

Water Sanitation – Are you on board?

By John Menges

Here it is again...the poultry production gear. With VFD's, ABE, NAE, Organic, etc...requirements, pathogen reduction has become more critical than ever. The water sanitation cog has always been one of my top two most important (but they all are in moving a production system forward) cogs. It is gaining more attention due to the improvement in livability, gut health, and overall performance for those that take it seriously.

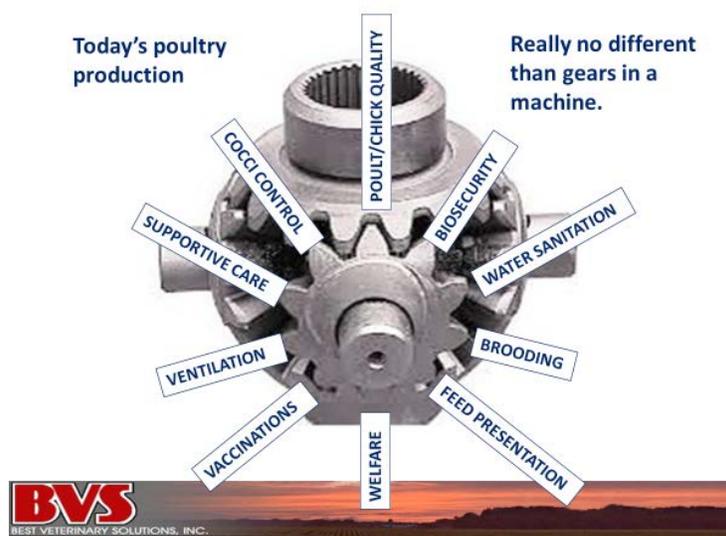
Water sanitation starts with water line cleaning between flocks, especially 24-48 hours prior to placement with a stabilized hydrogen peroxide (CID Clean) or peracetic acid/stabilized hydrogen peroxide (CID 2000) depending on whether scale is present or not. Running these products at the recommended label rate is critical for removing biofilm. The goal is to start clean and stay clean.

Completely flush this product out by following it with *activated* chlorine dioxide. I used to mention chlorine as an alternative. Not

any more. That technology is old and not nearly as effective as activated chlorine dioxide. Properly activated chlorine dioxide (see your local BVS representative for what *activated* chlorine dioxide means and how it is created effectively and efficiently) can remove biofilm constantly and kill pathogens in the water. To prove this to yourself, swab your lines prior to using activated chlorine dioxide and about 2-4 weeks after using activated chlorine dioxide. The results should speak for themselves depending on how much biofilm and organic matter is present.

We have had many testimonials from turkey, broilers, layers and breeders on the improvement in performance and cost of production by using and measuring activated chlorine dioxide. The movement is on and other "chlorine dioxide" systems are jumping on the band wagon. BE CAREFUL! Ask the right questions about the form of chlorine dioxide their systems create. Some of these products are better than using chlorine, some are not – just more expensive. If you are

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Clostridium susceptibility to formic acid

By Joshua A. Jendza, joshua.jendza@basf.com

Clostridial diseases

Pathogenic clostridial species are associated with a host of different disease states in poultry. Probably the most well known would be necrotic enteritis (NE), which is caused by *Clostridium perfringens*. Usually in association with some sort of gut stressor like coccidia infection, excessively high dietary protein, or high fiber. Overall, the cost of NE to the broiler industry is estimated to be more than \$5 billion globally. There are several other poultry clostridial diseases in addition to NE. For example, *C. colinum* causes ulcerative enteritis, *C. perfringens* and *C. septicum* both cause gangrenous dermatitis/cellulitis, and *C. botulinum* causes botulism.

Control of Pathogenic Clostridia

Pathogenic clostridia are collectively very difficult to kill. They are ubiquitous in the environment, and this is due in no small part to their hardiness. For example, *C. botulinum* has been shown to grow best between 90 and 95°F, and capable of growing anywhere between 43 and 104°F. This means conditioning and pelleting (generally done between 65 and 90°F), which is a good means of killing salmonella is quite probably working against us on clostridia. Furthermore, clostridia – much like bacillus – are spore forming bacteria. When they are faced with conditions that are no longer favorable for growth they are capable of sporulating and waiting for better days.

Fortunately, chemical interventions like acidification have been shown to be better for inhibiting clostridia. In the lab, formic acid has been shown to require as little as 0.1 to 0.15% to inhibit *C. botulinum* and *C. perfringens* (Strauss and Hayler, 2001). This is compared with 0.25 and 0.30% for propionic and lactic acid, respectively to inhibit clostridia. This is similar to the sensitivity of other microorganisms of concern (Figure 1)

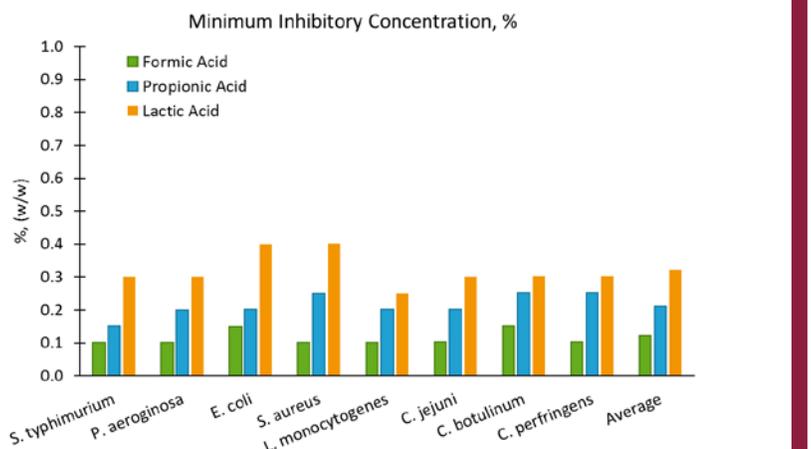


Figure 1. Minimum inhibitory concentrations (MIC; lower is better) of 3 common organic acids against different microbial of concern. Adapted from Strauss and Hayler (2001).

