

# BVS POULTRY

## Best Veterinary Solutions, Inc.

### Summer 2017

[www.bestvetsolutions.com](http://www.bestvetsolutions.com)

# Talk

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## CONTENTS

BVS Private Label Products .....	2
The Curmudgeon's Corner .....	2
Solutions for Organic Production .....	4
Identifying and Understanding	
Saponin Content of Yucca Products .....	6
Barnes Paper .....	6
BioProtecion by CID Lines .....	7
BVS Personal Protection .....	8
BVS Sanitizing/Cleaning Equipment .....	9
Steris Cal Stat® Plus and ALCARE .....	10
Elanco AviPro® Megan® .....	11
Merck Animal Health Products .....	12-13
Cleaning and disinfection of layer house	
systems for table egg production .....	14-15
Bio-security: practical tips to minimize the	
human risk of contamination .....	16-17
AviCare Diamond V .....	18-19
Safe-guard® AquaSol .....	20
Omegamune-Plus .....	21
Organic Manage® .....	22
Manage® .....	23
BVS Poultry & Swine Wash Concentrate .....	24
Gut Pro™ & Gut Restore® .....	25
Anpario OREGO-STIM™ .....	26
Virocid & Kenosan .....	27
Lohmann Lovit LC-Energy .....	28
pH Safe .....	29
Elanco Spring Bioprotection Program .....	30
Elanco Agita® 10 WG .....	31
Implications of Litter Management in an	
Antibiotic Free Program .....	32-35
HatchPack® Cocci III .....	36
Jones Hamilton Ag PLT® Litter Acidifier .....	37
Cleaning & treatment of evaporative cooling pads .....	38
Animal Science Products® .....	39
ProOxine® (AH) Disinfecting Solution .....	40
Gilmer Industries, Inc. ....	41
Huvepharma® .....	42
Agroin Biosupreme® .....	43
Arko Laboratories .....	44

# Paying Attention to Detail

## Silver bullets – they are coming out of the woodwork

by John Menges, BVS  
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How many times have we heard or used the phrase – “coming out of the woodwork”. How many times have we heard or said the phrase – “there are no silver bullets”. To continue to look at *Paying Attention to Detail*, as an ex-live production manager, I want to discuss how there are no silver bullets available to fix or improve performance, and there are a lot of products coming out of the woodwork that claim to be able to do this. As production managers, how do we sift through this mess and keep our eye on *Paying Attention to Detail*?

### Current Situation

- [www.microbialcompendium.com](http://www.microbialcompendium.com)
- In 2010 – 18 companies listed
- By 2013 – 85 companies listed

A few years ago, I listened to the Curmudgeon give a talk on ABF production. In that talk, he presented the following slide.

The purpose of that slide was to show the significant increase in the number of companies marketing products in response to using less antibiotics. Many, if not all, of these products are unregulated by FDA. So,

*continued on page 3*

# BVS

has manufactured, branded  
and private-labeled water  
soluble vitamins and  
nutritional supplements!

## MANAGE<sup>®</sup>

**Get into the Manage<sup>®</sup> Zone**  
Contains Buffered Acids  
Plus Copper.

## MANAGE<sup>®</sup>

**Organic MANAGE<sup>®</sup>**

**Omegamune<sup>®</sup> Plus**

**Omegamune<sup>®</sup> GutPro**

**Omegamune<sup>®</sup> GutStart**

### **Acid SOL**

*Water acidifier without copper*

### **Starter Pak**

*New improved highly concentrated  
vitamins with citric acid*

### **Vita Pak<sup>®</sup>**

*Highly concentrated vitamins  
& electrolytes*

### **Solulyte**

*Balanced Electrolytes*

### **Vitamin E**

### **Dry Cider Vinegar**

### **Citric Acid 410**

### **Acidified Copper**

### **Vitamin B Complex**

## The Curmudgeon's Corner

Robert L. Owen, V.M.D., Ph.D., DACPV  
Director of Technical Service

This was a hard Spring for poultry in the Northeast. I am not sure whether it was the cold wet weather, alignment of the planets, or global warming but something triggered the round worm eggs in the poultry houses to all become infective at the same time and for the larval stages to migrate in the wall of the birds' intestines like I have never seen before. This pilgrimage lit off a tremendous number of cases of enteritis and, in a surprising number of birds, necrotic enteritis. Since the animals I take care of are primarily NAE (no antibiotics ever) or organic, treatment for these animals, as usual, presented a challenge.

Fortunately, on the NAE side, MSD Animal Health recently introduced a water soluble febendazole product marketed as AquaSol for control of internal parasites. It was while researching how to properly dose and administer this product that I received yet another kick in my already bruised private parts. In some of the supporting literature for this product's use in Europe the statement is made that this product can be used in organic production if the withholding time, which for meat in Europe is 4 days, is doubled. Yes, Sports Fans, veterinarians are actually allowed to do their jobs in Europe and treat sick animals, even organic animals, with safe and efficacious compounds that will actually cure the disease and mitigate the animal's suffering.

What a novel concept – veterinarians being able to do what they were trained for and what they have accepted as their life's mission – and without artificial market forces and bureaucrats, who know nothing about animal agriculture and live production, dictating rules lacking any common sense telling them how or whether they are allowed to practice their profession. How is it that we have allowed ourselves to idly stand by and watch slick marketing programs constantly bombard us with advertising about the virtues of NAE and such well known therapeutic agents as oregano and thyme?

What is wrong with a marketing program consisting of a veterinarian standing up for a company and saying that we do our best every day to prevent disease in our animals. Unfortunately, despite these efforts, animals will get sick. People and animals do get sick - that is a part of life. Our obligation as a company is to protect the welfare and alleviate the suffering of our animals. Therefore, our company policy is when our animals get sick we treat them with FDA approved products with established withdrawal times. Even though we trust these withdrawal times, to alleviate any concerns on the part of our customers, we will double the withdrawal time of any treatment for animals producing products bearing the Curmudgeon's label. We are making this extraordinary commitment to insure both the welfare of our animals and the wholesomeness of the products produced from those animals.

I could drone on and on about the animal cruelty that I see constantly imposed on these animals by this ludicrous marketing strategy but am seriously concerned that constantly having to stand by and watch animals die that I could help so that organic orders can be met is affecting my sanity. To me, it defies logic that legions of veterinarians are not standing up and screaming at the top of their lungs. It is all so wrong because all these marketing programs for rich people are creating the most egregious cruelty and suffering being perpetrated upon animals since I took my Veterinarian's Oath in 1976 and no one except the poor farmer picking up the dead animals day after day ever talks about it or even seems to care.

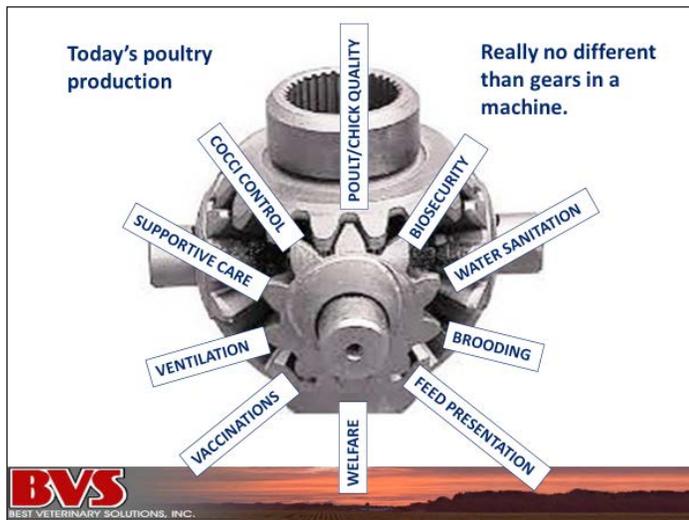
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# Silver bullets , continued from cover

as production managers, how do you determine if any of these products are worthy of your time and money?

For those raising antibiotic free (ABF) or organic (ORG) poultry, you may be forced to use products that those in conventional production don't think about. For example, if you would have told me that cough syrup (MucuSol) and Yucca (BioSupreme) would have been my "go-to" tools for treating turkeys when I was conventional, I would have laughed that salesperson out of my office. But, in ABF and organic, they were staples. For conventional production, the VFD ruling may move producers to think more about some of the unconventional (non-antibiotic) products available. How do we determine/evaluate if these products are working or not? If we have our house in order, I mean if we are *Paying Attention to Detail* in our operations, it is a lot easier to evaluate the effectiveness of different products for prevention or treatment.

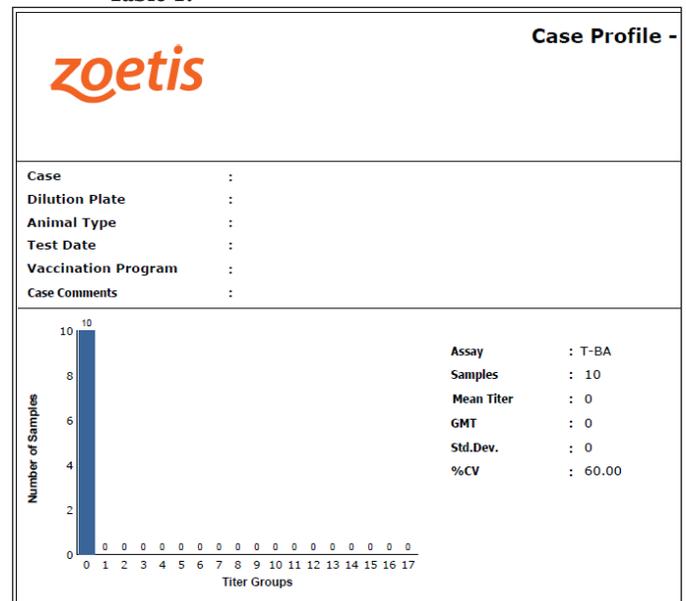
Below is a tool or gear that I use in my presentations to talk about *Paying Attention to Detail*. In the *BVS Poultry Talk Winter 2016-2017* edition, I listed several issues that those in the ABF world need to be prepared to deal with for success. The tool below lists these items in manner that is easy to understand. Missing items means missing cogs in the gear. Missing cogs means the machine, or flock in this case, can't move forward.



