

Edited by:
Dennis Scott BVSc
MANZCVS

EA Veterinary Marketing Ltd
54 Hobill Ave Wiri
PO Box 97-110 Manukau City
Manukau 2241

Ph 09-262-1388 Fax 09-262-1411
Freephone 0800 800-624
email info@ethicalagents.co.nz
website www.eavm.nz

Good News on the AMR Front

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It is now more than seven years since the antimicrobial resistance committee (AMRC), under a different acronym at the time, came out with the statement that “By 2030, NZ Inc will not need antibiotics for the maintenance of health and welfare in animals.”

Talk is cheap and it was then behoven upon the AMRC to follow up with some actions.

Two of the most important were the publishing of a paper in NZVJ showing the low level of use in NZ compared with other OECD countries and the development of the simple and informative traffic light system of antimicrobial classification (not to be confused with the government’s clunky unpopular traffic light guide to the country’s Covid 19 status.)

Moving on from there it has been fantastic to see a study by post-doctoral researcher Rose Collis, which confirms New Zealand dairy farms have a relatively low level of antimicrobial resistance (AMR).

When it came to studying just how prevalent AMR is on New Zealand dairy farms, Rose Collis took a “whole farm” approach to an issue most farmers may associate mainly with mastitis treatment and how well their cows respond to that treatment.

It was also heartening to see the AMRC paper being quoted by Rose Collis in a report on her work.

“We knew from some good earlier work based off sales data that NZ’s use of antibiotics is relatively low and when you look at our dairy farms here, they typically use less than more intensive indoor systems like poultry or pig production.”

Collis’ work involved collecting samples of effluent, faeces, soil and raw milk from two Manawātū dairy units and applying some cutting-edge sampling techniques to try and identify the type and prevalence of AMR genes and resistant bacteria on the farms.

“Once sampled we can sequence all the DNA contained within it and

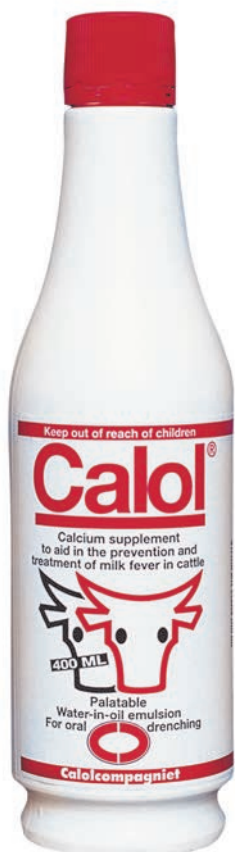
use comparative analysis from indices to look for AMR genes present.”

The article states the following, “Her work has confirmed that NZ’s status as one of the three lowest users of antibiotics in livestock use globally translates to less AMR in the farm environment and has proved dairy farmers have another environmental benefit worth preserving.

Collis says the sector should also receive some recognition for the efforts it has made to preserve that low AMR status and respond to calls about careful antibiotic use.

The NZ Veterinary Association has supported the traffic light system to help vets in their antibiotic decision making, and farmers are using more alternative non-antibiotic preventatives in their dry cow therapy treatments.”

All good news for NZ Inc and showing that NZVA and the AMRC were certainly ahead of their time in 2015. The challenge now is to stay ahead of the pack!



What is Ionic Copper?

Just what is meant by the term ionic copper? With so many claims and counterclaims on the internet it is often difficult to distinguish true science from pseudoscience.

If one Googles ionic copper one is led to websites selling copper supplements of dubious benefit. They give a definition of ionic copper as a liquid copper supplement in a bioavailable form.

More accurately when a mineral is ionic it means it has a positive or negative charge and can readily bond with water to be more easily distributed throughout the body.

When ionic compounds dissolve in water, the ions in the solid sepa-

rate and disperse uniformly throughout the solution because water molecules surround and solvate the ions, reducing the strong electrostatic forces between them. This process represents a physical change known as dissociation.

Thus these disassociated ions are more readily available for action or absorption than ions still bound into a chemical moiety. This then is the huge advantage of the copper and the cobalt in the Cosecure boluses.

At the high temperature that the Cosecure boluses are made, the copper and the cobalt attach to the phosphate chain in the polyphos-

phate glass. The oxide (in the case of the copper ion) and the carbonate (in the case of the cobalt ion) break off and leave the copper and cobalt elements to bind with the glass. This leaves them to be in their most pure form i.e. ionic.

"If one Googles ionic copper one is led to websites selling copper supplements of dubious benefit."

The copper is then free to bind with thiomolybdates in the rumen while the cobalt is freely available for use by the ruminal microorganisms in the making of vitamin B12.