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Water Sanitation, *continued from cover*

doing nothing for flock sanitation and use one of these products, you might see improvement, but not what you could see by using properly activated chlorine dioxide.

Now, I will reference my title of this article. Are you on board with water sanitation? That means, are you taking it seriously? Water is the most important nutrient for any animal. We use our water to deliver a lot of different products to our animals. Are we taking care of keeping the delivery system free of biofilm and pathogens? Are your service technicians and growers engaged in the process? Or, are you expecting your supplier to do this most important process of managing and monitoring for you? We spend a lot of time, money, and effort on building houses or upgrading houses with ventilation technology to keep birds comfortable. We spend a lot of time and money on vaccination programs, nutritional programs for the feed, and other daily management guidelines to ensure the success of good performance. But, when it comes to water sanitation – we want cheap, plug and play, no maintenance, put it in and forget about it systems.

Do you regularly change the oil in your pick-up truck, (picture on the top)?



If the answer is no, you are willing to risk this picture on bottom! That's exactly what we are doing if you neglect the management of your water sanitation to your flock of birds. The potential for it to blow up, or certainly not be nearly as efficient as it could be, not to mention animal welfare issues.

Would you drink water out of the stream on the top? Or the stream on the bottom?



Which stream is your flock drinking from?

Even if you are committed to sound water sanitation. Remember, it is not a cure all. It is part of the gear to move the flock forward. Activated chlorine dioxide, if administered properly, we remove the pathogen load from the water. But, it needs your help, especially if your water high is in total dissolved solids, calcium, manganese and/or iron. There are filtration systems available to remove these problems from your water. They will negatively impact your activated chlorine dioxide effectiveness.

When I get to talk to some production managers and growers, I hear – we are going to ABF or NAE, or at least trying to get some flocks to qualify for either. But, management hasn't changed anything except remove the crutches we have been used to for years - in the hatchery (antibiotic injection), in the feed (ionophores for example), and in the water (scripted antibiotics). Water sanitation must become part of your arsenal. We are moving from curative production to preventive production, as illustrated below. WHERE ARE YOU? ■



Solutions for Organic Production

Acidifiers:

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

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Organic Manage
BVS Vitamin D3 Liquid
BVS Poult Start
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BVS Sol-U-K
BVS Solulytes Natural
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EnviroSupreme Green
Orego-Stim Liquid
Orego-Stim Feed Grade
DeviStat - O

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Probiotics:
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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.



Clostridium susceptibility to formic acid, *continued from page 2*

Animal trials

Working in the lab is, of course, less important than working in the animal. Fortunately, acidification with formic acid has been shown to reduce clostridia and severity of associated diseases, such as NE. Manzoor et al. (2013) compared formic acid with Amprolium in birds challenged with coccidia and reported a restoration of normal body weight and improvements in NE severity with 5000 ppm of formic acid in the drinking water.

Recent work from our company has shown that Amasil NA (feed grade sodium formate) can deliver comparable benefits to feed medication with Coban (monensin; Elanco) and BMD (bacitracin methylene disalicylate; Zoetis) in birds challenged with coccidia and *C. perfringens* (Coelho et al., 2019a,b) in terms of both performance (Figure 2) and NE severity (Figure 3)

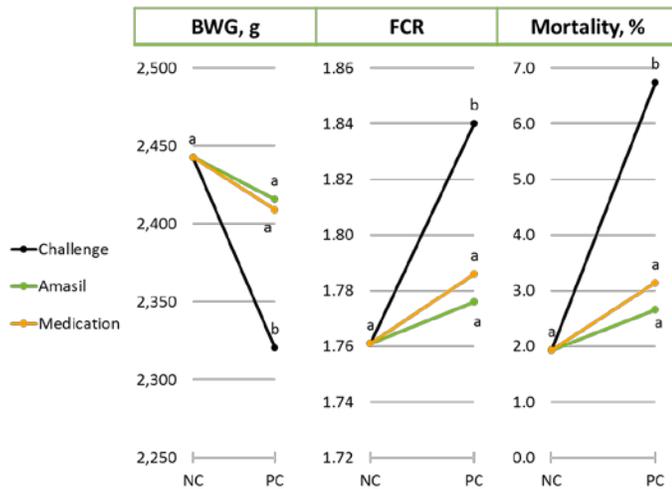


Figure 2. Performance and mortality of broilers without (NC) or with (PC) exposure to 50,000 oocysts of coccidia and *Clostridium perfringens*. Points within a graph with different superscripts are different ($P < 0.05$).

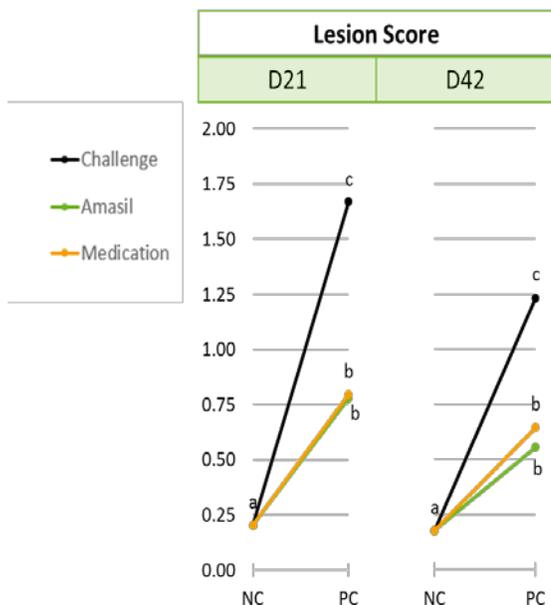


Figure 3. Necrotic enteritis lesion scores of broilers without (NC) or with (PC) exposure to 50,000 oocysts of coccidia and

Clostridium perfringens at day 21 and 42 of age. Points within a graph with different superscripts are different ($P < 0.05$). Scoring was done on a 0 to +4 scale according to Johnson and Reid (1970). Score 0 = no gross lesions; +1 = very few scatter petechiae on the cecal wall, no thickening of the cecal walls, and normal cecal contents present; lesions more numerous with noticeable blood in the cecal contents, cecal wall is somewhat thickened, and normal ceceal contents present.