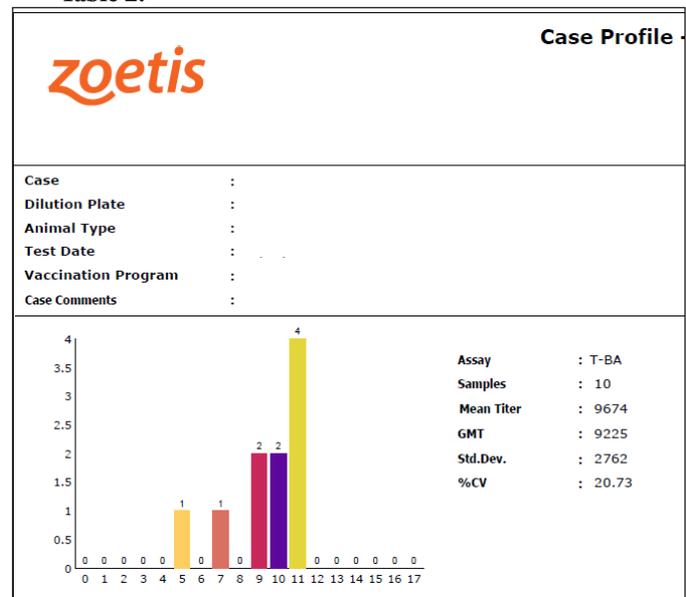
Most of the cogs in the gear are obvious – cocci control, ventilation, biosecurity, welfare, vaccinations, pout/chick quality, brooding, feed presentation – we all know how critical they are. If they are not being managed effectively, the machine can't move and they are all measurable. But, how do we evaluate the water sanitation and supportive care cogs? Are they necessary? What products are the most effective? It's not as easy as evaluating a cocci control program – you are either controlling cocci or not. It's not like evaluating a tunnel ventilation system when the outside temperature is in the mid 90's. You either have air speed and wind chill with evaporative cooling keeping birds comfortable or you don't. In both cases if we aren't *Paying Attention to Detail* the results are obvious – poor performance or even mortality.

Let's start with water sanitation. In my turkey production experience, water sanitation evaluation was simple. Do I have Bordetella (BA) or not? If the answer is yes on a farm, then my water sanitation is ineffective and I need to *Change* what I am doing. For me, Bordetella is an indicator of water line sanitation and a water system that is free of or has reduced biofilm. If I have Bordetella under control then other bacteria, viruses and potential pathogens will generally be under control. For turkeys, the difference between having Bordetella or not is measurable in blood serology, mortality and performance versus the cost of water sanitation. Table 1 shows blood titer result from a flock with good, consistent water sanitation. There are no BA titers present at 8 weeks of age, which is the age I like to look at BA and HE (Hemorrhagic Enteritis) titers for BA challenge and HE vaccination effectiveness. Table 2 on the other hand shows a flock that has elevated BA titers at 8 weeks of age. This would be a red flag for me to take a hard look at my water sanitation program for effectiveness and consistency.

**Table 1.**



**Table 2.**



# Solutions for Organic Production

## Acidifiers:

BVS Citric Acid  
 BVS Liquid Citric Acid  
 BVS Acidified Copper Sulfate  
 BVS Dry Cider Vinegar  
 LPH 100 (ClO2 Activator)

## Supportive Care:

AviCare™  
 BVD3  
 XPC™ Green  
 AniPrin LQ-PM (Aspirin)  
 Organic Manage  
 Mucusol®  
 BVS Vitamin D3 Liquid  
 BVS Poult Start  
 BVS Vitamin EKA + D3  
 BVS Sol-U-K  
 BVS Solulytes Natural

## Essential Oils:

Biosupreme® L  
 Biosupreme® Organic Feed Grade  
 EnviroSupreme Green  
 Orego-Stim Liquid  
 Orego-Stim Feed Grade

## Insecticides:

Essentria™ All Purpose Concentrate  
 Elector PSP  
 PyGanic

## Probiotics:

Gut Pro-O

## Cleaners/Disinfectants:

Keno™ X5  
 Keno™san  
 Pro Oxine®  
 Gil-O-Fact II

## Litter Ammendments:

Klasp™  
 Activated Barn Fresh  
 Stall Dry  
 Enviro Green

Please contact your BVS Salesman for more information on the products we offer for organic production

**BVS** BEST VETERINARY SOLUTIONS, INC.  
 QUALITY ANIMAL HEALTH & HYGIENE

\*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.



# Silver bullets,

continued from page 3

Below are results of a farm that had a history of Bordetella and respiratory challenges on a consistent basis, flock after flock. Bordetella challenges were eliminated after water line sanitation was administered consistently and monitored weekly. Free chlorine dioxide (CLO2) levels of 3 ppm were achieved with the use of the AANE (Automatic Activation No Electric) system.

## AANE system



### Bordetella blood titer levels measured at 8 weeks of age:

Before CLO2	7833 GMT
After CLO2	0 GMT (5-month period)

Respiratory and E. coli challenges were virtually eliminated on this farm, which had a history of losing 1-2% between 8-10 weeks of age. Depending on how “dirty” the water system on the farm, including pressure regulators and underground pipes in addition to the drinking lines, it may take several flocks to see a significant improvement. Drinker line swab tests for total bacteria and coliform are also good indicators of water line sanitation effectiveness, checking before changing water sanitation and after. BVS has a cost calculator available for using ProOxine and LpH100 in an AANE system that can give a very good estimate on what water sanitation costs may be based on water consumption. Table 3 below is an example of the cost for using ProOxine and LpH100 acid activator when targeting 5 ppm total chlorine dioxide levels and placing 10,000 toms to 133 days of age.

Table 3.

Pro-Oxine Usage:		
Volume (Gal)	PPM	Total Concentration
174,570.00	5.00	872,850.00
	Pro-Oxine PPM	Pro-Oxine Used (Gal)
	50,000.00	17.46
	Price/Gal	Total Price
	\$25.00	\$436.43
LPH100 Usage:		
Pro-Oxine Usage	LPH100 Ratio	Acid Used (Gal)
17.46	0.07	1.16
	Price/Gal	Total Price
	\$18.00	\$20.95

The 10,000 toms drink approximately 175,000 gallons of water and the total cost would be approximately \$458.00 to sanitize the drinking water for the flock. This is a small price to pay for controlling BA and other potential pathogens, and at the same time keep the drinker lines free of biofilm. The key now is to monitor the water sanitation product level measuring total and free chlorine dioxide levels at the end of the drinker lines on a regular basis (preferably a minimum of once each week). If levels are not where they need to be, then investigate immediately the potential cause of the issue. Your local BVS representative can help you trouble shoot your AANE system to make sure you are successful.

Supportive care is more difficult, primarily because as I mentioned in the beginning, there are so many products available, some claiming to be the next thing to a silver bullet. It is much more difficult to determine their effectiveness within a flock of birds that will always show natural variation. To begin, choose products that have a guaranteed analysis for the active ingredient that claims to be effective. For example, if you are using a yucca product, the active ingredient should be Saponin (BioSupreme carries a minimum guarantee of 10.5%). So, use a product that guarantees Saponin levels with every batch. Products that do not carry a guarantee already add variation to the evaluation process. So, ask for a guaranteed analysis from the supplier.

For years, the turkey industry has relied on feed additive antibiotics that are no longer available - Penicillin, 3-Nitro and Histostat are the first three that come to mind. The industry needs to learn how to live without these products that tended to handle protozoa and bacteria that were common struggles – coxlasoma, trich and clostridia are the first three that come to mind. Alternative products must be evaluated and used to help reduce the load. BioSupreme yucca product (feed and water administration) and Gut Pro (bacillus and lactobacillus) probiotic in combination have been field tested over time (along with sound water sanitation listed above) with some effectiveness in improving gut health. In the next article of *BVS Poultry Talk*, we will look at a specific program, the effect on performance and the cost analysis.

If I am *Paying Attention to Detail* with the cogs that are known, including water sanitation noted above, then evaluation of supportive care is much easier. If I am doubting my ventilation, poult/chick quality, etc. or don't have a sound water sanitation program, this clouds my evaluation, then I will never know if my investment in products is worthwhile. ●



# CID LINES®

Believe in hygiene!

# Identifying and Understanding Saponin Content of Yucca Products

Robert L. Owen, V.M.D., Ph.D., DACPV  
Director of Technical Service

Several times in recent years our supplier of Biosupreme™ has kindly tested the saponin levels of several competitors' products. While we trust our supplier implicitly, customers felt that having them do this testing was much like the proverbial fox watching the chicken coop. For this reason, we have engaged the services of an independent laboratory to test saponin levels in samples we submit. Why we have done this is because only one product, Biosupreme™, supplies a guaranteed analysis of the levels of saponin provided in every lot of product delivered and we wanted to be able to cut through all the marketing hype of brix and dissolved solids and compare levels of what is believed to be the active ingredient in different Yucca products.

The results of the first round of testing are shown in the table below. Products labeled A, B, and C were all liquid products with labels claiming to contain concentrated Yucca schidigera extract. Product C was Biosupreme™.

Sample ID	Saponins (%)	Saponins (mg/ml)	Saponins (mg/oz)
A	0.05	0.5	15
B	0.12	1.2	35
C	10.8	108	3194

Because these "Natural" products represent the Wild West of therapeutics and are not subject to government approval or scrutiny, the effective dosage for any of the products has not been established. Instead a clinician wishing to use a Yucca product for medicinal purposes must rely on clinical judgement and experience for the dosage used. In the case of Biosupreme™, the dose this clinician typically uses is 4 oz./128 gallons of water. Products A and B have dosages of 1 and ½ oz. per 128 gallons of water on their label. The derivation of these dosage recommendations is unclear.