Stolen Horse

A cowboy walks into a bar. He gets a few drinks and settles up with the bartender. He walks out to find his horse is missing!

He walks back into the bar, whips out his pistol and fires into the ceiling.

He says, "Which one of you idiots stole my horse?!" No one answers.

Then he says, "If my horse ain't back by the time I finish another drink, I'm gonna have to do what I did back in Texas, and I don't like to do what I did back in Texas."

He has a drink and walks back outside. His horse is back where it used to be.

As he is mounting up the bartender walks out and asks, "Say partner, what'd you have to do in Texas?"

"I had to walk home," the cowboy answers.

Not So Dumb

A young boy enters a barber shop and the barber whispers to his customer. 'This is the dumbest kid in the world. Watch while I prove it to you.'

The barber puts a dollar in one hand and two 20 cents pieces in the other, then calls the boy over and asks, 'Which do you want, son?'

The boy takes the two 20 cents pieces and leaves. 'What did I tell

you?' said the barber. 'That kid never learns!'

Later, when the customer leaves, he sees the same young boy coming out of the ice cream store.

'Hey, son! May I ask you a question? Why did you take the two 20 cents pieces instead of the dollar?'

The boy licked his cone and replied, 'Because the day I take the dollar, the game is over!'



From Double Glazing To Cows Grazing:

How A Glass Company Improved Fertility & Thrive In Cattle & Sheep:

A unique partnership between Pilkington Glass and Animal Nutrition experts at the University of Leeds, resulted in the development of a revolutionary soluble glass bolus which has been used worldwide.

Dr Stewart Telfer, then lecturer in Animal Nutrition at the University of Leeds, became interested in the idea of delivering trace elements in the reticulum of ruminants through a soluble glass bolus.

He teamed up with a PHD student named George Zervas and with Peter Knott of the University of

Leeds Ceramics Department; and the trio set about developing a soluble glass bolus containing essential trace elements.

From the combination of expertise in animal nutrition and a knowledge of glass, came the development of a unique and revolutionary patent-protected soluble glass bolus, which would deliver trace elements in the rumen at a constant rate, for between 4.5 to 6 months in cattle, and up to 8 months in sheep.

To this day, the boluses developed by the team remain unique in their mode of action.

The publication of the patent for the bolus formulation resulted in

the team being contacted by Dr Brian Algar of Pilkington Glass Brothers. A joint University/Pilkington project ensued, which resulted in Pilkington taking over the development of the glass.

In October 2013, Bimeda Animal Health acquired Telsol. The Bimeda Telsol Cosecure and Cosecure boluses that resulted from the

team's years of research, graft and innovation deliver copper, selenium and cobalt to the animal; trace elements which are essential for immunity and thrive.

However, their most significant achievement in developing these boluses was their ability to provide rumen-available copper.

To this day, they remain the only boluses which can provide ionic rumen available copper.

"To this day, the boluses developed by the team remain unique in their mode of action."



Voted Top 10 Jokes From The Edinburgh Fringe

1. Masai Graham: I tried to steal spaghetti from the shop, but the female guard saw me and I couldn't get pasta.

2. Mark Simmons: Did you know, if you get pregnant in the Amazon, it's next-day delivery.

3. Olaf Falafel: My attempts to combine nitrous oxide and Oxo cubes made me a laughing stock.

4. Hannah Fairweather: By my age, my parents had a house and a family, and to be fair to me, so do I - but it is the same house and it is the same family.

5. Will Mars: I hate funerals - I'm not a mourning person.

6. Olaf Falafel: I spent the whole morning building a time machine, so that's four hours of my life that I'm definitely getting back.

7. Richard Pulsford: I sent a food parcel to my first wife. FedEx.

8. Tim Vine: I used to live hand to mouth. Do you know what changed my life? Cutlery.

9. Sophie Duker: Don't knock threesomes. Having a threesome is like hiring an intern to do all the jobs you hate.

10. Will Duggan: I can't even be bothered to be apathetic these days.



Rumen Pharmacology

The biggest issue facing oral medication of sheep and cattle is the impact of the rumen on availability. This is well documented with oral calcium remedies for milk fever and, even more so, with essential amino acids such as choline and methionine, both of which have to be administered in a rumen protected form in order to be of any use whatsoever.

Similarly copper bullets, which have become increasingly popular, should have the copper ionised in the rumen itself if they are to be effective. The majority of bullets on the market contain copper oxide as their copper source and copper oxide requires a low pH to be in an ionised state. Rumen pH levels are much higher than those of the abomasum and copper oxide is thus unionised in the rumenoreticulum, where the bullets reside. As such the copper is available neither for absorption into the blood stream nor for combining with thiomolybdates.