Acid tolerance response

When using organic acids to control clostridial species, it's important to ensure that you apply strong and consistent pH pressure. This is because acid tolerance response. When subjected to a sub-lethal pH challenge (say pH of 4.5) they turn on genes that enable them to survive a stronger subsequent challenge that would have otherwise have been lethal (say pH 3.5; Villarreal et al., 2000). This is where use of a strong organic acid like formic comes in hand. Many other organic acids are simply not capable of achieving a low enough pH to kill clostridia, but they are capable of achieving a pH that triggers the acid tolerance response. This then poses a problem for the birds themselves, as well as the food safety system that relies heavily on acids for pH control and pathogen control in meat processing.

Take away

Unfortunately, the story around clostridium is not so simple as "Clostridium = BAD". While all the species outlined above are toxin producing proteolytic clostridial species, there also exist several commensal clostridial species in the bird. Commensal clostridia are generally saccharolytic clostridial species (clusters IV and XIVa). Several such strains have been identified that can convert acetate to butyrate in the gut and intestinal butyrate is widely recognized as beneficial to gut health and intestinal integrity. Therefore, it's important to focus on controlling the 'bad' clostridia at feed intake without necessarily eliminating all beneficial species that have colonized the gut. Acidification can be a potent tool toward that end, but it is important to use efficient organic acids consistently to ensure best effect.



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Six Steps to Create the Ideal Environment for Chick Placement

By Blake Gibson, Senior Manager
Jones-Hamilton Co

Producers are tasked with increasing a chick's body weight 4-5 times within the first seven days. Even one lost day of optimal performance can decrease growth potential by 5 to 7 percent. Creating an ideal environment for chick placement is a crucial part of attaining the desired performance, and something that is within each producer's control. Start with these six steps:

Decake litter. As soon as the previous flock leaves, carefully remove all the wet cake from the house trying not to disturb the litter too much. The more you disturb the litter, the greater the exposed surface area, which can increase ammonia. This is why we don't recommend tilling litter. Tilling is easy and creates good looking litter, but it doesn't equal performance.

Purge ammonia. Once the cake is removed, close the house up tight to let heat build up to above 85 degrees F to allow ammonia to purge from the litter. Opening vents or curtains to air out a house will not help ammonia levels; you have to use heat to purge ammonia from the floor before ventilating.

Outside temperature not conducive to reaching 85 degrees? Producers who consistently rank in the top 2% will tell you that turning on a brooder to raise the temperature is worth the cost. You'll end up using less fuel in the long run, and your litter amendment will last longer, since you'll only have to ventilate for relative humidity and not ammonia.

Get set up. Once ammonia has been purged, prepare the houses for the next flock. Level the litter, and be sure

waterlines are at the right height and that they are full of clean, fresh water.

Pre-heat for 48 hours. Not pre-heating for long enough is one of the most common mistakes. Pre-heating for 48 hours prior to bird placement raises the core litter temperature, not just the surface temperature, which helps:

- Release ammonia from the litter, which once ventilated, will extend the life of your litter amendment
- Warm the water in waterlines and encourage chicks to drink and eat
- Keep chicks from huddling at placement; birds who huddle aren't eating and drinking

Check for ammonia at bird level. Most producers are desensitized to ammonia, so it's crucial to buy an ammonia gun and take readings at chick level. Just because you can't smell

it, doesn't mean there isn't ammonia present. Ammonia can cause health and performance problems at levels as low as 10 ppm.

Apply a litter amendment (year-round). Apply your litter amendment 2-24 hours prior to bird placement to eliminate any remaining ammonia and lower the litter pH. While you may not think litter amendments are necessary in warmer months, not applying an amendment year round can make it difficult to accomplish 10 ppm ammonia readings. Plus, without pH control, the litter can become an environment that is more suitable for bacterial growth.

With as fast as birds are being grown, producers need to do everything possible to limit stress. Creating this ideal environment takes time but delivers substantial returns. ■



CAN YOU SEE THE COST OF AMMONIA?



It may be invisible, but research shows ammonia creates costly challenges at levels as low as 25 PPM.

Control ammonia to boost performance, meet welfare requirements and support environmental demands. Only Jones-Hamilton's litter management experts and our industry-leading litter treatment, PLT[®], has a 25-year history of eliminating ammonia's costly challenges.

Get focused. Apply PLT[®]. Gain profit.

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3 FACTORS THAT IMPACT PAW HEALTH

Chicken paws have become a lucrative commodity in the industry with millions in exports annually. Paws also serve as an indicator of animal welfare during audits and can be a direct indicator of bird performance. Footpad dermatitis (FPD), the ulcerated lesions that can form on the pad of the paw, has the power to disrupt their potential. For the sake of welfare, profitability and performance, it's important to understand the top three factors that influence paw health.

1/ Litter Moisture

High litter moisture content has been shown to be a sole contributing factor to the development of FPD, especially before two weeks and as early as 3-5 days of age, with levels greater than 30% being very detrimental. Focus on litter and moisture management year-round to help avoid FPD. Even decaked and windrowed litter can cause severe burns if excess moisture is present.

2/ Bedding material and depth

The role of bedding material is to absorb and then allow for evaporation of moisture, which can be influenced by the material's particle size, moisture content and build up, and rate of caking. New bedding is often placed at inadequate depths. Research has shown a direct correlation between litter depth and FPD with paw scores improving as litter depth increased (Bilgili et al 2009). Increased litter depth leads to decreased moisture levels and improved paw quality, which positively impacts bird performance and health (Shepard et al 2017).

3/ Nutrition

Nutrition can impact the development of FPD in various ways, including affecting feces consistency and thus litter quality. For example, excess sodium can increase water intake thereby increasing litter moisture. One study that examined diets with equal protein:energy ratio with either low- or high-density levels showed broilers raised on the low-density diet had significantly fewer FPD cases than the high-density fed birds (de Jong et al 2015).

