning and disinfection is a top priority. An ounce of prevention is better than a pound of cure!

Where Virocid® is being correctly applied (after a thorough cleaning with a CID LINES detergent), bacteria, viruses, fungi and spores have no chance.

The bactericidal, virucidal, fungicidal and sporicidal effect of Virocid® is unique in the world and is safe for people, animals and their environment at in use dilutions.

The worldwide success of Virocid® is based on the unique synergism of it's characteristics:
- EPA approved as a "broad spectrum " disinfectant (and registered in more than 85 countries)
- highly efficient to kill bacteria, viruses and fungi
- residual action
- stable stock solution
- no resistance encountered
- very low dilution rate
- extremely economical cost- in-use
- versatile usage: spraying, foaming, fogging, booth dips, wheel dips, …
- active at all temperatures
- effective in hard water (even sea water)
- effective in presence of organic matter
- safe for equipment (non corrosive in dilution) and environment friendly (meets European biodegradation standards)
- safe for people (low MEL)

Virocid® is consistently twice or more times efficacious compared to any other disinfectant. So it's not surprising at all that Virocid® is the number one disinfectant in the world of pig and poultry production ! Virocid® is more economical (thanks to it's low dilution rates). It is also offering a wide application range for the daily disinfection in the areas for animal production, food processing, foot dips, vehicle disinfection etc. Contact: info@cidlines.com www.virocid.com

# OMEGAMUNE®
# GUT PRO
# POULTRY PROBIOTIC

***Contains a source of live (Viable) naturally occuring micro-organisms and stabilizing agents to help contain viability of product through administration.***

***Use Gut Pro to supply naturally occuring micro-organisms to poultry in the first 1 to 5 days of placement, at periods of unusual stress, before and after moving or after therapeutic antibiotic treatment***

**DIRECTIONS FOR USE:**

**For starting birds** supply one Gut Pro 4 oz. jar per 5,000 birds in first 8 hours of morning drinking water for 3 consecutive days.
**For periods of stress**, before and after moving or therapeutic antibiotic treatment supply one 4.0 oz. jar of Gut Pro per 5,000 bbirds in first 8 hours of morning drinking water as needed.
**Turn off chlorine or** water sanitizer and neutralize water system with Vaccine Stabilizer before use of Gut Check.
**Make sure the entire watering system and** stock solution are free of any anti-microbial agents.

**GUARANTEE**
11.2 billion CFU/gram total lactic acid producing bacteria
11.2 billion CFU/gram Bacillus cultures

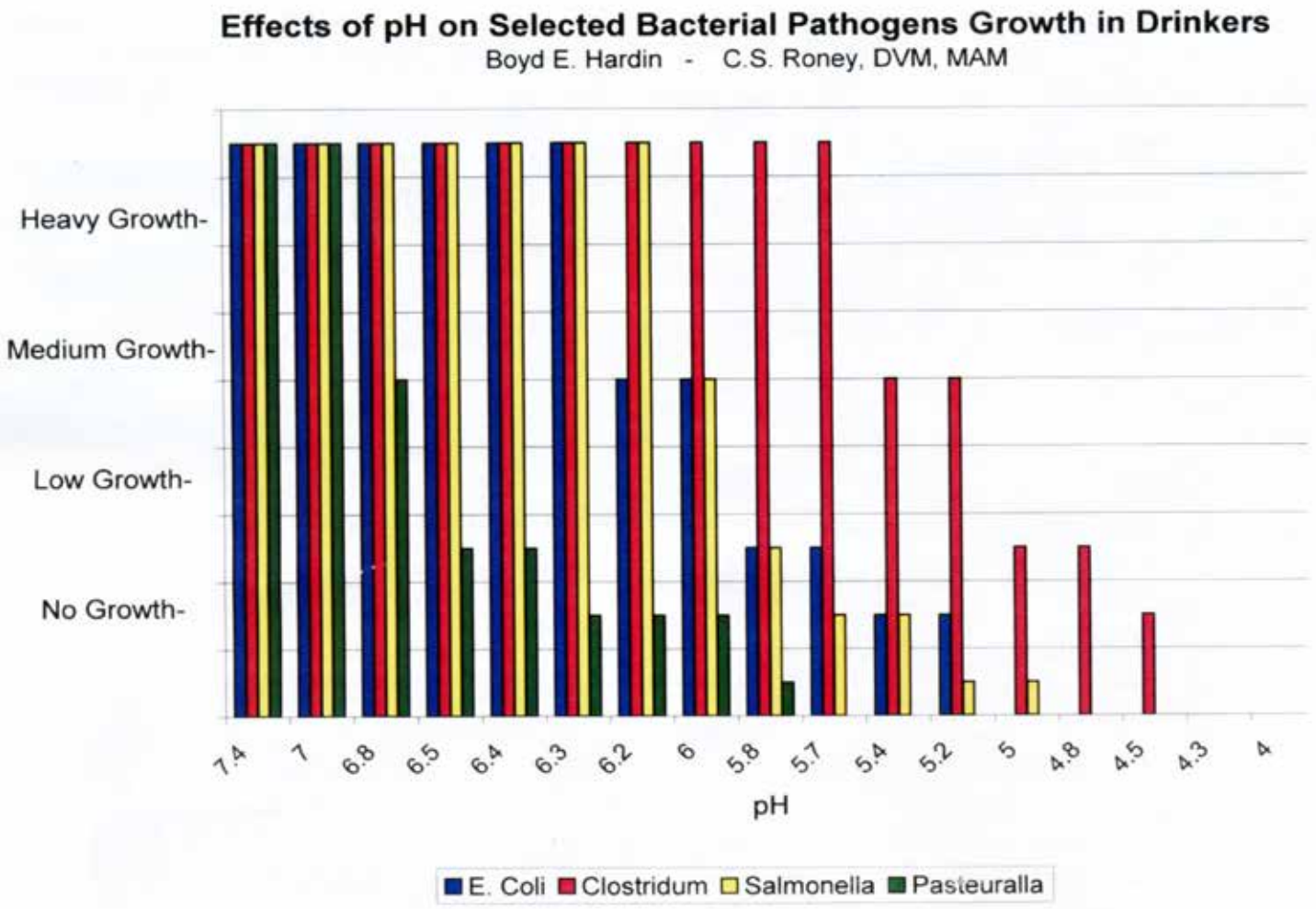
INGREDIENTS: Milk products, sodium thiosulfate, magnesium chloride, gelatin hydrolysate, Enterococcus faecium fermentation product, Lactobacillus casei fermentation product, Lactobacillus acidophilus fermentation product, Lactobacillus plantarum fermentation product and Bacillus subtilis fermentation product and Bacillus licheniformis fermentation product, sucrose