The dose of Biosupreme™ that this clinician uses, therefore, is 12,776 mg of saponin (3194 X 4). This may or may not be the correct dose and it may or may not be an effective dose, but it is the dose that is routinely used. If product A is used and is dosed at the label recommendation of 1 oz./128 gallons of water instead of administering 12,776 mg of saponin only 15 mg of saponin are being administered. Increasing the administered dose to 4oz/gallon to simulate the way the Biosupreme is being administered only increases the amount of saponin from 15 to 60 mg of saponin. Still a far cry from 12,766 mg of saponin. For product B, the math is the same. Four oz./gallon of product B treats the animals with 140 mg of saponin. If one wanted to treat with equivalent amounts of saponin to the amounts currently being used for Biosupreme™, it would require **6.6** gallons of Product A and **2.8**

gallons of Product B. Remember, these are real numbers based on the data generated by this independent laboratory.

Biosupreme currently sells for approximately 55 cents an ounce. Therefore, in this example the cost to treat 128 gallons is about \$2.18. If all three products were priced at 55 cents per ounce the cost of equivalent treatment for Product A would be \$464.64 and Product B would be \$197.12

This article is not intended to be an endorsement of Biosupreme™, although I do believe in the product, and it is not intended as a dose recommendation for Biosupreme™, although this is the dose I use. The intent is to point out the fallacy of not asking real questions of the suppliers of these products so that an apple to apples comparison of different products can be made. How does one make reasonable decisions about the efficacy of different products unless equivalent doses of active ingredient are administered? How does one evaluate cost of treatment unless equivalent doses of active ingredient are compared? In this particular example, using real numbers generated by an independent laboratory, Biosupreme instead of being priced at approximately \$70.00 per gallon, on a saponin equivalent basis should be priced at over \$5000.00 per gallon.

As professionals purchasing these products we are as guilty as the federal government of not doing our jobs. The government appears to have abdicated any responsibility in policing these products – We must not. As I have said before, it is our responsibility not to allow the health care of these animals to return to the old days of snake oil salesmen hawking the latest magic elixir of life. We must know what is in the products we are administering to our animals and how much active ingredient we are administering. There is no efficacy data so we must figure out for ourselves whether it works or not. There is no way we can professionally achieve that if we don't even know what we are administering. ●

## 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

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- Non cor
- Apply by spray, wash 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

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- Equipment friendly
- NO heavy metals

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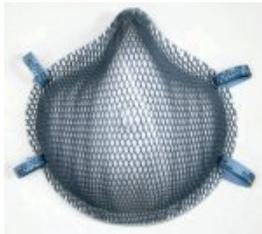
Latex Powder Free Gloves



Nitrile Powder Free Gloves



Yellow Rubber Boot Cover LG & XL



Moldex 1200N95 Mask



Moldex 2400N95 Mask



Moldex 2200N95 Mask



Nuisance Mask



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Moldex Cartridges Multi-Gas



Moldex P100 Filter Disk



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White Micromax Coveralls



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# Sanitizing/Cleaning Equipment



BVS Handy Foamer



BVS Handy Foamer with Tank



Hydro Foamer 481



0.5 Gallon Foam Unit



1.3 Gallon Foam Unit



15 Gallon Concentrate Foam Unit



Concentrate Foam Unit



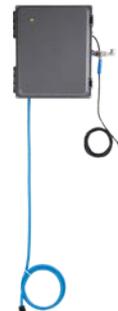
Doorway Foam Unit



Footwear Sanitizing Unit with Boot Scrubber



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Wall Mounted Fog Unit



Disinfection Mat



Doorway Foam Unit



0.5 Gallon Foam Unit

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## PHYSICAL PROPERTIES

Form ..... Liquid  
Color ..... Colorless  
Fragrance ..... Baby powder  
Typical specific gravity ..... 0.891  
Antiseptic ingredient..... Isopropyl alcohol (63% v/v)

## DIRECTIONS FOR USE

Wet hands thoroughly with Cal Stat Plus Antiseptic Handrub with Enhanced Emollients and rub until dry.

Storage: Do not store at temperatures below 32°F (0°C).

Flammable, keep away from fire or flame.

# ALCARE® FOAMED ANTISEPTIC HANDRUB

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**Storage:** Protect product from freezing. Store and use at 55-85°F (12-29°C); do not store above 120°F (49°C).

## PHYSICAL PROPERTIES

Form ..... Foam  
Color ..... White  
Fragrance ..... Mild alcohol  
Antimicrobial..... 62% (v/v) ethyl alcohol

## DIRECTIONS FOR USE

### Surgical Scrub

Clean under nails with a pick. Nails should be maintained with a 1 mm free edge. Dispense 5 g (about the size of a tennis ball) onto one hand. Spread on both hands paying particular attention to the nails, cuticles and interdigital spaces and forearms. Rub into skin until dry. Dispense 2.5 g (approximate size of a golf ball) onto one hand and spread over both hands and the wrists and rub into the skin until dry.

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Apply product to hands and rub until thoroughly dry.

NEEDS NO WATER · CONTAINS EMOLLIENTS

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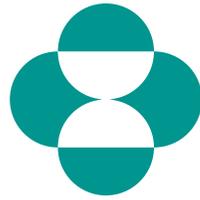
As part of a comprehensive control program, AviPro<sup>®</sup> Megan<sup>®</sup> vaccines are safe, effective and targeted interventions providing *Salmonella* protection every day.<sup>1,2</sup>

The label contains complete use information, including cautions and warnings. Always read, understand and follow the label and use directions.

<sup>1</sup>Elanco Animal Health. Data on file. <sup>2</sup>Elanco Animal Health. Data on file. Elanco<sup>®</sup>, AviPro<sup>®</sup>, Megan<sup>®</sup> and the diagonal bar are trademarks owned or licensed by Eli Lilly and Company, its subsidiaries or affiliates. ©2016 Eli Lilly and Company, its subsidiaries or affiliates. vacc 2907-1 | USFBUML01709

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# MERCK

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### INNOVAX®-ND

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#### Marek's Disease - Newcastle Disease Vaccine (Serotype 3, Live Virus, Live Marek's Disease Vector)

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#### Advantages:

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- 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 (B<sub>1</sub>, Type, C2 Strain, Live Virus)

NEWHATCH-C2® is the patented, virtually nonreactive C2 strain of B<sub>1</sub> 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 B<sub>1</sub>, 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

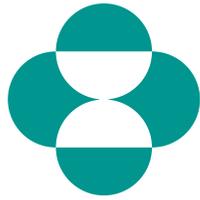
#### Hemorrhagic Enteritis Vaccine (Live Virus)

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





# MERCK

## Animal Health

### 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



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exclusive distributor  
and marketer  
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turkey vaccines  
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**MERCK**  
Animal Health

# Cleaning and disinfection of layer house systems for table egg production

by Karel Bossuyt and Lieven Dambre, CID LINES, Waterpoortstraat 2, 8900 Ieper, Belgium.

The poultry sector is a dynamic one and the egg producers, who are part of it, are no exception to the rule. The traditional cage ban that was imposed in the EU at the beginning of 2012 is a prime example of how the poultry production industry needs to be flexible and ready for changes in order to be sustainable today and in the future.

The main goal of the ban on traditional cages is to raise the hen welfare standards, but what about the hygiene standards in alternative layer housing systems?

The cages scored well on egg and hen hygiene and had relatively less dust flying around in them.

However, hens are occupying the layer house for up to 58 weeks and a high level of soiling (manure, feed, dust, scale, etc) can be expected.

Which layer housing systems will also score well in terms of hygiene and are they easy to clean? The possibility to thoroughly clean and disinfect the layer house only occurs every 12-13 months.

Farmers should take this opportunity to aim for a pathogen free (salmonella, etc) house during this all-out phase before introducing the new flock into the layer house.

## Trial of different systems

A trial was conducted by Karel Bossuyt where five different layer housing systems were cleaned and disinfected. A comparison was made in labour, water consumption, product consumption and cleaning and the disinfection results between the different systems.

The same cleaning company cleaned and disinfected all houses. In this way the modus operandi in terms of people and the equipment they used could not negatively influence the cleaning and disinfecting (C&D) results.

The C&D results were analysed by swabbing (RODAC plates). After incubation the remaining colony forming units were counted in order to analyse the hygiene



**A simple foaming cup lance is used to apply the disinfectant.**

result. Some 25 plates were taken per layer house and this took place twice – once after cleaning and once after disinfection.

These plates consisted of: 3 on the drinking system (pipe and drink cup), 1 on the egg belt, 1 on the hopper, 1 in the egg storage room (floor), 1 on the air inlet (grid), 3 in the laying nest grid, 3 on the laying nest side panels, 2 on the ceiling, 4 on the floor, 3 on the feeding system, 2 on the wall and 1 in the packing area.

The number of colony forming units (cfus) per plate were categorised by range and were given a score:

- 0 cfus per plate = 0
- 1-40 cfus per plate = 1
- 41-120 cfus per plate = 2
- 121-400 cfus per plate = 3
- More than 400 cfus per plate = 4
- Too numerous to count = 5

The swabbing, the incubation, reporting and interpretation of the scores were executed by an official and independent laboratory. In this case it was done by DGZ (Animal Health Care, Flanders, Belgium).

There are three possible interpretations:

- Score:  $\leq 1.5$ : The C&D procedure has been done properly and is approved.

- Score:  $> 1.5$  and  $\leq 3$ : The C&D procedure has to be done again before a new flock can be introduced to the layer house.

- Score:  $> 3.0$ : The C&D procedure has to be done again and this time by a professional cleaning company, before a new flock can be introduced to the layer house.

## Dare to compare

The five systems that were compared were:

- An enriched cage system with a central egg collection belt (A).
- A traditional cage system (B).
- An organic free range system (C).
- An enriched cage system with colony housing (D).
- An alternative housing system with winter garden (E).

It is clear that each system has its own specific design and therefore the critical points for each housing system will differ.

These critical points will influence the cleaning results in terms of labour costs. The time and personnel spent on dry and wet cleaning was taken into account. Some systems were more easy to clean than others. Of course when something is difficult to clean the risk of it not being cleaned properly is bigger.

This will reflect in the disinfection results. In addition, excessive organic soiling will influence the disinfection negatively. This cause and effect mechanism creates a vicious circle where some spots can really become infection sources that recontaminate each new flock over and over again.

The detergent used for cleaning was Kenosan at 1.5%, except for the traditional cage system. Here only water was used for cleaning. The detergent was applied by foaming.