Liquid Aspirin vs. Sodium Salicylate: Properties, Actions, Economics

By Grant D. Weaver, DVM, Swine Technical Services Veterinarian
Aurora Pharmaceutical, Inc.

Salicylate plays an important role as a non-steroidal, anti-inflammatory drug in poultry production systems worldwide. Those used most commonly are **sodium salicylate** and **acetylsalicylic acid (aspirin)**, due to their immunomodulatory, analgesic, antipyretic, and anti-inflammatory activities. Other effects have been reported such as minimizing the effects of heat stress, allostatic load, ascites, leg disorders, reducing respiratory and digestive disorders, as well as enhancing growth performance, feed utilization, nutrient digestion and absorption, egg production and the quality of meat and eggs.

Anti-Inflammatory Salicylates: Their Properties and Actions

Sodium salicylate and aspirin are two salicylates that are part of a larger group of anti-inflammatory agents known as nonsteroidal anti-inflammatory drugs (NSAIDs). Most NSAIDs act to relieve inflammation by reducing local fluid accumulation (edema), and heat and pain in injured or infected outlying tissues. They also act on the bird's central regulatory systems to reduce pain and fever (Lees and May, 1992, p. 847).

Sodium salicylate and aspirin have **comparable therapeutic properties and potencies** (Osol and Pratt, 1973, p. 1075) and the anti-inflammatory properties of sodium salicylate and aspirin are the same (Osol and Pratt,

1973, p.160), with some major exceptions, including:

- **Sodium salicylate does not prolong bleeding time as aspirin does** (Osol and Pratt, 1973, p. 162). This is due to the acetyl group of aspirin irreversibly acetylating and inactivating the prostaglandin synthetase of platelets. New platelets must be formed after aspirin use for full clotting to be restored (May and Lees, 1996, p. 231; and Plumb, 1995, p. 55). **Sodium salicylate does not contain acetyl groups, and consequently its effect on platelets is not irreversible.**
- **Liquid aspirin is subject to degradation when exposed to moisture** (Plumb, 1955, p. 55; and Budavari et al., 1989, p. 134), where **sodium salicylate has been demonstrated to stay stable for periods in excess of one year** in aqueous conditions (Tizard, unpublished data).
- **The solubility of sodium salicylate in water is very high**, with one-gram dissolving in slightly less than 1 ml (Budavari et al., 1989, p. 1367). **Aspirin is as much as 300 times less soluble**, with one gram of aspirin dissolving in 300 ml of water (Budavari et al., 1989, p. 134)

Sodium salicylate and aspirin both

work to relieve the inflammation that results from a cascade of events that occur because of injury or infection. The body produces prostaglandins that are responsible for the pain, fever and edema associated with inflammation. Prostaglandin synthesis depends on prostaglandin synthetase enzymes. Live animal studies have been used to demonstrate that sodium salicylate, aspirin and other NSAIDs reduce inflammation by inactivating prostaglandin synthetase and preventing the development of prostaglandins (Higgs, et al., 1976, p. 105; and Lees and May, 1992, p. 846).

The anti-microbial effects of salicylates can be a double-edged sword. If used at too low levels, induction of antibiotic resistance can result, while at higher levels antimicrobial effects can be enhanced (Price et al., 2000, p. 1029). This enhanced antimicrobial effect results in more efficient use of feed and water by birds when used properly. It is always important to follow labeled directions for the use of drugs, but it is especially important with salicylates for these reasons.

Cost Comparison

Due to the fact that sodium salicylate is highly soluble in water vs. **aspirin at 300X less soluble** in water, the cost benefits greatly favor sodium salicylate as shown in the chart on page 9.

continued on page 9

Sodium Salicylate Properties, *continued from pg. 8*

Per-Gram Cost Comparison: Liquid Aspirin 12% vs. Oral-Pro® Sodium Salicylate 48.6%*

Product	Dose	Approximate Retail Cost/Gallon of Stock Solution	Salicylate Dose Delivered to the animal	Cost Per Gram
Aspirin 12% (\$14.00 per qt)	4 oz./Gallon	\$1.75/Gallon Stock	.117 gram/gallon of treated water	\$0.11/gram
Oral-Pro 48.6% (\$36.50 per gal)	16 oz./Gallon	\$4.56/Gallon Stock	1.89 gram/gallon of treated water	\$0.018/gram (6.1XSavings/gm)
Oral-Pro 48.6% (\$36.50 per gal)	10 oz./Gallon	\$2.85/Gallon Stock	1.18 gram/gallon of treated water	\$0.018/gram (6.1XSavings/gm)

*Oral-Pro® Sodium Salicylate 48.6%, Aurora Pharmaceutical Inc.

The other consequence resulting from the solubility issue related to aspirin is that the animal is not able to consume enough treated water to achieve therapeutic levels in the blood. The amount of aspirin ingested does not allow for the beneficial antipyretic and anti-inflammatory effects as discussed above to be realized. Conversely, the amount of sodium salicylate that can be consumed is more than adequate to achieve the desired effect. Therefore, the advantages of using sodium salicylate are both cost, and effectiveness related. ■

About the Author

Grant D. Weaver, DVM, is Swine Technical Services Veterinarian for Aurora Pharmaceutical, Inc. Dr. Weaver received his DVM degree from Iowa State University in 1989. For nearly 20 years, Dr. Weaver was a partner in Sheldon Veterinary Clinic, Sheldon, IA, engaged in mixed animal practice with major emphasis in swine medicine. Dr. Weaver was most recently with MVP Laboratories, Inc. as Technical Services Veterinarian and Texas Farm, LLC as Veterinarian for Midwest Operations. Contact Dr. Weaver @ gweaver@aurorapharmaceutical.com.