Net Weight: 4.0 oz. (113.4 grams)

*Manufactured for:*
**Best Veterinary Solutions, Inc.**
Willmar, MN 56201
***Best Veterinary Solutions, The Solution Company***

# OMEGAMUNE GUT START

- **Extremely fortified probiotic for poults and chicks containing 6 strains of live (viable) naturally occurring micro-organisms**
- **Applied at the hatchery at 1 day of age (Hatch Day) or at placement**
- **Probiotic is applied with a gel spray diluent to provide better uptake and uniform coverage**
- **Gel appears as droplets on poults or chicks and is visible and readily picked up by the birds which increases the amount of product getting to the birds and the amount of birds that get the product.**
- **All droplets are gone within 2 or 3 minutes**
- **Unlike water spray, the gel spray does not soak the poults / chicks , keeping them dry and warm**
- **Can easily be mixed with IMMUCOX vaccines for same time application**
- **Contact your poult / chick supplier and ask them to apply Gut Start on your next order**




# OMEGAMUNE-PLUS®

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## WITH ANTIOXIDANTS FOR TURKEYS & BROILERS

For Use in Closed Drinking Water Systems for Poultry

### GUARANTEED ANALYSIS

$CuSO_4$.....18%

**INGREDIENTS:** Copper, Organic Acids, BioSupremeL, Buffers, Dye #40, Extract from Essential Oils.

### Omegamune-Plus *Precautions*

- Acidic solution
- Corrosive to galvanized and mild steel equipment, piping ..... and/or fittings.
- Wear goggles or full face shield when handling
- For animal use only; not for human consumption
- Keep out of the reach of children

**WARNING:** ***Follow label directions***

### MIXING DIRECTIONS

***Standard Dosage*** - 1:1024 gallons drinking water. Administer 1 part Omegamune-Plus in 1024 parts drinking water. For injectors/proportioners administer 1 oz. stock solution per gallon drinking water. Prepare stock solution by mixing 1 gallon Omegamune-Plus with 7 gallons water.

***Optimum Dosage*** - 1:512 gallons drinking water. Administer 1 part Omegamune-Plus in 512 parts drinking water. For injectors/proportioners administer 1 oz. stock solution per gallon drinking water. Prepare stock solution by mixing 1 gallon Omegamune-Plus with 3 gallons water.

**Available in the following packaging:**

4 x 1 gallon cases.....(Product # 100801)
5 gallon pails.....(Product # 100810)
55 gallon drums.....(Product # 100820)

*Manufactured by:* **Best Veterinary Solutions, Inc. • Willmar, MN 56201**
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"Marketed Exclusively by Best Veterinary Solutions"

Contact the BVS sales representative or distributor in your area for more details.

# Get into the Zone

## The Manage® Zone
Dietary Agent for Poultry and Swine

- is considered GRAS (generally recognized as safe).
- has a pH of 1.3.
- when mixed at recommended levels will reduce drinking water to pH 3.5-5.5.
- will hold pH down longer than other commercially available acidifiers.
- contains higher levels of copper than other liquid copper products on the market.
- is a dark purple solution that stays in solution without any settling out like that of competitive products.
- fits well into an antibiotic free program.
- works very well to maintain waterlines. Prevents scale build up.
- is friendly to the environment. 40% less copper excreted by using Manage versus feed grade copper.
- Is the only Patented product of its kind!

## The Acid Sol® Zone
Dietary Agent for Poultry and Swine

- is considered GRAS (generally recognized as safe).
- has a pH of 1.3.
- when mixed at recommended levels will reduce drinking water to pH 3.5-5.5.
- will hold pH down longer than other commercially available acidifiers.
- is a red solution that stays in solution without any settling out like that of competitive products.
- fits well into an antibiotic free program.
- works very well to maintain waterlines.
- is a combination of buffered acids.
- contains No copper.

BioProteXion
by CID LINES

# COMPLETE SANITATION PROGRAM FOR FIELD AND HATCHERIES

## BIOGEL

- The strongest cleaner
- Gel clings on longer than classical foam = superior cleaning result

## KENOSAN

- Deeply penetrating alkaline foam for farms, incubators, trucks, …
- Apply at 1 to 1 ½ oz / gal only with a foam wand.
- Non corrosive in dilution.