For disinfection two products were used – Virocid or CID20. Both products are well tested and have a strong bactericidal, virucidal and fungicidal action. The difference was in the application of the disinfectant. Some fogged the disinfectant (at 20-25%) and others foamed it (wet disinfection at 1%). In Table 1 the different methods are specified.

In the enriched cage system (A) the laying mats had to be pulled out of the nests and

Company	Capacity	Dry Cleaning		Wet Cleaning		Product consumption	Average cleaning score	Disinfection method	Product consumption	Disinfection	
		hours	people	hours	people					hours	people
<b>A</b> – Enriched cage + egg belt	60,000 hens 1920m <sup>2</sup>	36	5	278	5	60 litres	3.9	Thermo fogging	30 litres	na	na
<b>B</b> – Traditional cage system	13,500 x 800 <sup>3</sup>	20	2	60	5	water	4.6	Sprayer nozzles		na	na
<b>C</b> – Organic free range	7,200 hens 1,200m <sup>2</sup>	10	2	100	3	40 litres	3.8	Thermo fogging	10 litres	na	na
<b>D</b> – Enriched colony two floors	24,000 hens 780m <sup>2</sup>	25	3	120	3	20 litres	3.1	Foaming	40 litres	30	2
<b>E</b> – Alternative + winter garden	30,000 hens 3,500m <sup>2</sup>	70	2	130	3	60 litres	2.7	Foaming Thermo fogging	40 litres 20 litres	3.5 na	2 na

**Table 1. The different methods of application.**

Continued from page 7

cleaned outside the layer house. As this is a two floor system the dust and manure that comes from the second floor needs to be evacuated to the first floor.

A lot of dirt gets stuck between floors. These are the main two reasons why this system is more labour intensive in terms of cleaning.

The traditional cage system (B) was cleaned only with water which resulted in a poor average cleaning score of 4.6. In the organic system (C) grids, drinkers and feeders were dismantled and cleaned outside the house.

This explains the high amount of hours and people needed to clean a relatively small surface.

The colony housing system (D) proved to be fairly easy to clean. It scored on average 3.1. The critical points were the laying nests. The manure pit system (E) had no automatic manure belt but the drinking and feeders could be winched up which made the evacuating of manure easier.

However, all the floor grids needed to be dismantled and cleaned outside the layer house.

The laying mats were also evacuated and cleaned in an automatic system outside. The cleaning score was 2.7, so a dry cleaning phase, which is very labour intensive,

resulted in a very good cleaning score if done properly.

Labour costs and product consumption is one thing but, needless to say, it is the score at the end of disinfection that needs to be equal or below 1.5 (the DGZ norm) in order to consider the C&D protocol successful. Table 2 shows the disinfection scores for each swab point and the average disinfection score for each system.

### Disinfection results

If we look at the disinfection results we see that in the traditional cage system and the organic free range system the disinfection was not successful enough with a score of 1.7 and 1.6 respectively.

In the traditional cage only water was used to clean. The organic load was too high when the disinfection phase started. The nests still scored very high. The automatic sprayer system did not reach the nests efficiently.

The organic system only fogged 10L of CID20. With such a high level of soiling, a wet disinfection is absolutely imperative. It will improve the contact of disinfectant with the surface dramatically. The grids were made of wood and therefore scored the worst at 3.5.

The enriched cage system with a central egg collection belt (A) just performed at the norm with 1.5. The floor and packing room scored above the norm.

The best scores were definitely achieved with the enriched cage colony system (D) and the manure pit system with winter garden (E) with 1.1 and 1.3 respectively.

The bad score on the drinking system (3.3) in the alternative layer house (E) was due to the fact that the swab was taken underneath the drinking cup.

The drinking lines were winched down at the moment the disinfection was done. This place was not reached by disinfectant. Without this error the score would be 0.7.

Both applied the disinfectant Virocid by foaming. A simple foaming cup lance was used. In the alternative housing system (E) a fogging phase was also done after the wet disinfection. The score afterwards dropped from 1.3 to 0.8.

The different layer housing systems can influence the dry and wet cleaning phase but when this is done properly the disinfection results should not be influenced by them.

Foaming the disinfectant when correctly applied (dosage) proved to be crucial for a clean and pathogen free layer house.

Fogging should be seen as an additional measurement for disinfection executed after the wet disinfection. ■

**Table 2. The disinfection scores for the different layer housing systems (the DGZ average was 1.5).**

	Drinking system	Egg store	Egg belt	Hopper	Air inlet	Bottom of cage	Side of cage	Laying nest	Ceiling	Corridor	Grid	Floor	Feeding hopper	Feeding system	Packing room	Side panels
<b>A – Enriched cage system (average score = 1.48)</b>																
Score	2.0	2.0	na	0.0	0.0	na	na	1.3	0.5	na	1.0	2.7	na	0.7	3.0	1.5
<b>B – Traditional cage system (average score = 1.7)</b>																
Score	2.0	2.0	na	2.0	1.0	na	na	2.7	1.0	na	1.5	1.0	na	1.3	1.0	2.0
<b>C – Organic free range system (average score = 1.6)</b>																
Score	1.0	4.0	na	1.0	0.0	na	na	0.7	0.0	na	3.5	2.7	na	1.3	3.0	1.0
<b>D – Enriched cage system with colony housing (average score = 1.1)</b>																
Score	2.0	na	1.5	na	0.0	0.3	1.0	na	1.0	1.0	na	na	1.0	1.0	3.0	na
<b>E – Alternative housing system (average score = 1.3)</b>																
Score	3.3	1.0	na	0.0	0.0	na	na	0.5	1.0	na	0.7	1.0	na	1.0	na	na

# Bio-security: practical tips to minimize the human risk of contamination

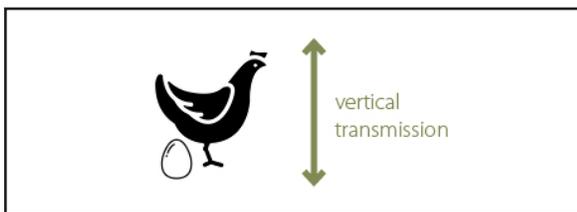
All poultry operations are under a constant threat from the ever-present enemy of disease and infection. It is imperative in all operations that we teach our staff how to reduce potential risks as far as possible. In this article, I explain how diseases are transmitted and how you can reduce the risk of human transmission.

*By Jason Cormick, Petersime Hatchery Development Specialist*

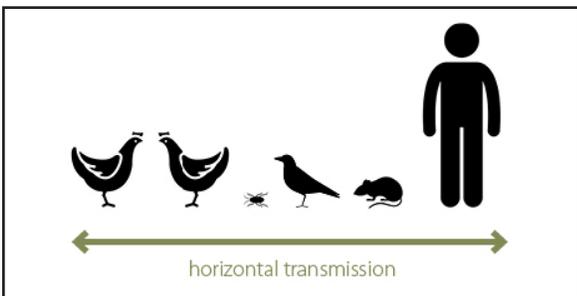
## How are diseases transmitted?

One of the greatest risks to any poultry operation is the risk of contamination of disease. This not only depletes production, but can also damage the reputation of the company. The transmission of disease can be spread in two ways.

→ Firstly, disease can be spread vertically when bacteria such as salmonella and mycoplasma, or viruses like avian influenza etc., are spread already in the oviduct of the hen laying the egg. This means that the developing embryo will already be infected during development.



→ The second type of infection is through horizontal transmission which can be from bacteria spread by a vector, which could be anything from airborne dust particles, animals frequenting livestock (beetles, rats, birds etc.), equipment that moves from infected stock to clean stock or the action of people transmitting disease to your stock. It is this 'human risk' we will cover in this article.



## The three main sources of infections: mycoplasma, salmonella and avian influenza

### Mycoplasma

Mycoplasma is one of the main culprits of infections. It is a bacteria that can be transmitted both vertically and horizontally and which is able to survive for up to four days off its natural host. Therefore

it has huge potential to jump from one location to another. A thorough 'showering in' regime (staff that enters should take a shower) and change of clothing should greatly reduce the risk from mycoplasma being brought in by personnel.

### Salmonella

Salmonella is another prime issue in poultry. This can also be spread both vertically and horizontally, but can also easily infect people. Breeding stock operations should have routine testing of staff and visitors.

### Avian influenza

One of the biggest threats today to our operations comes from avian influenza, which has managed to spread across the world. There are many strains of avian influenza, but these are generally split into two main categories:

- low pathogenic
- high pathogenic

Low pathogenic strains can result in low impact on stock. However, strains of H5 and H7 have the potential to mutate from low pathogenic to high pathogenic which can wipe houses and can also infect other species including humans coming into contact with it. Avian influenza can also be transmitted both vertically and horizontally.

These are just three potential risks but there are many others too numerous to go into during this discussion.

## Practical tips to minimize the human risk of contamination

### Don'ts for poultry workers

There are some basic rules that all poultry workers should adhere to: poultry workers should...

- not own or keep any Avian species
- not come into contact with backyard chickens
- avoid live/wet markets
- not have second jobs that involve avian species
- be discouraged from wild bird hunting

All employees of a poultry operation should have an understanding of bio-security, as it is not only production workers that could be vectors for disease entering an operation.

## Dos and don'ts for visitors

Likewise, any visitors are potential risks to the operation. When it comes to external visitors, the golden rule is: 'if they do not need to be there, they should be kept out'. Visitors should be screened prior to entering the site. On entering the site, visitors should fill in a visitors' record explaining why they are there, date of their last contact with poultry and where, and sign a good health declaration. Visitors should also receive explanation receiving the bio-security regulations. They should understand where they can and cannot go and sign to say they will adhere to the rules. On entering an operation, all visitors should shower in to eliminate the risk of bringing in bacteria. Equipment can also be sterilised with UV chambers or disinfectant sprays.