Cows ingest molybdenum and sulphur through their diet. Molybdenum and sulphur bind together

to form thiomolybdate. Thiomolybdate is very 'copper-hungry'. It binds with copper in the rumen and when there is no copper left in the rumen, the thiomolybdate is absorbed through the rumen wall and it will then bind with copper in the blood stream.

This is where the real issue lies, as enzymes which are essential for fertility and energy utilisation require copper from the blood stream to function. These enzymes are vital for fertility and productivity. When the molybdenum and sulphur combination (thiomolybdate) binds with these copper enzymes in the blood, they are rendered inactive, so fertility and productivity are impaired. This is often referred to as 'copper lock' or 'secondary copper deficiency'. We know it as TMT (or thiomolybdate toxicity).

TMT is commonly misdiagnosed as copper deficiency, as the clinical symptoms of spectacles and poor coat are often associated with a lack of dietary copper. However, cows and sheep with thiomolybdate toxicity (TMT) are not deficient in dietary copper.

To stop 'copper lock' or 'TMT' occurring, we need to stop the molybdenum and sulphur combination (thiomolybdate), from moving out of the rumen and into the blood-

"Copper oxide only becomes active in the abomasum"

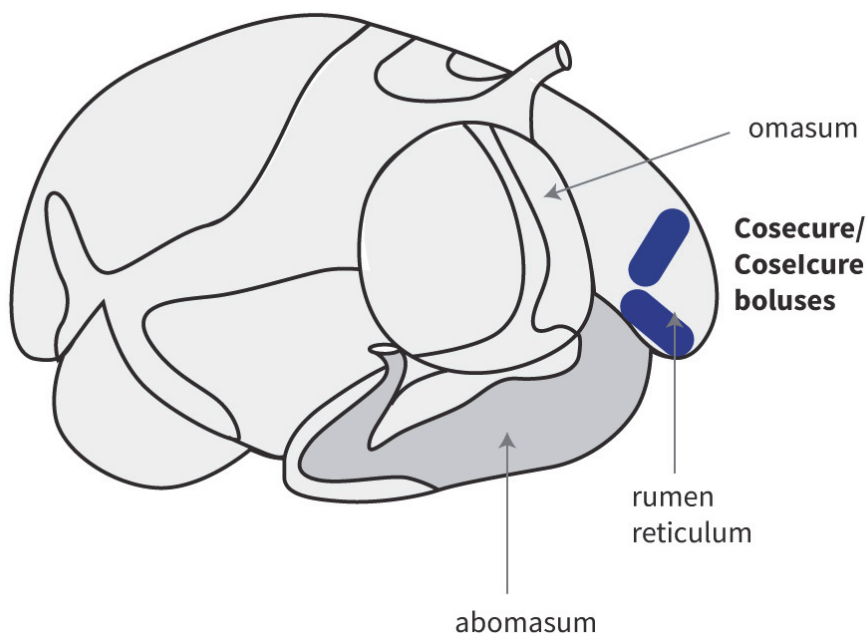
stream. The only way to do this is to supply enough copper in the rumen to satisfy the thiomolybdate's 'copper hunger'.

A constant supply of rumen-available ionic copper is required, which binds with the thiomolybdate and makes it harmless; passing out of the body as faeces. Therefore the key to preventing TMT lies in the rumen. With a copper bolus which would supply 'sacrificial copper' in the rumen, the thiomolybdate would combine with this copper, and would not go in search of copper in the blood stream. TMT would be prevented and fertility and thrive would not be impaired.

In order to provide sacrificial copper it would need to be active roughly between pH 5.5 and 6.5, which is the normal pH of the rumen.

Unlike the Cosecure soluble glass boluses, which contain ionic copper, many other nutritional capsules and boluses deliver copper in the form of copper oxide. Copper oxide only becomes active in the abomasum (which has a pH range of 2 to 4), where it may simply be absorbed into the body, and cannot stop thiomolybdate uptake into the blood.

This means these boluses are not active in the rumen, which has a



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Rumen Pharmacology

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pH of roughly 5.5 to 6.5 and can therefore not provide the rumen-available, sacrificial copper. Rumen-available copper is essential for the prevention of thiomolybdate uptake into the blood, and consequent thiomolybdate toxicity.

Cosecure Cattle boluses contain: 13.4% Ionic Copper, 0.50% Ionic Cobalt, 0.30% Selenium

Following oral administration, the boluses lodge in the reticulum where they dissolve slowly over a period of approximately four and a half to six months.