## VIROCID®

- EPA approved "broad spectrum disinfectant"
- QAC/glutaraldehyde based, dil 1/3 oz – ½ oz/gal
- Non corrosive
- Apply by spray, foam or (thermo) fog
- Maintains pad cooling systems

## KENO™ X5

- EPA approved "broad spectrum disinfectant"
- Per Acetic Acid based, dil ½ oz/gal
- 100% biodegradable

## CID 2000

- H2O2 removes heavy soils
- Peracetic Acid removes scale / mineral build up
- Equipment friendly
- Proven "greatest reduction in microbial load" by U. of Arkansas

## CID CLEAN

- 50% Stabilized Hydrogen Peroxide
- H2O2 removes heavy soils
- Equipment friendly
- NO heavy metals

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ANIMAL SCIENCE PRODUCTS®
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## Knock the Snot Out of Respiratory Disease

Respiratory diseases are among the major group of diseases affecting poultry today. Consequently, losses incurred by these diseases make a major economic impact on U.S. poultry producers. Respiratory disease is not caused by a single virus or bacteria. It generally is caused from a combination of both, or a host of air quality issues, making treatment and prevention more complicated.

MucuSol™, from Animal Science Products, contains the highest concentration of Guaifenesin— the most efficacious mucolytic agent available today. MucuSol™ thins mucus, allowing the animal to easily expel it, and rapidly improve breathing efficiency. At the first sign of respiratory congestion utilize MucuSol™ to eliminate the costly secondary effects of respiratory disease.

## Advantages of MucuSol™:

- Most concentrated form of the premiere mucolytic agent Guaifenesin.
- Thins mucus, lubricates and drains respiratory tract.
- Makes coughs more productive.
- Improves respiratory efficiency.
- Reduces breathing discomfort.
- Helps expel trapped irritants and infectious agents in mucus.

ASP MucuSol™

Made in the USA

To learn more about MucuSol, please contact your local BVS representative.

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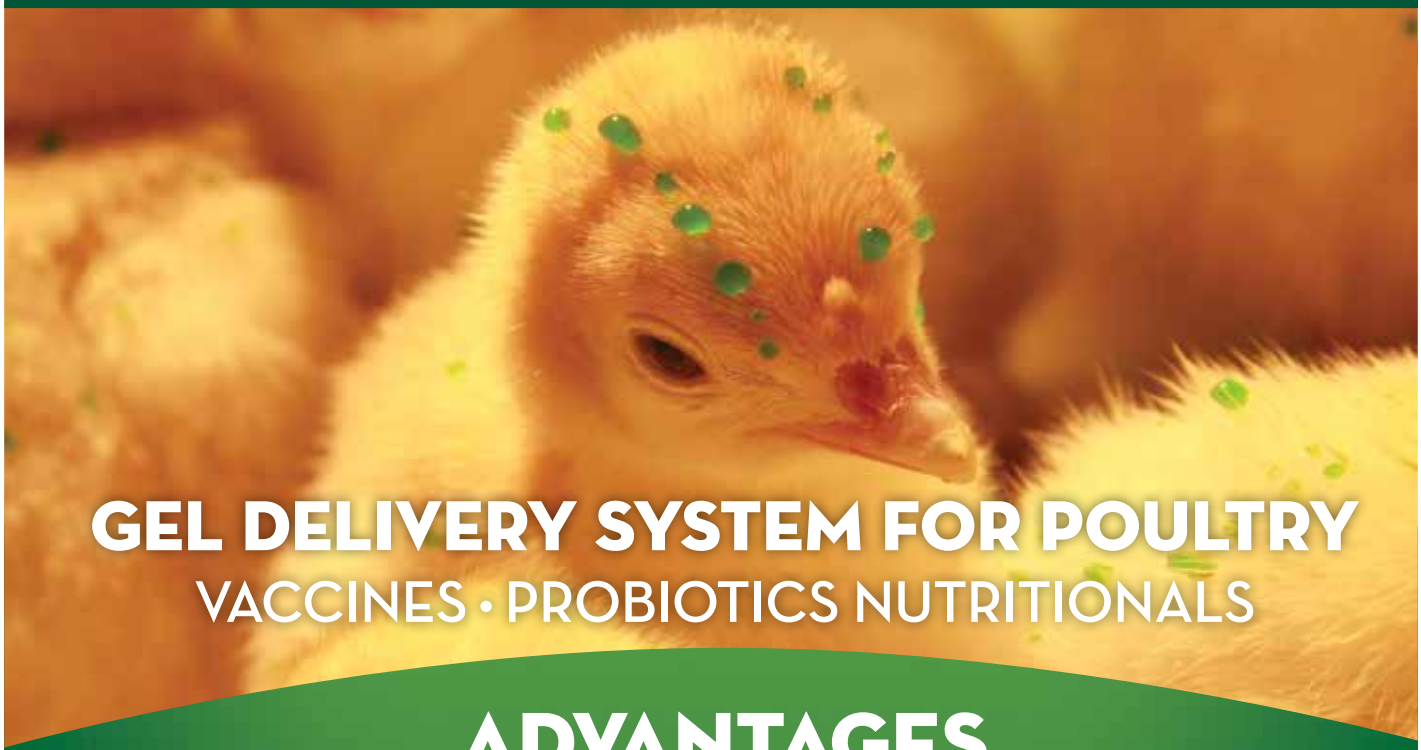
# Gel-Pac™