<b>VISITOR REGISTRATION</b>	
<i>By signing this document, you agree to comply with all bio-security protocol of the company</i>	
<b>Date:</b>	<input type="text"/>
<b>Name:</b>	<input type="text"/>
<b>Company:</b>	<input type="text"/>
<b>Reason for visit:</b>	<input type="text"/>
<b>Last avian site visited:</b>	<input type="text"/>
<b>Date of last visit:</b>	<input type="text"/>
<b>Time in:</b>	<input type="text"/>
<b>Time out:</b>	<input type="text"/>
<b>Good health (No diarrhoea or sickness)</b>	<input type="text"/>
<b>Signature</b>	<input type="text"/>

*Example of a visitors registration form*

## Washing hands

Once inside, good hygiene must be adhered to washing hands after eating or going to the toilet for example. Use of hand sanitisers in every area around the operation is also good practice.



*How to wash your hands to avoid contamination* (Source: [http://www.who.int/gpsc/clean\\_hands\\_protection/en/](http://www.who.int/gpsc/clean_hands_protection/en/))

## Keep 'clean' and 'dirty' areas separated

In the hatchery, it is also advantageous to keep staff to either egg side ('clean') or chick side ('dirty'). This is to avoid chick fluff cross contaminating other 'clean' areas. This can be helped by giving each area a designated colour of clothing. For example, blue clothing for the egg side and white clothing for the chicks side.



(Source: <http://www.theuniformfactory.co.nz/store/category/194/overalls>)

## Boot barriers

One of the continuous vectors of transmission comes from the soles of shoes worn outside and worn into an operation. The most effective way to eliminate this risk is with physical barriers and a complete change of footwear, commonly referred to as 'boot barriers'.



Keeping disease out from livestock operations will always be a great challenge. One that can only be achieved with cooperation of all involved. It is imperative we all keep vigilant and report any non-compliances to safeguard our operations and to ensure continuous supply to our clients.

To watch Jason Cormick's video on 'Bio-security: the human risk', visit <https://www.youtube.com/watch?v=jPzN-rrVGpo>

## About the author

Jason Cormick has over 27 years of experience in the poultry industry, working in hatcheries and farms across all levels of the breeding pyramid, from pedigree through to broilers. As Petersime Hatchery Specialist, he supports Petersime customers both remotely and with site visits and has developed a specialist Hatchery Management Training.

Reprinted from <http://www.petersime.com>

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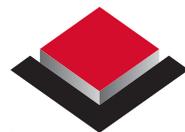


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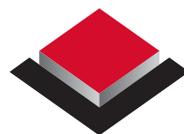
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reduction starts at the farm.  
We can help.**

Diamond V's natural technologies promote safer animal protein production. Our research-proven products support:

- Pre-harvest food safety**
- Health and well-being**
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**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.

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- **Organic MANAGE®** contains higher levels of copper than other liquid copper products on the market.
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- **Organic MANAGE®** is the only patented product of its kind!

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2. For tank use, mix 1 gallon Manage with 1,000 gallons water.

#### OPTIMUM DOSAGE: Administer 1 part Manage in 512 parts drinking water.

1. For injectors/proportioners set to administer 1 oz. stock solution per gallon drinking water, prepare stock solution by mixing 1 gallon Manage with 3 gallons water.
2. For tank use, mix 1 gallon Manage with 500 gallons water.

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- ✓ 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.
- ✓ can be used in place of Chlorine or Iodine.
- ✓ 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. Prevents biofilm build up.
- ✓ is a combination of buffered acids.
- ✓ contains No copper.



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# BVS Poultry & Swine Wash Concentrate

**BVS Poultry & Swine Wash** contains a three-part moisturizing system that includes a skin emollient, a humectant, and a skin plasticizer. This moisturizing system is the best available on the market today.

All of the components in **BVS Poultry & Swine Wash** are approved for use in the manufacture of food as direct and indirect food additives.

**BVS Poultry & Swine Wash** utilizes no harsh cleaning chemicals. Cleaning and rinsing pigs with **BVS Poultry & Swine Wash** prior to their introduction into the herd and prior to farrowing has proven effective in increasing cleanliness.



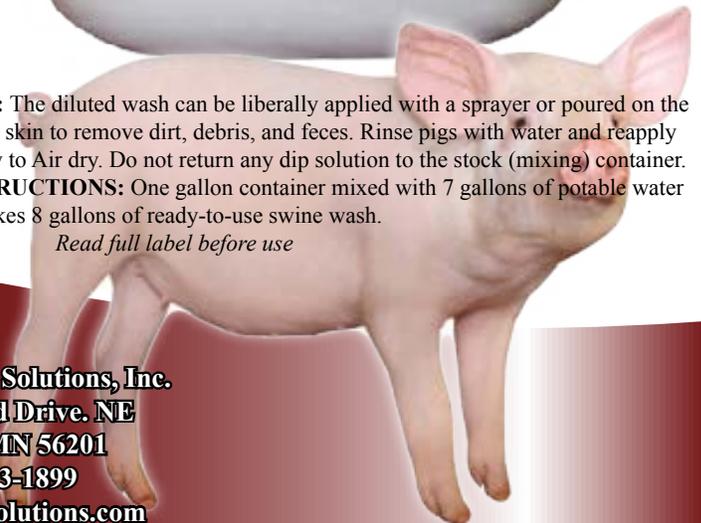
**DIRECTIONS FOR POULTRY USE:** The ready to use wash can be liberally applied with a sprayer. Do not rinse off: allow to air dry. Do not return any wash solution to the stock (mixing) container.

**DILUTION AND MIXING INSTRUCTIONS:** One gallon container mixed with 2 gallons of potable water makes 3 gallons of ready-to-use poultry wash  
*Read full label before use*



**DIRECTIONS FOR SWINE USE:** The diluted wash can be liberally applied with a sprayer or poured on the pig's skin surface. Gently scrub the skin to remove dirt, debris, and feces. Rinse pigs with water and reapply diluted wash. Do not rinse off: allow to Air dry. Do not return any dip solution to the stock (mixing) container.

**DILUTION AND MIXING INSTRUCTIONS:** One gallon container mixed with 7 gallons of potable water makes 8 gallons of ready-to-use swine wash.  
*Read full label before use*



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# A Program Solution for Gut Health

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+



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Bacillus to the birds

Use prior to an anticipated challenge  
or secondary bacterial infection.

### GUT RESTORE

Used to colonize or reestablish  
homeostasis in the GIT with lactic acid  
bacteria.

Use as an aid to RESTORE gut flora  
post antibiotic treatments, copper  
therapy or after periods of stress to  
combat dysbacteriosis.

Powered by

**Microbial** *Terroir*™

Technology by Agro BioSciences, Inc.

100% Natural Feed & Water Additive

# OREGO-STIM™

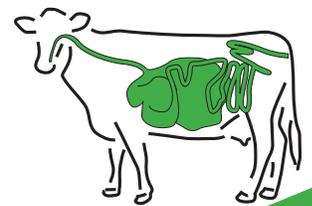
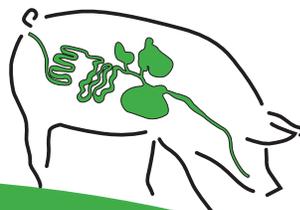
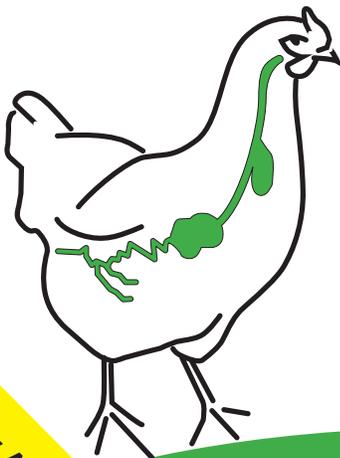
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DISINFECTANT**

**STANDS A GREAT  
CLEANER**



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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.

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innovative hygiene solutions  
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## Powerful start

Optimization of energy supply via drinking water.

### **LOVIT** LC-ENERGY

Get your chicks started with our liquid supplement Lovit LC-Energy. This balanced liquid formulation consists of L-carnitine, betaine, sorbitol and magnesium sulphate. These increase the conversion of energy and protein in the first days of life and during all critical production phases which are characterized by metabolic stress. Lovit LC Energy also supports liver functionality.



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*Same product from Jones-Hamilton Co.  
is now available from BVS as **pH Safe***

**pH Safe** water acidifier is the first FDA-approved feed grade inorganic acid water treatment available to the poultry and livestock industries. Due to the unique chemistry of **pH Safe**, the consumption of treated water does not decrease at higher concentrations, as has been reported for organic acids. **pH Safe** contains the strongest animal feed grade mineral acid available. A much lower addition rate is required to acidify drinking water to biologically effective low pH levels. This lower addition rate provides pH reduction with no bitter taste. Birds won't back off from **pH Safe** treated water, so optimum water consumption is maintained. This advantage gives producers the flexibility for administration in a wide range of application in all livestock and poultry species.

# 2017 SPRING BIOPROTECTION PROGRAM



The bioprotection portfolio brought to you by Elanco® offers control of profit-robbing pests, such as house flies and darkling beetles, with products like Elector® PSP, Neporex®, Larvadex® and Agita® 10 WG. Elanco wants to help integrators keep animals healthy, which is why we're offering **rebates** on our bioprotection products from March 1 through April 30, 2017.