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REFERENCES

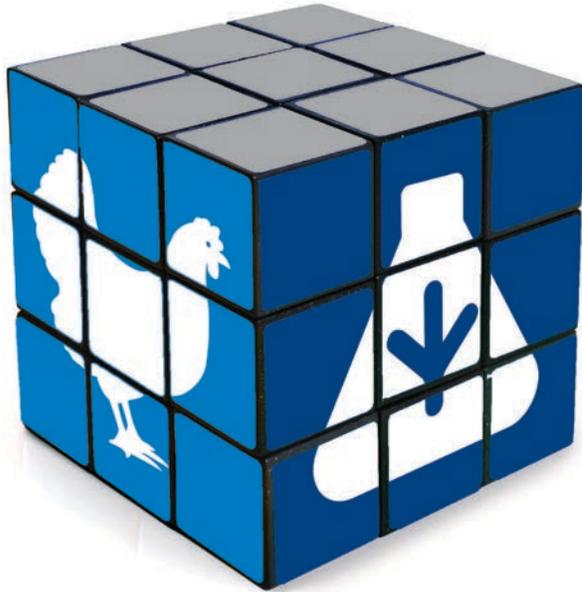
- 1 Perozo, F. et al (2008). Avian Pathology, 37:3, 237-245.
- 2 Data on file.

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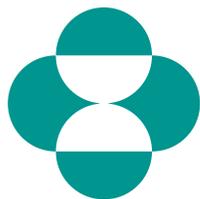
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- Safe to use for hatchery application



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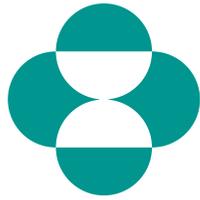
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- Produced under federal quality control standards, ensuring purity and sterility
- Consistent high potency titers to ensure protection of every vaccinated bird, flock after flock
- Recommended administration at 6 weeks of age or older helps assure no maternal antibody interference





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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 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®

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(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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Latex Powdered Gloves



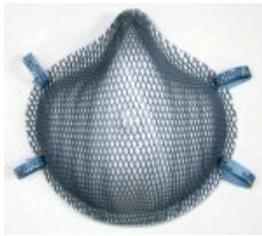
Latex Powder Free Gloves



Nitrile Powder Free Gloves



Yellow Rubber Boot Cover LG & XL



Moldex 1200N95 Mask



Moldex 2400N95 Mask



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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



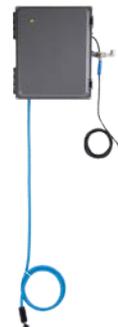
Doorway Foam Unit



Footwear Sanitizing Unit with Boot Scrubber



10 Gallon Fog Unit



Wall Mounted Fog Unit



Disinfection Mat



Doorway Foam Unit



0.5 Gallon Foam Unit

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Best Management Practices for Successful Coccidiosis Vaccination in Turkeys

By Kelli H Jones, DVM, MAM, diplomate ACPV
Technical Services Veterinarian, CEVA Animal Health
kelli.jones@ceva.com

As an alternative to anticoccidials used to combat coccidiosis in turkeys, live non-attenuated vaccines can be administered via gel spray application on the first day of life in the hatchery. Their mode of action is to initiate immunity by providing the first low level dose of oocysts in a uniform, controlled manner. There are, however, key factors for success with a coccidiosis vaccination program.

Vaccination in the hatchery is only the beginning. In order to achieve proper immunity development, 3-4 life cycles of coccidiosis infection is required to pass through the birds in the barn. Poult should be brooded in a manner to encourage early intake of feed and water to ensure a good “start,” but also to manage re-cycling of vaccine oocysts. Start poult as needed, but try to allow birds to shed the first oocysts in larger areas of the barn (minimum of 1ft²). If birds are brooded in rings or compartments, target their release around 4d (before the first oocyst shedding) and again around 10d (before second shed period) if done in stages.

Litter/air moisture is required for sporulation to occur, but must not become excessive. This vaccine does not need much encouragement to be able to recycle in most barns with the following moisture levels. Oocysts need at least 20% litter moisture and air humidity of at least 35%. Avoid any “wet” litter (> 40%), especially around feed or drinker areas. If litter becomes wet, it should be removed and replaced with dry litter as soon as possible.

If one keeps in mind that birds cycle coccidiosis every 7d, then it is possible to

identify when birds may be experiencing intestinal stress. Pacing, vocalization, huddling as if feverish, uneasiness, changes in fecal/cecal droppings, and litter consumption are common clinical signs observed when poult are going through enteric stress. It is completely normal to see



clinical signs of some enteric discomfort that lasts for approximately 2-3 days, but should not be allowed to become excessive or create mortality.

Supplemental interventions may be necessary to help birds through cycle stress periods. Increasing the barn temperature 2°F, and encouraging poult to eat feed rather than litter, either through the use of attractants (cracked corn, granular molasses, grit, feeding on paper or trays) will go a long way to help poult maintain a healthy g.i. flora and avoid secondary bacterial infections. Administration of

some sort of anti-inflammatory products may also help poult “feel better.” Water soluble aspirin is a product that is commonly used for this. Please consult your veterinarian for options available for your particular program.

Lastly, one can either help or hinder re-cycling of vaccine oocysts in a barn. Anything done prior to the completion of those 3-4 coccidiosis life cycles can either help or hurt development of proper immunity. Avoiding other intestinal stressors, such as HE vaccination, during heavy re-cycling of coccidiosis vaccines is encouraged. Also, if poult go off feed during times of enteric stress, aside from encouraging them back to feed, probiotics and/or antibiotics may be helpful to prevent dysbacteriosis and subsequent secondary bacterial infections. Again, please consult your veterinarian for direction.

In addition, administration of anything with potential anticoccidial properties (tetracyclines, sulphonamides, essential oils, anything with an anticoccidial claim) should only be performed under the strict guidance of your veterinarian, as some products can interfere with proper vaccine oocyst recycling if used inappropriately. Vaccine oocysts are extremely sensitive to anticoccidials, so it shouldn't take much to make a big impact. Ideally, NO treatment should be needed!

Just keep in mind the “circle of cocci life” and don't interrupt the process. These key factors mentioned will help provide success in a coccidiosis vaccination program. ■



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We can help.**

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- Non corrosive
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- EPA approved "broad spectrum disinfectant"
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CID 2000 PRO

- H2O2 removes heavy soils
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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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Dilution Rate: 1:256 Dilution Rate: 1:400

Synergize is EPA registered as a Cleaner - Disinfectant. Virocid is EPA registered as a Broad - Spectrum Disinfectant.