## GEL DELIVERY SYSTEM FOR POULTRY

VACCINES • PROBIOTICS NUTRITIONALS

## ADVANTAGES

- STABLE GEL ENSURES UNIFORM SUSPENSION
- PERFECT FOR INSOLUBLE INGREDIENTS
- INDIVIDUAL GEL DROPS ARE EASILY CONSUMED
- WILL NOT SOAK FEATHERS
- READILY VISIBLE TO THE BIRDS
- IDEAL FOR USE IN GEL DELIVERY SYSTEMS

Made in the USA

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As published in

PoultryAdvisor

# Broilers: Improve performance with Original XPC™ when using a cocci-vaccine

**Don McIntyre, Ph.D., PAS**
Director, North America Poultry Research & Technical Service
Diamond V

Birds given a live coccidiosis vaccine often show signs of diminished appetite and slower-than-expected growth rate soon after vaccination. Historically, the conventional approach to alleviate these symptoms in broiler chicken rearing is to supplement the flock with sub-therapeutic antibiotics. However, many producers are searching for an alternative, all-natural product to reverse the often-observed depressed performance brought on by a live coccidiosis vaccine.

**What Is Happening at Gut Level?**
Why are low-dose antibiotics effective? What happens at the gut level when the bird is exposed to a live coccidiosis vaccine, causing the bird to back off feed and hindering its growth rate?

One possible explanation: Invasion of the intestinal mucosal layer by the live *Eimeria* oocysts produces the desired first line of immune defense (innate immunity) but also produces an increased localized inflammatory response (Lillehoj, 2014; . Niewold, 2014). Niewold (2014) suggests that the practice of feeding sub-therapeutic levels of antibiotics successfully reduces the inflammation and restores optimum appetite and body weight gain following vaccination with live coccidia.

However, this practice is not available to antibiotic-free or all-natural rearing programs. Broiler producers need an all-natural solution that produces similar results.

Previous research has demonstrated that Diamond V Original XPC™ fed to turkeys prevents the reduction in appetite and growth rate following a live coccidia vaccination (Broomhead, 2014). In that study, turkey hens given a live cocci-vaccine

showed reduced feed intake and reduced body weight gain compared to non-vaccinated controls. Feeding Original XPC increased body weight gain of both the non-vaccinated and vaccinated hens, compared to control birds that did not receive Original XPC. Furthermore, no depression in feed intake or weight gain was observed with Original XPC inclusion.

In another study, broilers challenged with coccidiosis while being fed Original XPC demonstrated reduced severity of intestinal lesions, increased body weight and improved feed conversion compared to control challenged birds (McIntyre et al., 2013).

A recent study was conducted using broilers to compare the effects of a live coccidiosis vaccine with and without the dietary inclusion of Original XPC.

**Trial Design**

An experiment was conducted in Arkansas using 1,280 Ross 708 male broilers. Birds were allocated to one of four treatments (Table 1). A three-phase feeding program included Starter, Grower, and Finisher diets (Table 2). All birds were vaccinated in the hatchery with Marek's, IBD, NCDV & IBV, and sprayed with Coccivac-B (Merck) at 0d of age. Salinomycin (Sal) was used as the sub-therapeutic coccidiostat in the Grower diet.

**Table 1. Treatment allocation**

| ID | Description[1] | Original XPC (2.5 lb/t) | Salinomycin (40g in Grower) |
|---|---|---|---|
| **T1** | Control; Cocci-vaccine (no XPC) | No | No |
| **T2** | Cocci-vaccine + XPC | Yes | No |
| **T3** | Cocci-vaccine + Sal (no XPC) | No | Yes |
| **T4** | Cocci-vaccine + Sal + XPC | Yes | Yes |

**[1]Diets were fed to 16 pens per treatment; 20 birds per pen.**

Birds and feed were weighed by pen at 16, 28, and 42d. Fecal samples were taken by pen at 14, 21, 28, and 35d to estimate oocysts per gram (OPG) of fecal matter.

**Table 2.** Feeds and feeding program

| Diet | Feed (lb)/bird | ME (kcal/lb) | C. Protein (%) | Feed Form |
|---|---|---|---|---|
| Starter | 1.25 | 1390 | 22.37 | Crumble |
| Grower | 2.85 | 1420 | 19.98 | Pellet |
| Finisher | To market | 1440 | 17.81 | Pellet |

**Results and Discussion**

Depressed feed intake is a common observation following administration of a live coccidiosis vaccination. Treatments in this study that contained Original XPC (T2 &

*continued on page 24*

T4) increased feed intake compared to their respective control treatments (T1 & T3; Table 3).

These results support previous reports that feeding Original XPC can reduce intestinal inflammation and restore appetite in birds vaccinated with live coccidia (Broomhead, 2014).

**Table 3.** Feed intake (lb/bird) by age

| ID | Treatment | 16d | 28d | 42d |
|---|---|---|---|---|
| T1 | Cocci-vaccine | 1.52 | 5.26 | 11.99 |
| T2 | Cocci-vaccine + XPC | 1.58 | 5.34 | 12.10 |
| T3 | Cocci-vaccine + Sal (40g) | 1.56 | 5.28 | 11.86 |
| T4 | Cocci-vaccine + Sal (40g) + XPC | 1.62 | 5.39 | 12.05 |

Body weight gain was significantly increased in Original XPC fed treatments (Table 4 & 5). Adding Original XPC to the diets (T2 & T4) helped birds overcome the common weight depression with cocci-vaccine alone and with the addition of low levels of salinomycin (40g) in the Grower diet.