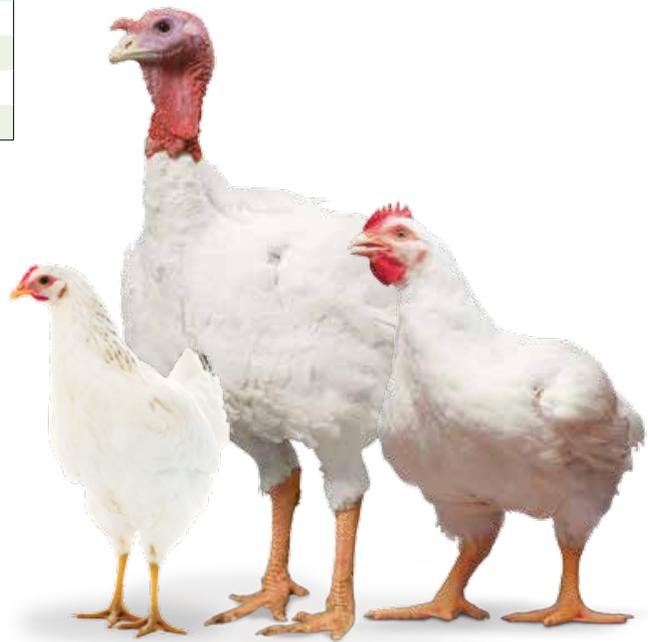
## Bioprotection — 2017 Spring Program Rebate Level

Product	March 1-31	April 1-30
Agita 10WG	\$5.00/container	\$4.00/container
Larvadex	\$6.00/container	\$4.75/container
Neporex	\$3.50/container	\$2.50/container
Elector PSP	\$9.75/container	\$7.50/container

Must purchase a minimum of \$2,000 of qualifying products to earn a rebate

## Payment terms

- Elanco will be responsible for calculating payments to end users based on EDI purchases
- Elanco reserves the right to audit EDI data. If found to be inaccurate, Elanco has the right to withhold earnings
- Payments will be made at the end of the program
- No maximum purchase limits
- Only product purchases billed to qualifying accounts are eligible, including satellite locations owned by the qualifying account. In the case of multiple qualifying bill-to locations, a single payment will be made to the primary billing account
- If enrolled in an existing program, sales will not qualify for a Spring Bioprotection Program rebate
- Elanco reserves the right to determine if a purchaser qualifies for the rebate



Contact your Elanco sales representative to learn more.

The labels contain complete use information, including cautions and warnings. Always read, understand and follow the label and use directions. Animals cannot be present at time of premise treatment.

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# FIND FAST. KILL QUICK.

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See how a first choice for fly and beetle control can help protect your poultry house at [Elanco.us/Agita](http://Elanco.us/Agita)

**Elanco**

**Agita® 10 WG**™

<sup>1</sup>Grogan K. "Beetles and houseflies play role in disease transmission." PoultryTimes. August 25, 2008.  
<sup>2</sup>Elanco Animal Health. Data on file.

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REDUCE DISEASE TRANSFER<sup>1</sup>



DUAL MODES OF ACTION



MANAGE RESISTANCE<sup>2</sup>

## Implications of Litter Management in an Antibiotic Free Program



**W**ith the increasing number of antibiotic free (ABF) broiler facilities, there are a lot of opinions about how to be successful. While there are varying opinions about products that can take the place of antibiotics for improved health and growth promotion, much of the industry is in agreement that without antibiotics the role of house management becomes more crucial for success.

While growers have been conventionally taught to manage a house from the ceiling down, the removal of antibiotics demands houses be managed from

the floor up. It is largely litter condition during a chick's first seven days of life that impacts health and performance by dictating the type of bacteria that develop in the gut which can greatly influence intestinal flora and the passage of maternal antibodies.

In this paper, we will discuss litter management basics for antibiotic-free operations at three basic stages: during clean out, before placement and during grow-out.

## Ideal Clean Out Procedures

While some say it's best to entirely clean out litter between flocks, the cost, environmental impact and availability of replacement bedding material make that difficult at times. Not to mention that there are some advantages to growing birds on built up litter, such as the ability to better manage cocci load and introduce beneficial bacteria to the gut. If litter has been completely cleaned out, pad acidification will play a crucial role for antibiotic free operations.

### Pad Acidification Following Clean Out

It's important to understand, the longer birds have been raised in the house, the more ammonia is absorbed into the pad. As the ammonia content of the dirt pad goes up, so does the pH. As the pH shifts to levels above 7.5-8.0, the type of bacteria and other microbes that make up the typical flora of the dirt pad begins to shift into ones that aren't good for poultry. Because these are the bacteria that birds are exposed to upon placement, decreases in performance can be seen—especially in an ABF program.

To create an environment more favorable to birds, acidify the dirt pad while the house is empty to significantly lower the pH—making the dirt pad very hostile to bacterial, viral and fungal pathogens. One research study showed that when pH was reduced to below a 3.0 by applying PLT® litter acidifier at a rate of 100-lbs./1,000 sq. ft., 99.99% of bacteria, yeasts and molds living in the dirt pad were decreased (Table 1). In addition, the treatment neutralized ammonia trapped in the pad so that it wasn't released during pre-heating.

	pH	Aerobic Bacteria	Molds	Yeasts
Pre-Treatment	7.17	6,732,500	21,750	6950
2 hours Post-PLT®				
Treatment at 100lbs/1,000 sq. ft.	2.61	66	7	4

**Table 1.** Microbial Levels Pre and Post PLT® treatment, Watkins, 2003.

## Litter Management Prior to Bird Placement

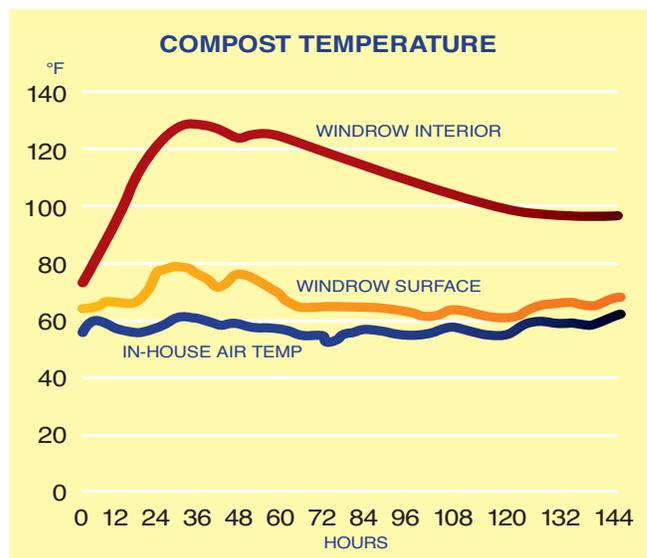
For ABF operations, there are several litter management issues that require new thinking, starting with downtime between flocks. Traditional downtimes of less than 14 days make it difficult to complete basic preparations. Most notable, however, is the role downtime plays on pathogens. Twenty-one days or more between flocks is ideal as it allows time for pathogens in the litter to die off.

### The Role of Windrowing

In-house windrowing has also been considered by some to be a cost effective litter management tool. Windrowing involves piling the litter into rows (windrows) down the length of the house. As a result of the natural composting process, the windrows generate heat and temperatures rise high enough to destroy pathogenic bacteria and other micro organisms. The generally accepted minimum temperature recommendation is 130-135°F (Figure 1) over the course of five to seven days, plus some added time for ammonia and moisture release.

The challenge lies in ensuring the litter is properly windrowed and that all the necessary components are present to attain proper heating once the litter is piled. Applying this program on all farms within a complex can be difficult as it is costly and time consuming to the company and producer. Ultimately, failure to reach the target temperature can create more of a challenge than a benefit.

Research performed at Auburn University found that *Clostridium perfringens* was reduced by 99.99% during windrowing as compared to litter that did not undergo the process. This is notable since *Clostridium* is a spore-forming bacteria that has the power to detect unfavorable environments, form a spore, and be resistant to most disinfectants, heat, cold and desiccation. It is thought that the rapid temperature change occurring during windrowing catches the bacterium unprepared.



**Figure 1.** Temperatures reached in unturned windrow compost pile

### Pre-Heat Litter, Purge Ammonia

Pre-heating houses to purge ammonia and raise litter temperature prior to bird placement are common litter management steps for conventional and ABF operations. It's important to heat far enough in advance of the arrival of chicks to ensure the core litter temperature rises, not just litter surface and air temperature. A minimum 48-hour pre-heat is needed for the litter to cure properly, even if floor temperatures are achieved much more quickly. Ideally, core litter temperature should be 85°F or greater; surface litter temperature should reach the standards set by the company for chick placement.

In houses that are not properly preheated, litter core temperature can be as much as ten degrees lower than the air temperature, which provides a perfect environment for chicks to be chilled. Chicks that are placed on a cold floor spend more time trying to keep warm than eating or drinking. Numerous studies have shown that birds placed on floors even as little as five degrees cooler than optimal temperature, gain significantly less weight than chicks placed on warm floors.

As the litter temperature rises, there will be a

second purge of ammonia. Completing this second ammonia purge before applying litter amendments or placing chicks is crucial for the effectiveness of the amendment and the health of the chicks (Figure 2).

### Apply Litter Amendments

Applying the litter amendment PLT®, which is an EPA Safer Choice product, is an effective, safe way to neutralize ammonia and lower pH to create an environment unfavorable for pathogen growth.

As a dry granular product, PLT seeks moisture from floor and air to activate, and therefore does not require additional water which can be detrimental to the litter.

If existing litter has not been windrowed, a minimum rate of 100 lbs./1,000 sq. ft. should be applied. If you have windrowed litter, you're working with a maximum level of litter surface area, which means greater ammonia volatility. In these cases, PLT should be applied at a rate of 100-200lbs/1,000 sq. ft. based on litter age and quality, and amount of moisture present.

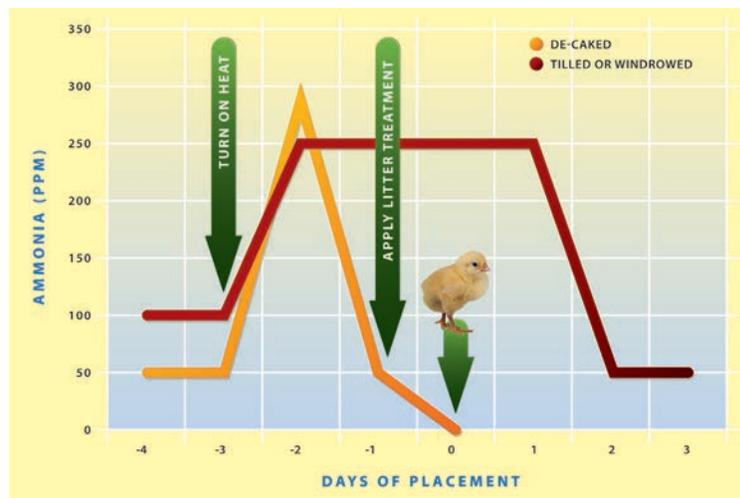


Figure 2. Ideal timing of pre-heating, litter treatment and bird placement after ammonia purge

## During Grow-out

Once birds are in the house, there are several factors that significantly impact litter quality, which in turn affect bird health.