The ultimate breakdown products are copper, cobalt and selenium in ionic form. The boluses provide a source of these trace elements at levels compatible with the animal's daily requirements.

The critical difference between Cosecure and other nutritional supplements is that Cosecure boluses supply rumen-available elements. The copper in these unique boluses is in the form of ionic copper, which is active in the same pH.

At the high temperature that the Cosecure boluses are made, the trace element attaches to the phosphate chain in the polyphosphate glass. The oxide and breaks off and

leaves the trace element to bind with the glass. This leaves the copper to be in its most pure form i.e. ionic. Ionic means a charged particle in its purest form.

The boluses also contain rumen-available ionic cobalt. Unlike cobalt-oxide boluses, the Cosecure boluses supply ionic cobalt which is instantly rumen-available. Bacteria in the rumen require cobalt in order to synthesize Vitamin B12. Vitamin B12 is vital for energy utilisation and productivity.

The body has no capacity to store cobalt, so Cosecure's ability to continually supply rumen-available cobalt for up to 6 months is ideal for improving cobalt supply and promoting health in cattle.

There may be a massive push in the veterinary pharmaceutical world to fill cattle up with all sorts of boluses but cognizance needs to be taken of the effect of the rumen on pharmacokinetics, especially absorption.

This was neglected in the 90s when products came and disappeared all attempting to mirror the effect of Calol, without having the required characteristics.

It is the same with boluses, particularly for copper absorption. Thiomolybdate toxicity is a real thing and the best way to counter it is not by straight copper oxide but ionic copper, as supplied by Cosecure Cattle Boluses.

The Cosecure boluses also have a unique delivery system, being made of a unique soluble glass which dissolves at a controlled and constant rate.

This means that the boluses deliver consistent rates of trace elements each day, at levels which are consistent with the daily requirements of the animal. This is an important feature of the boluses, as peaks and troughs in trace elements can adversely affect fertility.



Curiosity

Nagy is walking down the street and hears a bunch of people in a fenced-in yard shouting, "19! 19! 19! 19!"

Curious, he walks over and looks through a hole in the fence.

Someone from the other side pokes him in the eye and they all start shouting "20! 20! 20!"

The Emergency

Two hunters are out in the woods when one of them collapses. He doesn't seem to be breathing and his eyes are glazed over. His mate is quite distressed, whips out his phone and quickly calls emergency services.

He explains that they are deep in the woods, his companion is lying

still on the ground. He says, "he doesn't seem to be breathing, what shall I do?"

The operator says, "Calm down, I can help. First of all, make sure that he is dead."

There is a silence, then a shot is heard. Back on the phone the guy says, "OK, now what?"

Biodegradability

Vegetable peels, eggshells, paper, and garden waste are all straightforwardly biodegradable. When discarded, these items break down in a relatively short period of time, so they can be assimilated into the natural environment. In comparison, materials like styrofoam, plastic, and aluminium are typically deemed non-biodegradable because of how long they take to break down.

The big question is can a mixture of chemicals that are stable for over 12 months in solution be classified as biodegradable in the environment? The short answer is yes but to understand this, one needs to look both at the evidence and understand the definitions.

The term biodegradable refers to any material that can be broken down by microorganisms (like bacteria and fungi) and assimilated into the natural environment. Biodegradation is a naturally occurring process; when an object degrades, its original composition degrades into simple components like biomass, carbon dioxide, water.

This is different from the term compostable, which refers to a product or material that can biodegrade under specific, human-driven circumstances. Unlike biodegradation, which is an entirely natural process, composting requires human intervention. During composting, microorganisms break down organic matter with the help of humans, who contribute the water, oxygen, and organic matter necessary to optimize conditions.

So, for a chemical mixture to be classified as biodegradable, the ingredients themselves must degrade in the environment. Sunlight and soil inactivation are major factors in this process and so it is possible for high quality disinfectants to break down, not only into component parts but for these parts to themselves biodegrade.

We already know with chlorine dioxide, the active component of Tristel Fuse, that it extremely rapidly breaks down onto its two components, chlorine gas and oxygen gas, which both dissipate harmlessly into the atmosphere; neither have a negative global warming effect.

While the majority of strong chemicals in the disinfectant world can be viewed as environmentally hazardous, especially in the eyes of the general public, SteriGENE itself has undergone rigorous testing to determine its biodegradability status.

It was tested as TriGene Advance the only change is

in the name, it being changed to SteriGENE later on.