**Table 4.** Body weight (lb) following cocci-vaccine administration

| ID | Treatment | 16d | 28d | 42d |
|---|---|---|---|---|
| T1 | Cocci-vaccine | $1.12^{b}$ | $3.58^{b}$ | $7.05^{b}$ |
| T2 | Cocci-vaccine + XPC | $1.18^{a}$ | $3.74^{a}$ | $7.25^{a}$ |
| | | $P < 0.05$ | $P < 0.05$ | $P < 0.05$ |

**Table 5.** Body weight (lb) after cocci-vaccine with salinomycin in Grower

| ID | Treatment | 16d | 28d | 42d |
|---|---|---|---|---|
| T3 | Cocci-vaccine + Sal (40g) | $1.13^{b}$ | $3.67^{b}$ | $7.19^{b}$ |
| T4 | Cocci-vaccine + Sal (40g) + XPC | $1.21^{a}$ | $3.85^{a}$ | $7.30^{a}$ |
| | | $P < 0.05$ | $P < 0.05$ | $P < 0.05$ |

Feed conversion ratio (FCR) was also improved by the addition of Original XPC to the feed following cocci-vaccine administration. The strongest advantage was seen from 16-28d (Table 6), when the coccidiosis challenge is greatest and salinomycin was added to the Grower diet (Table 7).

*continued on page 25*

| **Table 6.** Adjusted feed conversion ratio (FCR) after cocci-vaccination[1] | | | | |
|---|---|---|---|---|
| ID | Treatment | 16d | 28d | 42d |
| T1 | Cocci-vaccine | 1.36 | 1.47[a] | 1.70 |
| T2 | Cocci-vaccine + XPC | 1.34 | 1.43[b] | 1.67 |
| | | NS | $P < 0.05$ | $P = 0.16$ |
| [1]FCR adjusted to a common body weight. | | | | |

| **Table 7.** Adjusted FCR after cocci-vaccination + salinomycin (40g) in Grower[1] | | | | |
|---|---|---|---|---|
| ID | Treatment | 16d | 28d | 42d |
| T3 | Cocci-vaccine + Sal (40g) | 1.38[a] | 1.44[a] | 1.69 |
| T4 | Cocci-vaccine + Sal (40g) + XPC | 1.34[b] | 1.40[b] | 1.67 |
| | | $P = 0.09$ | $P < 0.05$ | NS |
| [1]FCR adjusted to a common body weight. | | | | |

No differences were observed between treatments in fecal oocysts per gram (OPG), indicating that the addition of Original XPC to the diets of T2 & T4 did not interfere with colonization of *Eimeria* and development of immunity during the trial. This supports the premise that Original XPC can be used in conjunction with live vaccines without interfering with their effectiveness.

## Observations

- Feeding Original XPC improved feed intake in birds given live coccidiosis vaccine, compared to control diets with and without salinomycin (40g) in the Grower feed.

- Feeding Original XPC to birds given live coccidiosis vaccine increased body weight of broilers at 16, 28, and 42d of age, compared to control diets with and without salinomycin (40 g) in the Grower feed.

- Feed conversion was improved by adding Original XPC to diets in birds given live coccidiosis vaccine, compared to control diets with and without salinomycin (40g) in the Grower feed, notably during the colonization of coccidia following vaccination.

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# The Rodenticide Evolution

**By: Ted Bruesch**
**National Technical Support Manager**
LIPHATECH

Rodent control has come a long way in the past two centuries, but how did we get to this point? From cats & rat terriers to soft bait technology, this article will give you a background and understanding of where rodenticides came from, and where they are going.

## *Important Background Concepts:*

Norway rats, roof rats and house mice are referred to as commensal rodents. That means, while they are found out in the "wild", they can also live in our human environments and survive by eating our food. When humans began practicing agriculture and storing food, these rodents adapted. All three commensal rodents trace their ancestry to Asia including the Norway rat. This rat probably got its name when it was believed, likely mistakenly, to have been introduced to central Europe via ships from Norway in the mid-seventeen hundreds. As trading via ocean shipping spread, stowaway rodents also spread throughout the world. Since then, people around the world have been trying to get rid of them.

**Resistance** can be categorized as biological or behavioral. Biological resistance is a genetically inherited ability to tolerate more than a normal lethal dose of a toxicant. Behavioral resistance is an inherited behavioral trait which causes a rodent to not eat the bait in first place. An example of this occurred in Europe when a population of rodents were found to shun carbohydrate based rodenticides and were later controlled with protein based products.

**Bait Aversion** is reluctance by the rodent to try a new rodenticide. Because of their fearful nature this is often a greater problem with rats than mice, which are naturally inclined to try new foods. All active ingredients in rodenticides taste bad, which is the main cause of bait aversion problems. More active ingredient often means more bait aversion. Here are the most commonly used concentrations of the 10 active ingredients currently registered in the United States:

- 20,000 PPM (2%) Zinc Phosphide
- 750 PPM (0.075%) Cholecalciferol
- 250 PPM (0.025%) Warfarin
- 100 PPM (0.01%) Bromethalin
- 50 PPM (0.005%) Chlorophacinone, Diphacinone
- 50 PPM (0.005%) Brodifacoum, Bromadiolone, Difenacoum
- 25 PPM (0.0025%) Difethialone, Brodifacoum

**Bait shyness** can occur after a rodent eats a fast acting product and gets sick right away. Rodents will then connect the discomfort to the food. If they don't die, they will avoid that food in the future.