### Density

Operations that have eliminated antibiotic use need to decrease stocking density in order to reduce bacterial and coccidial pressure on the birds. Having fewer birds in a house also decreases the humidity pressure on the floor making it easier for growers to maintain litter quality and proper litter function throughout the entire flock.

### Litter temperature

Litter temperature plays a large part in bird distribution during brooding. Uneven bird distribution will cause uneven cycling and coverage of coccidial vaccines, transient areas of wet litter due to increased relative humidity and areas of increased bird density all of which can wreak havoc in an ABF program.

### Water acidification

Water management in ABF operations should be focused on managing water pH to reduce bacterial load. By providing birds with water at a pH of 3.5 to 4.0 with an inorganic acid that does not impact taste profile during the first seven to 10 days, growers can lengthen the amount of time we have a lower pH extending from the crop through the proventriculus. In addition, continuous water acidification to a pH of 4.0 for the first 14 days will bring chicks through the second coccidiosis lifecycle, thereby decreasing the severity of the necrotic enteritis risk.

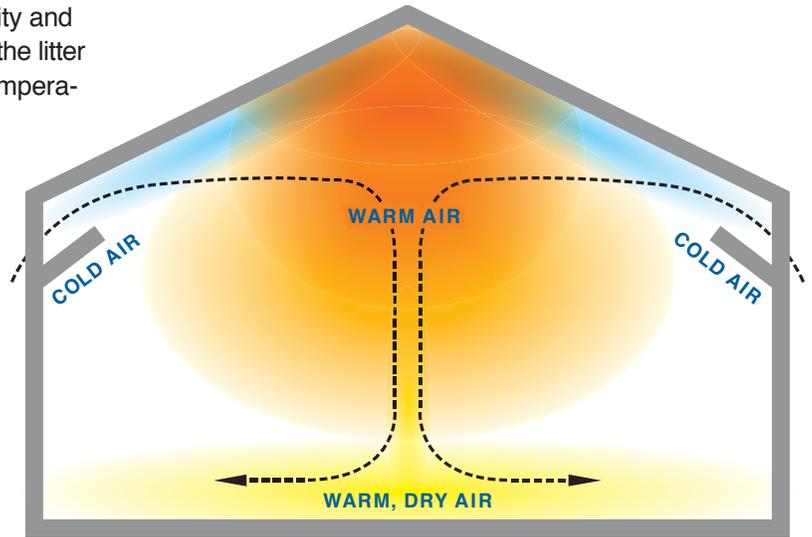
### Ventilation and Relative Humidity

Moisture can wreak havoc on ABF operations in a variety of ways. Controlling relative humidity throughout the brooding period (when ventilation needs are low) is essential to prevent a bloom of Clostridium, coccidia and other unwanted organisms.

- Houses should be ventilated for relative humidity and directional air flow should be maintained to keep the litter dry. Directional airflow also helps keep house temperatures within a narrow range (Figure 3).

- As birds mature, improper management of drinker lines can cause wet litter, which aggravates coccidiosis by providing the proper environment for oocysts to sporulate, thereby increasing challenge levels to which birds are exposed. Ensure proper waterline height, pressure and nipple function to satisfy birds' water needs while keeping floors dry.

- Allowing the floor to get damp and tacky will cause changes in the litter microflora and thereby intestinal microflora in ways that are difficult to recover from for ABF operations.



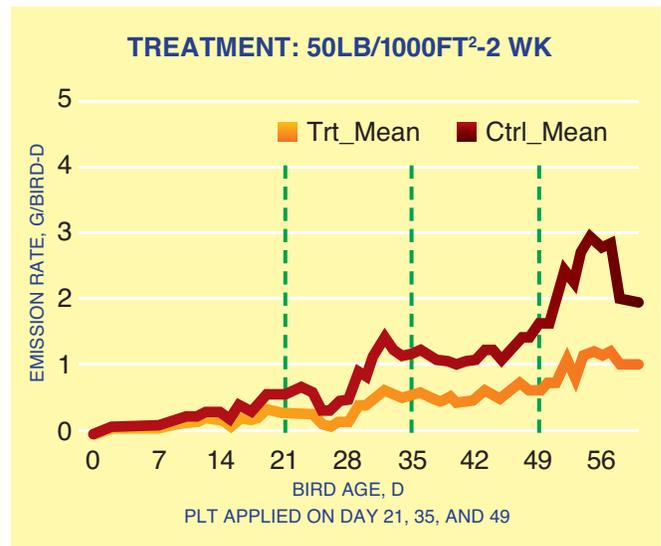
**Figure 3.** Optimal directional air flow for temperature management

Around three weeks of age we see a spike in ammonia volatility generated from the fecal matter (Figure 4). Additional PLT can be applied at 50-75 lbs at this time and continued every two weeks up to movement to minimize ammonia stress and reduce pH to control pathogens. It is very important to correct wet litter issues resulting in high ammonia or Clostridial challenges.

### Conclusion

Antibiotic free production requires a shift in every aspect of practices from the primary breeders to the meat bird flocks. If the proper BMPs are not instituted at the beginning of the program, trying to grow ABF poultry on the old conventional blueprint will be met with unfortunate challenges. It's easy to make changes in feed programs, vaccination programs, density, sanitation and vector control. However, managing a living environment such as built up litter takes time, and changes cannot be made overnight.

It has become clear that complexes moving to antibiotic free production as the result of consumer pressures must institute BMPs that manage from the floor up, meaning that litter management concerns come before all other parameters prior to bird placement. This careful attention to litter management practices ensures the environment does not present unnecessary challenges that may inhibit bird intestinal health and performance at placement or during grow-out.



**Figure 4.** Ammonia Volatility During Grow-out (Hong et al, 2017)



## THE VACCINE FOR ALL SEASONS



From summer heat to winter frost, the ecology of a broiler house is constantly changing, which can lead to an increased coccidiosis challenge. The precocious strains of HatchPak Cocci III vaccine induce optimum immunity with minimal lesions! So, at whatever level of coccidiosis challenge, your flock can be safely protected year round.

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<sup>1</sup> Merial internal data.

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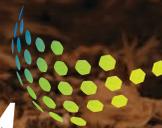


# It's Time to **RETHINK** Litter

In the era of antibiotic-free production, house management starts well before placement. It starts by managing litter from the floor up, not the ceiling down like conventional wisdom taught.

ABF profitability starts with litter. And healthy litter starts with PLT®. Get the full story at [JonesHamiltonAg.com/ABF](http://JonesHamiltonAg.com/ABF)

**JH** Ag  
WE KNOW pH MATTERS



# Cooling pad

## Cleaning & treatment of evaporative cooling pads

To keep Evaporative Cooling System, running efficiently, the water in the system must be treated with the right chemical, tested and approved for pad cooling. The correct chemical(s) also increases its life and reduce the risk of contamination that could lead to a disease problem, as well.

### STEP 1: PRIOR TO START-UP OF SYSTEM - SHOCK TREATMENT

Examine the EC Pads to determine if they are fouled with algae or heavy mineral scales.

#### TO CLEAN ALGAE AND SLIME FORMING BACTERIA BUILD-UP:

- Spray or foam on EC Pads with Cid 20 @ 6.6 - 15.0 ml/litre (0.66 - 1.5%) OR Virocid® @ 3.3 ml - 7.5 ml/litre (0.33 - 0.75 % or ½ to 1 oz / gal) of water.
- Allow the product to remain on the surface of EC Pads for 10 minutes.
- Flush/spray off with clean water.
- Repeat, if necessary.
- Drain the system and flush with clean water.

(Cid 20 and Virocid are bactericidal, fungicidal, virucidal, algaecidal that eliminates clogging up by algae or microbial contamination by "slime forming bacteria". These products have residual activity and inhibit bio-film as both of the products contain Quaternary Ammonium Compound and Gluteraldehyde).



#### TO CLEAN MINERAL SCALE BUILD-UP (CALCIUM):

Choice of 2 methods;

**1** Add Pho Cid to the system @ 7.5 - 15 ml/litre (0.75 - 1.5 % or 1 - 2 oz / gal) of water; Let this solution to circulate through the system until EC Pads are cleaned; Drain the system and flush with clean water.

**2** Foam or spray with Tornax-S @ 30 - 45 ml/litre of water (3.0 - 4.5 % or 5 - 6 oz / gal) on the surface of EC Pads; Allow it to remain for 10 minutes; Rinse off with clean water; Drain the system and flush with clean water.

Refill the system with clean water.



\* The recommendations of manufacturer(s) should be kept in considerations that the chemical(s), being used, should not damage the EC Pads/Systems.

\* Check the water filters (if being used) and remove sediments build-up, on monthly basis.

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### STEP 2: INITIAL TREATMENT

Add Cid 20 @ 400 ml/1000 litres of water (0.04%) OR Virocid® @ 200 ml/1000 litres of water (0.02% or 1 oz / 40 gal ) within the system as to acquire the desired results.

### STEP 3: MAINTENANCE TREATMENT (PREVENTION)

Add Cid 20 @ 110ml/1000 litres of water (0.011%) OR Virocid® @ 55 ml/1000 litres of water (0.0055% or 1 oz / 150 gal ) within the system, continuously, with the help of medicator or treat this way, in general, on weekly basis.