Total amount of active ingredients and how those ingredients work together does matter.

Based on EPA registration and usage claims, Synergize has a general label usage rate of 1:256 and Virocid has a general label usage rate of 1:400. So, *two gallons of Synergize will treat 512 gallons of water. One jug of Virocid, which is 1.32 gallons (5 Liters), will treat 528 gallons of water.*

2 JUGS OF SYNERGIZE = 1 JUG OF VIROCID

When comparing total cost of any EPA registered Disinfectant take this into consideration.

Less inventory, less storage space, more savings! The choice is clear!

Cleaner & Descaler for poultry & swine water lines, cool cell pads & hard environmental surfaces

- Clean Nipple Waterers
- Clean Cool Cell Pads
- General-Purpose Cleaner
- For Use In Hatcheries



DANGER
 Causes severe skin burns and serious eye damage.
 Mixing with chlorine or chlorinated cleaners releases chlorine gas.
 Corrosive to metals.
 Irritating to aquatic life.
 Harmful to the environment.
 Avoid contact with skin and clothing.
 Wash thoroughly after handling.
 Do not eat, drink, or use tobacco while using.
 Do not get in eyes, nose, or mouth. Do not breathe dust.
 Do not get on clothing or body.
 Do not use in confined spaces.
 Do not use in areas where food is stored or prepared.
 Do not use in areas where animals are kept.
 Do not use in areas where children play.
 Do not use in areas where pets are kept.
 Do not use in areas where food is stored or prepared.
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PLC
Pad and Line Cleaner
 Cleaner & Descaler for poultry & swine water lines, cool cell pads & hard environmental surfaces

COMPOSITION
 alkyl dimethyl benzyl ammonium chloride C12-18 (CAS#9291-01-0), alkyl dimethyl ethyl benzyl ammonium chloride C12-14 (CAS#7702-19-0) and glycolic acid (CAS#79-14-1)

Keep Out of Reach of Children
INDUSTRIAL AND COMMERCIAL USE ONLY
 Before using, read the Safety Data Sheet.

Storage
 Store locked up in a corrosive resistant container with a resistant inner liner.

Disposal
 Avoid disposal. Attempt to use product completely in accordance with intended use. Dispose of in accordance with federal, state and local regulations. Unused product is RCRA 261.1 (Corrosive).

Lot: 092117
 Net Content: ONE GALLON (3.78L)

24-Hour Emergency Number
 1-800-424-9300

Manufactured for
Best Veterinary Solutions, Inc.
 Ellsworth, IA, 50125

DIRECTIONS
CLEANING NIPPLE WATERERS
 Follow the directions on the label for cleaning nipple waterers and proportion the PLC to the water in the nipple waterer. When done, flush the nipple waterer with clean water. When done, flush the nipple waterer with clean water.
CLEANING COOL CELL PADS
 Cool cell pads are in multiple sections. Mix PLC at 0.5% in water and spray on the pads. Allow minimum contact time of one hour. The temperature of the water and the pads should not exceed 20°C (68°F). Rinse the pads with clean water and then spray with clean water. Repeat the process every 45 minutes until the pads are clean. Do not use in areas where food is stored or prepared. Do not use in areas where animals are kept. Do not use in areas where children play. Do not use in areas where pets are kept.

GENERAL PURPOSE CLEANING
 Mix PLC at 0.5% in water and spray on the surface to be cleaned. Allow minimum contact time of one hour. Rinse the surface with clean water. Repeat the process until the surface is clean. Do not use in areas where food is stored or prepared. Do not use in areas where animals are kept. Do not use in areas where children play. Do not use in areas where pets are kept.

FARROWING HOUSES
 Mix PLC at 0.5% in water and spray on the floor. Allow minimum contact time of one hour. Rinse the floor with clean water. Repeat the process until the floor is clean. Do not use in areas where food is stored or prepared. Do not use in areas where animals are kept. Do not use in areas where children play. Do not use in areas where pets are kept.

HATCHERIES
 Mix PLC at 0.5% in water and spray on the floor. Allow minimum contact time of one hour. Rinse the floor with clean water. Repeat the process until the floor is clean. Do not use in areas where food is stored or prepared. Do not use in areas where animals are kept. Do not use in areas where children play. Do not use in areas where pets are kept.

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**Strengthen your bird's
respiratory system – Naturally**



Aflorin[®] P L

The ultimate aid to reduce respiratory stress



To know more
SCAN ME!

Aflorin® P L Technical Review

Several common and important diseases can affect the respiratory system (air passages, lungs, air sacs) of poultry.

Diseases of the respiratory tract account for a significant percentage of the overall disease incidence in poultry. Often, a respiratory disease observed in a flock will be part of a multi systemic disease whereby the total impact is defined by a variety of pathogens, environmental factors and the immune status of the animal.

Factors that influence the development of respiratory diseases

1. **The animal:** age, species and genetics, all play a major role determining how sensitive or resistant the animal may be towards the pathogen.
2. **The environment:** environmental temperature, dust, gases, humidity, poor ventilation, play also a major role on the occurrence of respiratory irritations. Physical vectors such as rats, insects and wild birds can bring in pathogens, whereas stress reduces the immunity of the animals. In addition, poor management practices can also influence respiratory diseases, including visitors, number and mixing of animals.
3. **The pathogen** itself: respiratory diseases can be caused by bacteria (e.g. pathogenic *E. coli*), viruses (e.g. pneumovirus) and fungi (e.g. Aspergillosis). Also mycoplasma are responsible for a broad range of infections. Seldom a respiratory disease is associated with only one pathogen. In the majority of the cases, both primary and secondary infections are seen. Secondary (bacterial) infections often lead to high mortality.