There are two **rodent senses** which make it challenging to create an effective rodenticide: they have incredible senses of taste and smell. They can taste "contaminants" (active ingredient, dye, bittering agents, etc.) at less than 1 part per million (PPM).

## *Rodenticides can be divided into 3 groups of active ingredients:*

Acute toxicants are the fastest acting, but they are prone to bait aversion and bait shyness. None of these have an antidote.

- **Acute toxicants**
  - *Bromethalin* kills by damaging the central nervous system
  - *Cholecalciferol* causes calcium to move from the rodents bones to various internal organs
  - *Zinc Phosphide* reacts with stomach fluid to form phosphine gas and damages multiple body functions

There are two types of anticoagulants: First and Second Generation. Anticoagulants all work the same way – by interfering with the rodent's natural blood clotting ability. As the rodent hemorrhages internally it loses its ability to sustain life. There are no signs of pain or discomfort as there are with the acute toxicants. Because of this, the rodent does not make a connection to its new food source and become bait shy. As with both anticoagulants, there is no bait shyness and they share the same antidote – Vitamin K1.

- **First Generation Anticoagulants:**
  - *Warfarin, Chlorophacinone and Diphacinone* are known as multiple feed anticoagulants. Rodents must feed on them for at least several consecutive days to build a lethal concentration in their system.
  - The effects take several days to more than a week to begin, further reducing any risk of bait shyness.
- **Second Generation Anticoagulants**
  - *Brodifacoum, Bromadiolone, Difenacoum and Difethialone* are also known as single feed anticoagulants. Rodents only need to feed on these for one day to ingest a lethal dose.
  - Historically, these products were also formulated at 50 PPM. Recently, that concentration has been reduced to 25 PPM in some new products creating highly palatable and very effective formulations.
  - Most single feed anticoagulants are formulated at 50 PPM which means there is much less active ingredient causing the rodenticide to taste bad. Difethialone is formulated at 25PPM increasing its palatability to rodents and lowering the risk of secondary poisoning to non-target animals.

## *Rodent Control through the Ages*

Ancient Egyptians revered cats in part because of their rodent killing abilities. In the Middle Ages "rat catchers" employed a variety of traps, rat terriers and "secret" potions to kill rodents. Twentieth century farmers and exterminators were still making their own special rodent killing compounds until the federal government began regulating pesticide formulations.

Early modern rodenticides included toxicants such as arsenic, red squill and strychnine. All of them carried serious risks to applicators, children and non-target animals such as domestic animals and wild-life. After World War II, the less risky anticoagulant rodenticides appeared and have since become the predominant class of active ingredients.

Bait forms utilizing modern day active ingredients have gone through a drastic amount of changes over the years as well. What started them all was meal bait. They are very palatable but are not weather resistant, and are difficult to make tamper-resistant by non-target animals. Pellet formulations improved the weather resistance but did not improve the tamper resistance. Meal and pellets in place

packs provided dose control and convenience. Eventually, blends of grains, flavorings and other ingredients with melted paraffin wax were poured into molds to form blocks. Later extrusion technology resulted in more efficient wax block manufacturing. As new active ingredients were developed, rodenticides became significantly more palatable. Wax block baits were effective to varying degrees but the high concentration of wax contributed to bait aversion and melting problems.

Liphatech understood the need for a bait with increased palatability and answered it with Soft Bait technology. In 2010, Liphatech, the Soft Bait Innovators™ launched the agriculture market's rodenticide revolution: no-wax FastDraw® Soft Bait containing difethialone, and later in 2012 Revolver™ Soft Bait containing bromadiolone. Both were developed utilizing second generation anticoagulants and with mixtures of milled grain & oils. FastDraw and Revolver soft baits outperform the popular red and green wax-blocks in head-to-head palatability comparisons. They maintain their consistency in hot and cold temperatures due to containing no wax, and remain highly acceptable to rodents even when there are competing food sources. Whether you or your customers are knocking down a high rodent population, need a low cost per placement maintenance bait, or simply demand the best, FastDraw and Revolver are the clear choices when switching from red and green wax-blocks.

Modern rodenticide formulation evolution has been driven by several important factors: greater efficacy against target rodents, less risk to non-target animals, and efficacy against warfarin resistant rodents. Below is a chart detailing the different rodenticide formulations, and their advantages & disadvantages.

| Formulation | Advantages | Disadvantages |
|---|---|---|
| Water Bait | Likely to appeal to rodents in very dry environments. | Can be easily spilled.<br>Active ingredient (diphacinone) is weak against mice. |
| Tracking Powder | Can be placed directly in rodents nest or pathway. | Restricted use product due to toxicity.<br>Risks related to its ability to be tracked from where it was placed and its ability to become an airborne contaminant must be managed.<br>All are labeled for indoor use only.<br>ZP Tracking Powder is only labeled for mice. |
| Bulk (loose) Pellets | Pellets resemble seeds and are readily accepted.<br>Best for rat burrow baiting especially if pellets are paraffinized to withstand burrow moisture. | Easily trans located, especially by mice. |
| Meal Bait | Excellent palatability and acceptance.<br>Excellent burrow bait:<br>• Especially if soil is dry<br>• If even one kicked out pellet is unacceptable | Not easily secured.<br>Not moisture resistant. |
| Place Packs (meal or pellet) | Pre-measured doses.<br>Minimal applicator contact.<br>Bait is protected from dirt.<br>Bait melt and insect attack is minimized. | Not as weather tolerant as blocks and soft bait. |