Approved by Munters

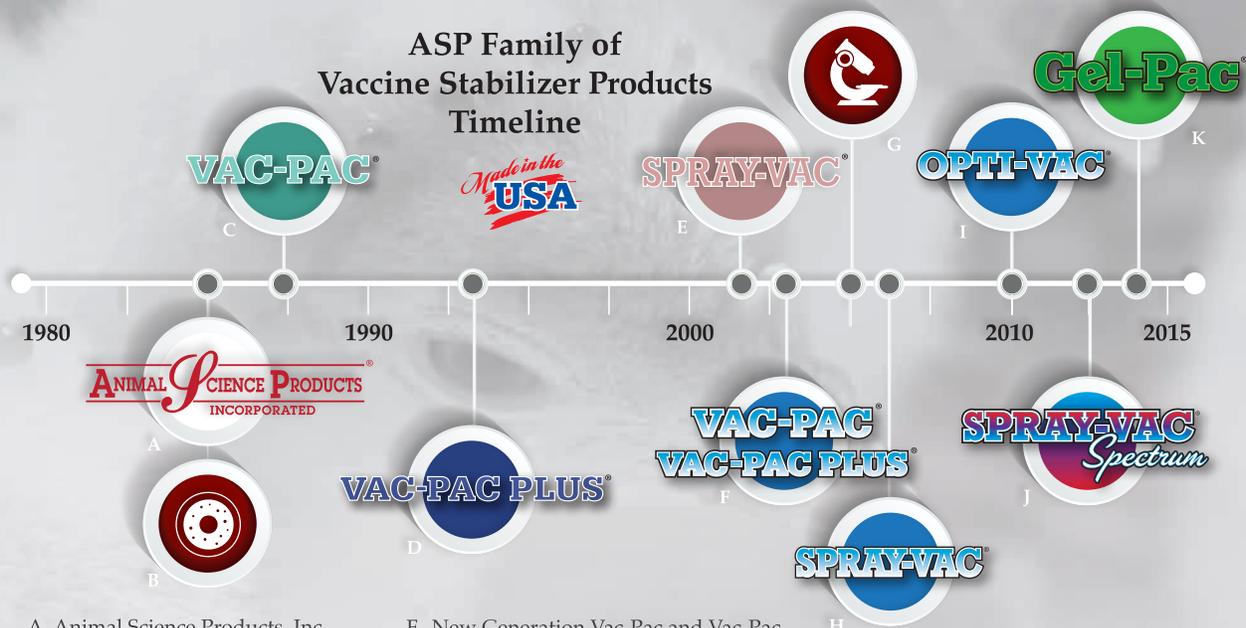
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# Vaccine Stabilization and Protection: A History of Innovation

Since its humble beginnings in 1985, Animal Science Products has expanded the boundaries of product development. For nearly twenty years, ASP has established a reputation as an innovator and industry visionary, eventually leading to the 2002 break-through we know today as New Generation vaccine stabilization. Once Spray-Vac, ASP's first New Generation vaccine protection product, was introduced to the market, the race was on to develop even more efficient, reliable, and cost-effective delivery methods for proper vaccination.

In just over 10 years, ASP has introduced five additional vaccine protection products, ranging in delivery methods from drinking water, to eye-drop application, to novel sprays that stimulate preening and feeding behaviors. Together, these products are changing the way poultry producers around the world protect their flocks against disease. Consumer demand for healthy poultry is on the rise globally. This demand calls for better ways to inoculate the entire flock, and is a driving factor behind ASP's commitment to innovation in vaccine protection.



- A. Animal Science Products, Inc. chartered and founded as a water soluble packaging company
- B. ASP introduces its first powdered milk-based vaccine stabilizer
- C. Vac-Pac® vaccine stabilizer first appears, incorporating enhanced solubility and improved dose recommendations
- D. Vac-Pac Plus® is introduced with added blue dye for visual vaccine monitoring
- E. Introduction of Spray-Vac® – a New Generation vaccine stabilizer that eliminated the need for distilled water

- F. New Generation Vac-Pac and Vac-Pac Plus introduced with patent-pending technology that improves solubility and effectiveness
- G. Product development laboratory expansion
- H. Spray-Vac improved to protect both viral and bacterial vaccines
- I. Introduction of Opti-Vac®, a tonically-balanced ocular delivery stabilizer
- J. Spray-Vac Spectrum developed with enhanced spectral response and increased preening
- K. Introduction of Gel-Pac® new generation gel delivery system of vaccines, probiotics, and nutritional ingredients



Learn more at  
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Sales Representative



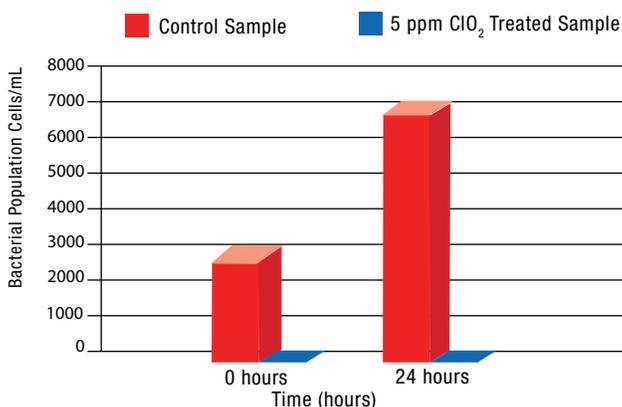
# ProOxine® (AH) Disinfecting Solution For Animal Drinking Water

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

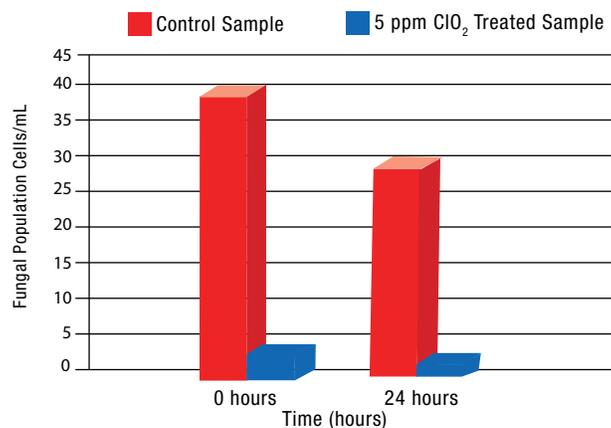
### CONTROL EFFECT OF 5 ppm ClO<sub>2</sub> AGAINST BIOFILM BACTERIA

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



### CONTROL EFFECT OF 5 ppm ClO<sub>2</sub> AGAINST BIOFILM FUNGI

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

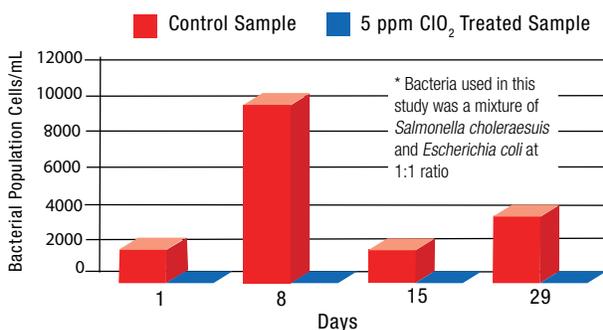


AANE (Automated Activation Non-Electric) System

## 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 <sub>2</sub> Treated Sample
1 Day	2000	20
8 Days	10000	2
15 Days	2000	2
29 Days	4000	2



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Long-Lasting Stabilized Chlorine • Effective for up to 2 Weeks

**pH-buffered for enhanced efficacy**

**\Does not provide a source for bacterial growth greatly  
Reduces cross-contamination potential**

Does not Freeze nor Evaporate

## TRUE PAN POWDER

**Ultra-dry, fine composition resists moisture clumping  
while providing superior foot coverage**

Effective Cleaning, Bleaching and Deodorizing Properties

**Economical way to clean footwear**

### DIRECTIONS

- Add as needed to foot pan to maintain a half-inch layer.  
(A thicker layer will not increase effectiveness.)
- Remove organic contaminants as necessary.
- Change out pan powder every 2 weeks for optimal results.

Ready-To-Use;  
NO MIXING

Available in  
11, 35, 50, 100  
and 400 pound  
Re-Sealable  
Containers

# Gil I-Poult & Gil Medic-Dyne

Multi-Purpose Iodine Supplement

**Gil I-Poult: 1.75% titratable iodine  
Gil Medic-Dyne: 3.5% titratable iodine**

Cold Weather Stable

**Concentrate mixes readily in cold, hard water**

Provides Essential Iodine to Poultry

**Cleans and conditions water drinking systems,  
keeping them free of slime and mineral scale**

Effective Deodorizer

**Consult your local sales or service representative  
for use directions.**

Available in 1, 5, 15, 55 and 275 Gallon Containers



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# Huvepharma® Water Solubles



Huvepharma is excited about the addition of our new water soluble products:

**Chloronex®**  
(Chlortetracycline HCl)

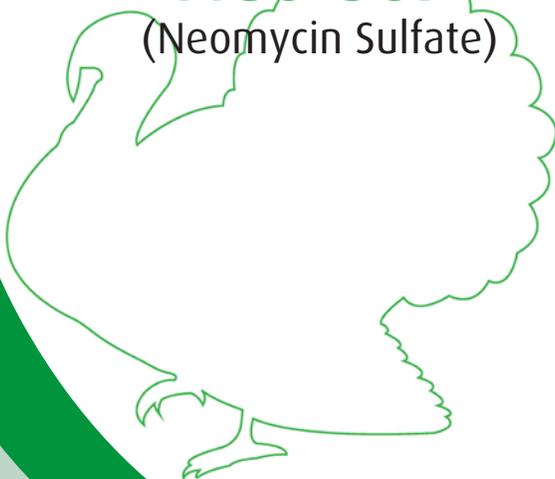
**Oxytet Soluble®**  
(Oxytetracycline HCl)

**Lincomycin**  
(Lincomycin HCl)

**R-Pen®**  
(Penicillin G Potassium)

**Neo-Sol®**  
(Neomycin Sulfate)

**Sulmet®**  
(Sodium Sulfamethazine)



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Federal Law restricts these products to use under the prescription of a licensed Veterinary only.

Pure *Yucca schidigera* powder



# BIOSUPREME®

## ORGANIC FEED INGREDIENT

### ENHANCES FEED EFFICIENCY

BIOSUPREME® contains saponins (active ingredient), which have surfactant properties, playing an important role in animal nutrition. The glycocomponents within saponins have a natural affinity to bind ammonia and other noxious gases, therefore improving the environmental air quality within the poultry houses, swine barns, and other livestock commercial facilities.

### REDUCES THE NEGATIVE EFFECT OF AMMONIA

BIOSUPREME® is produced under strict certified Food Safety Management System guidelines as well as certified organic manufacturing process. We use only mature and over mature *Yucca schidigera* plant stems obtained under an environmentally conscience sustainable harvesting program, monitored by our own in-house forestry engineers.

 BIOSUPREME™ L

Available in concentrated liquid, which can be included in drinking water systems.



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