4. **Housing density:** more intensive production is responsible for the increase in respiratory problems.
5. **Ammonia:** ammonia and ammonia gasses – which are always present in poultry houses – are irritant and corrosive, and may be harmful by all routes of exposure. Acute oral exposure rapidly results in pain, excessive salivation and burn to the mouth, throat and esophagus. Acute inhalation may initially cause upper respiratory tract irritation. Substantial exposures can cause burns in the oral cavity, nasopharynx, larynx and trachea, together with airway obstruction, respiratory distress and bronchiolar and alveolar edema.

Consequences of respiratory infections

- Reduced growth performance, up to 40%
- Reduced immunity
- Incomplete recovery
- Tissue can be severely damaged resulting in more sensitive animal for the rest of the production period
- Mortality

Aflorin® P L, an effective natural aid to reduce respiratory stress & subsequent complications

Aflorin® P L, developed by Innovad®, has been designed to overcome the negative consequences of respiratory infections. Aflorin® P L consists of carefully selected essential oils and plant extracts. A mixture of natural compounds (menthol, eucalyptus and saponins) capable of demonstrating the following effects:

continued on page 25



- Aids respiration and air passage and thus, facilitates better breathing
- Helps to reduce mucus accumulation & inflammation in the respiratory tract
- Acts as an expectorant and mucolytic in the upper and lower respiratory tract and thus, aids discharge from the respiratory cavities
- May exhibit direct antibacterial and anti-viral effect
- Helps to reduce the negative effects of disease and improves quick recovery
- Helps to reduce stress and loss of valuable feed intake
- Helps to improve resilience to respiratory infections
- Helps to reduce the negative effects and stress of live vaccinations
- Helps to improve survivability and reduces mortality

Application & Dosing

General Prevention:

Aflorin® P L can be applied via the drinking water for the regular prevention of respiratory disorders in poultry. This method is safe, economical and assists in the reduction of undesirable pharmacological active substances. Use 200 ml of Aflorin® P L in 1000 l of water (1:5000)

Special Prevention:

Aflorin® P L is the ideal tool for prevention of respiratory issues related to post vaccination reactions. To be applied 2-3 days after administration of both live and inactivated vaccines against Newcastle Disease, Infections Bronchitis, Avian Influenza, Infectious Laryngotracheitis etc. Use 200 ml of Aflorin® P L in 1000 l of water (1:5000)

Aerial Spray:

Aflorin® P L can also be applied via spraying using conventional equipment with a fine nozzle or an aerosol generator. Recommended for quick relief of respiratory symptoms Dilute 100 ml of Aflorin® P L in 1 gallon of water and spray over 10 000 birds

About Innovad

Innovad (Belgium) is active in over 70 countries worldwide and develops products for feed and farm application to help create a safer, more sustainable livestock industry. Innovad's specific poultry expertise in chicks, layers, broilers and turkeys helps producers to maximize their ROI by supporting the bird's health and improving growth rate and feed conversion. ■

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 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.



(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.



CID LINES®

- * 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.

STEP 2 - INITIAL TREATMENT

Add 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 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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Convincing advantages:

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Legal status: Complementary feed (in accordance with reg. 767/2009/EC), delivery to the final consumer

Composition: Water, magnesium sulphate, sorbitol, betaine, L-carnitine, salt, potassium sorbate, sodium citrate, citric acid

Activity per litre:

L-Carnitine 25 000 mg
Betaine 50 000 mg

Animal categories:

For poultry and other animal species

Density:

Approx. 1.18 g/cm³

Solubility:

Completely soluble in water

Recommended dosage:

1 - 2 litres per 1,000 litres of drinking water over a period of 2 - 5 days, repetition as required (during periods of stress e. g. at laying peak and during the following weeks)

Recommended use:

Shake well before application, do not use in pure form.

Storage:

Keep tightly sealed and protected from direct sunlight in a cool (max. 25°C) and dry place

Shelf life:

Guaranteed contents for 24 months if kept under proper storage conditions in original packaging

Packaging:

Bottle of 1 litre in carton of 12 x 1 litres
Canister of 5 litres in carton of 4 x 5 litres

Code number:

46051 (1 litres)
46050 (5 litres)

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Best Veterinary Solutions *Poultry Talk* - Summer 2019

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THE SCIENCE OF HEALTHIER ANIMALS.

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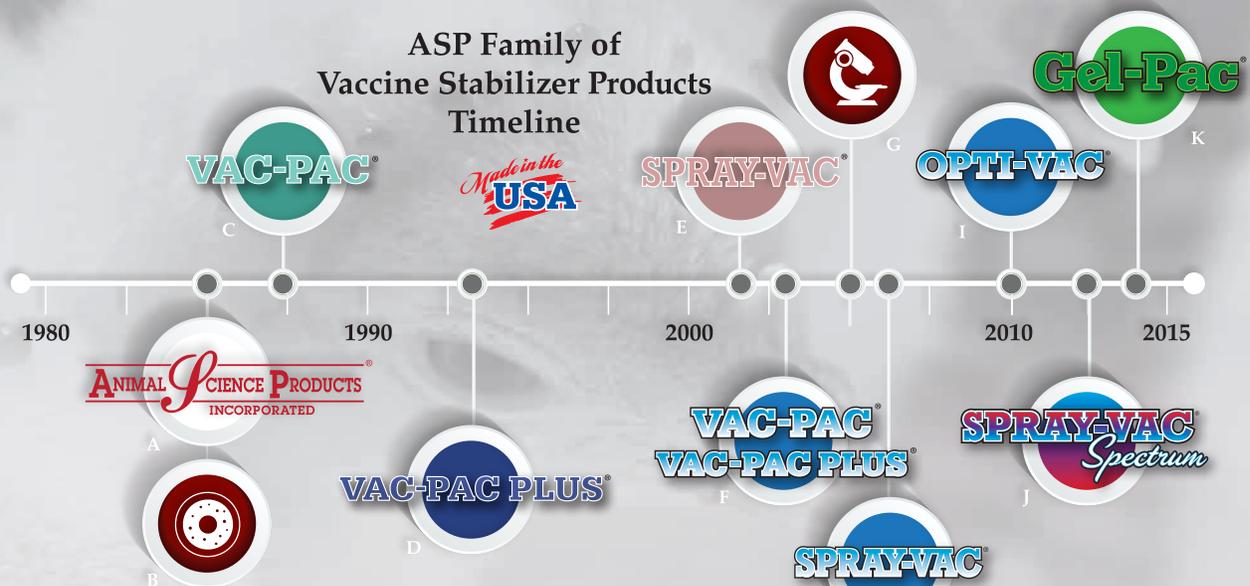
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Since its humble beginnings in 1985, Animal Science Products has expanded the boundaries of product development. For nearly twenty years, ASP has established a reputation as an innovator and industry visionary, eventually leading to the 2002 break-through 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



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To learn more about CELMANAX, contact Danny Wilburn at 304-668-3515 or Danny.Wilburn@churchdwight.com or visit AHanimalnutrition.com.