| | | |
|---|---|---|
| Wax Bars | Best for high moisture areas such as sewers.<br>The larger block size may be more cost effective in certain heavy infestations. | High wax content may affect palatability.<br>Can melt in bait stations.<br>May be attacked by insects and mollusks. |
| Extra Durable Wax Block | Preservatives minimize mold.<br>Fine texture eliminates seeds and husks.<br>Extra wax enhances moisture tolerance.<br>Well suited for audited accounts. | High wax content and preservatives may affect palatability.<br>Can melt in bait stations.<br>May be attacked by insects and mollusks. |
| Molded (poured) Wax Blocks | Usually more moisture tolerant. | Older technology.<br>High wax content may affect palatability.<br>Can melt in bait stations.<br>May be attacked by insects and mollusks. |
| Extruded Wax Blocks | Good to very good palatability and efficacy.<br>Easily secured.<br>Industry standard for routine rodent control. | Can melt in bait stations.<br>May be attacked by insects and mollusks. |
| Soft Bait<br>Grain and vegetable oil (no wax) | Very good to outstanding palatability and efficacy.<br>Doesn't melt in bait stations.<br>Available in difethialone or bromadiolone.<br>Similar to blocks: Mold and moisture tolerance, ease of application.<br>The future of rodent control. | May attract and be consumed by insects and mollusks. |

## *The Future Is Soft*

Why put the livelihood of your production facility at risk of a high rodent population? With federal food safety regulations and corporate biosecurity inspections gaining popularity, many poultry and swine producers are rapidly making the switch to FastDraw and Revolver soft baits to keep their rodent populations down. Their low cost, single-feed soft bait pouches can help: reduce the risk of diseases, reduce feed contamination & consumption, lower costly building damage, and may keep your operation within regulations or guidelines.

Many companies have come to rely on Liphatech's innovative product line of rodenticides and AEGIS® bait stations, entirely manufactured in the U.S.A., to keep their flock or herd free from rodent borne diseases. To learn more about soft bait, how it can improve your biosecurity program, and save your company time & money, contact your animal health distributor, visit Liphatech.com or call 888-331-7900. Think Savings. Think Effectiveness. **Think Soft Bait.**

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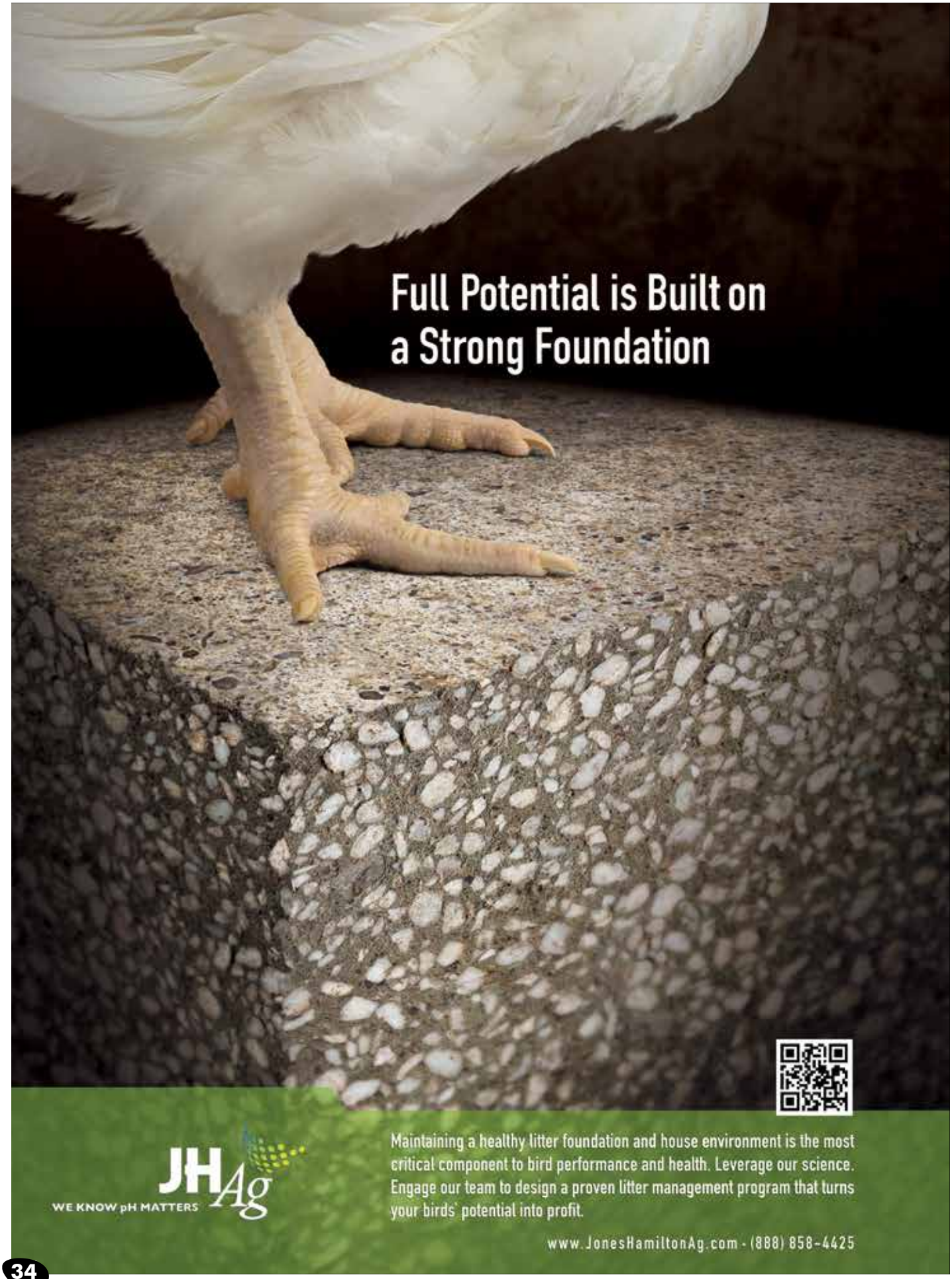
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**Gentamicin Sulfate Poultry Injection is recommended for the prevention of early mortality in day-old chickens associated with *Escherichia coli*, *Salmonella typhimurium* and *Pseudomonas aeruginosa* susceptible to gentamicin sulfate, and as an aid in the prevention of early mortality of 1 to 3 day-old turkeys associated with *Arizona paracolon* infections susceptible to gentamicin sulfate.**

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**Dosage and Administration**

Each day-old chicken should be aseptically injected subcutaneously in the neck with GentaPoult® diluted with sterile, physiologic saline solution to provide 0.2 mg gentamicin in a 0.2 mL dose.

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**RESIDUE WARNING:** For use in day-old chickens and 1 to 3 day-old turkeys only. Chickens injected with GentaPoult® must not be slaughtered for food for at least five (5) weeks following treatment. Turkeys injected with GentaPoult® must not be slaughtered for food for at least nine (9) weeks following treatment.

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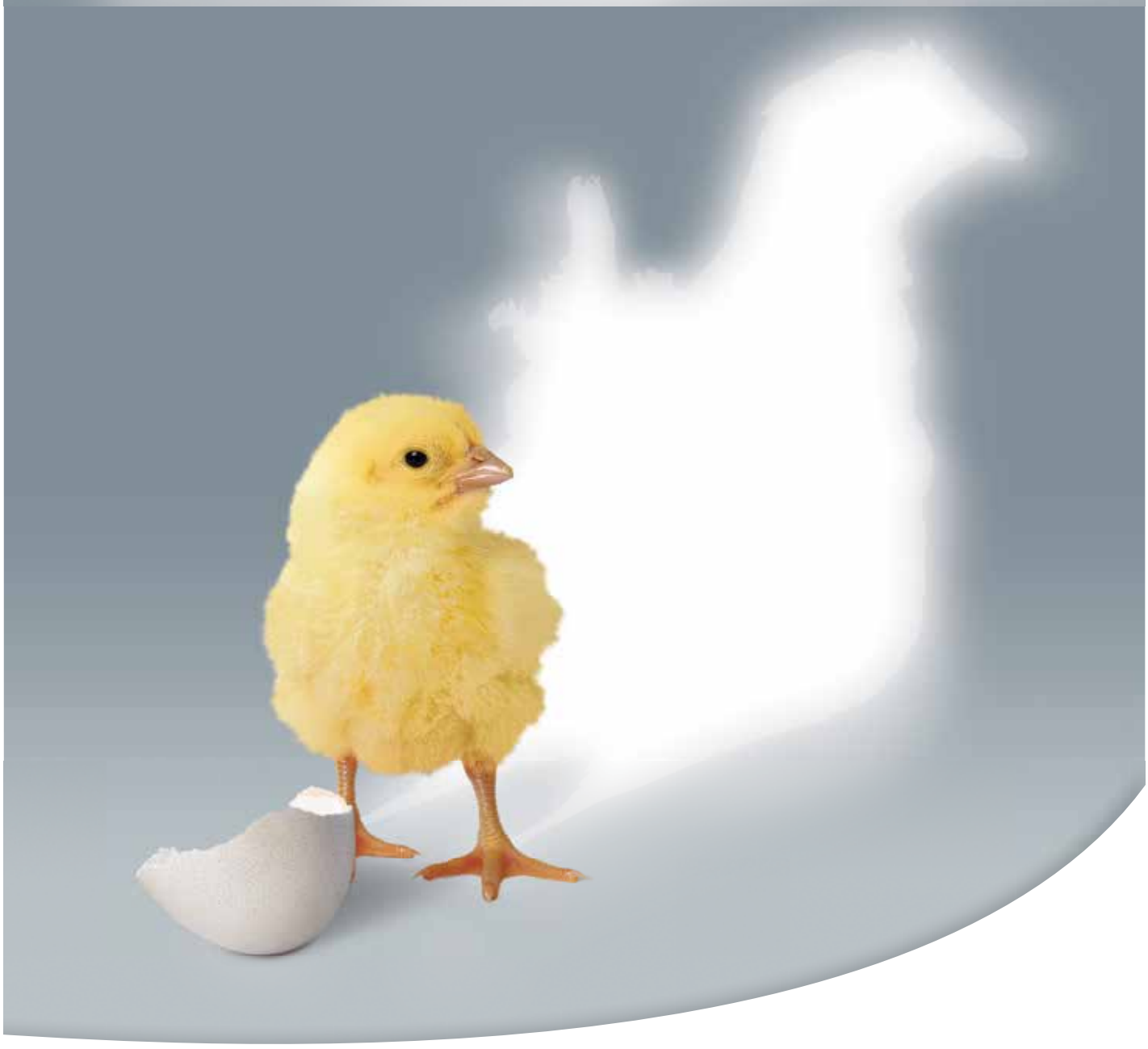

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