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Introducing
pH Safe
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**MAKE EVERY
DROP COUNT**

PWT is now

pH Safe

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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.

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- ✓ Red & Gray Plastic Feed Lids
- ✓ Egg Cases and Egg Flats

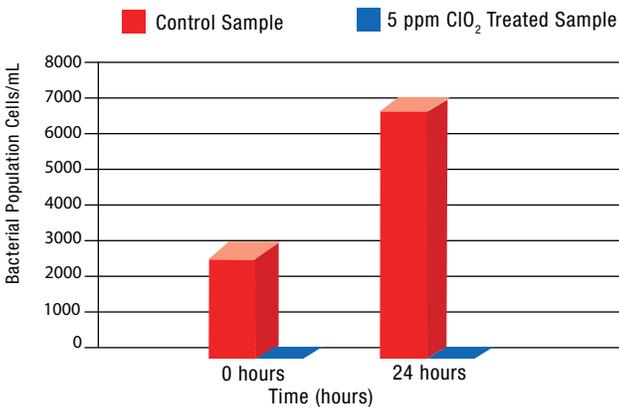
ProOxine® (AH) Disinfecting Solution For Animal Drinking Water

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

Efficacy of ProOxine® against Biofilm

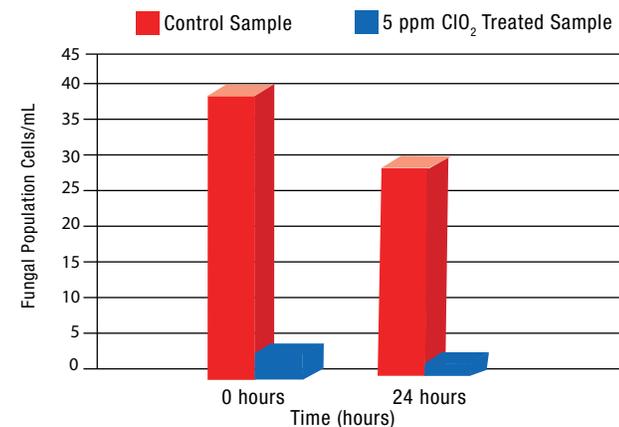
CONTROL EFFECT OF 5 ppm ClO₂ AGAINST BIOFILM BACTERIA

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



CONTROL EFFECT OF 5 ppm ClO₂ AGAINST BIOFILM FUNGI

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

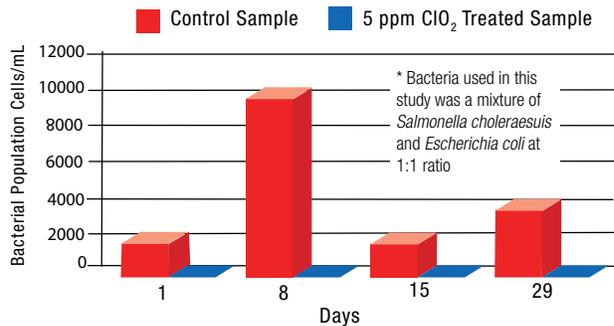


AANE (Automated Activation Non-Electric) System

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 ₂ Treated Sample
1 Day	2000	20
8 Days	10000	2
15 Days	2000	2
29 Days	4000	2



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Economical way to clean footwear

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Containers

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.

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

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**Consult your local sales or service representative
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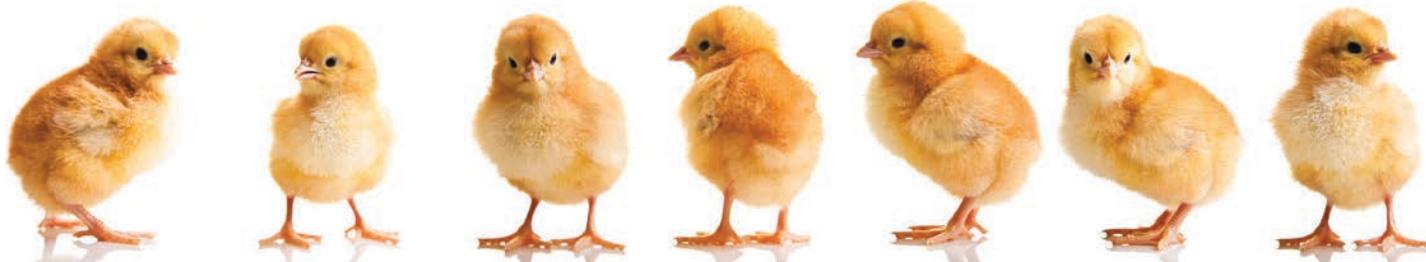


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Yucca schidigera in its natural habitat

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 **A natural way to control ammonia.**

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ORGANIC CERTIFICATION:

Begins at the field level, where we sustainably harvest the *Yucca schidigera* plant in its natural habitat and continues through the manufacturing process. **BIOSUPREME®** complies with all Jewish religious dietary laws and is also Kosher certified.



Certified to the terms of the US-Canada Organic Equivalency Arrangement.



**Contains phenolic antioxidants from *Yucca schidigera* bark.
(R. Goodall – Feedstuffs 2011 / Oleszcek et. al., 2001)

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