To quote directly from the trial report: "The test material attained 116% degradation after 28 days. Degradation values in excess of 100% were considered to be due to an increase in the numbers of viable micro-organisms in the test material vessel as a result of the readily biodegradable nature of the test material. This effect occurs due to the micro-organisms utilizing the test material as a carbon source for cellular growth resulting in a greater number of viable micro-organisms in this vessel when compared to the control vessel.

This increased number of microorganisms in this vessel gave rise to increased respiration rates and hence background CO₂ evolution was greater than in the control vessel. This increase in background CO₂ evolution resulted in biodegradation rates in excess of 100%."

The bottom line is that SteriGENE has proven to be completely degraded in the environment after 28 days, which really puts it in the company of fruits and vegetables, i.e. it has proven to be a clean green disinfectant, not only tough on germs while being kind to surfaces but also completely biodegradable, hence friendly to the environment.

With SteriGENE and Tristel Fuse both being safe for the environment this is a further argument for their use together in the "Deep Clean" process outlined in EA disinfection manual.

Reference: Technical Bulletin No. 270 TriGENE Advance- Biodegradability Test, SafePharm Laboratories Ltd, Shardlow Business Park, London Road, Shardlow, Derby DE72 2GD United Kingdom.



Brand Comparison

Vegetative bacteria and lipid enveloped viruses are relatively easy to kill. However spores and small non lipid enveloped viruses are among the hardest organisms for disinfectants to neutralize.

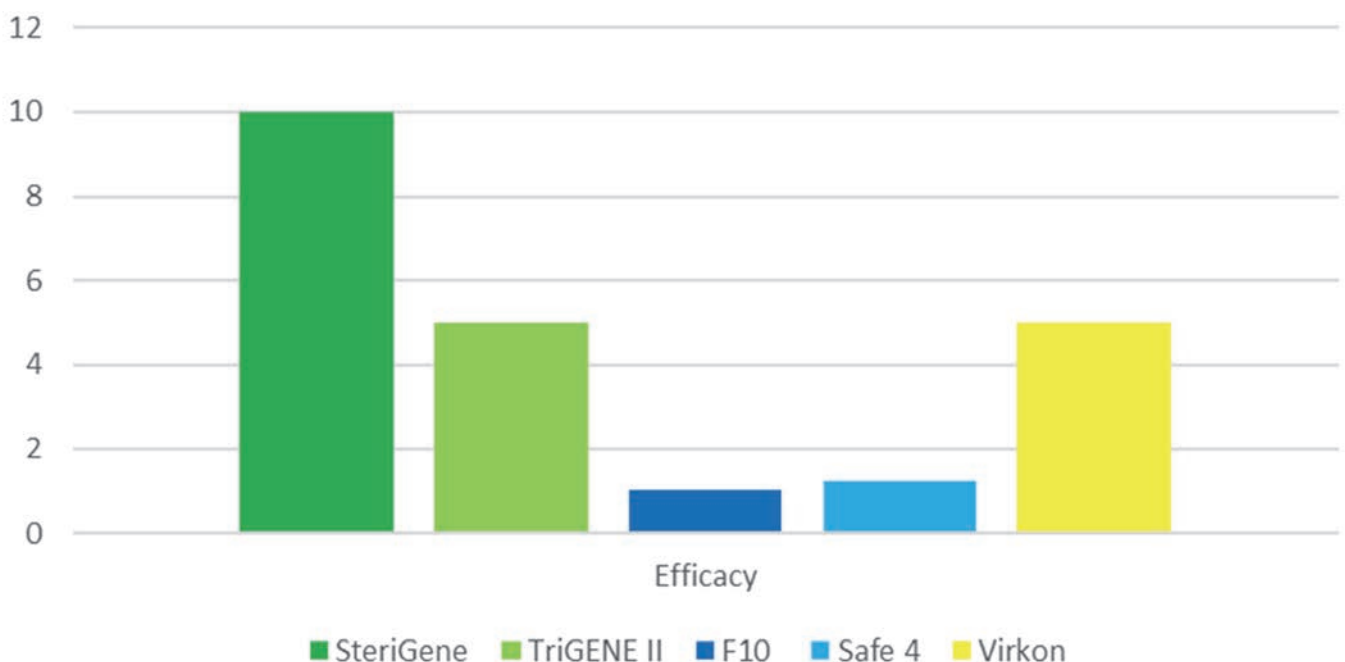
Canine Parvovirus is a small non enveloped virus of huge importance in the veterinary world, making it the ideal yardstick for comparing disinfectant efficacy.

The log reductions are taken from each products material.

Note that the EU minimum standard for viruses is a log 4 reduction.

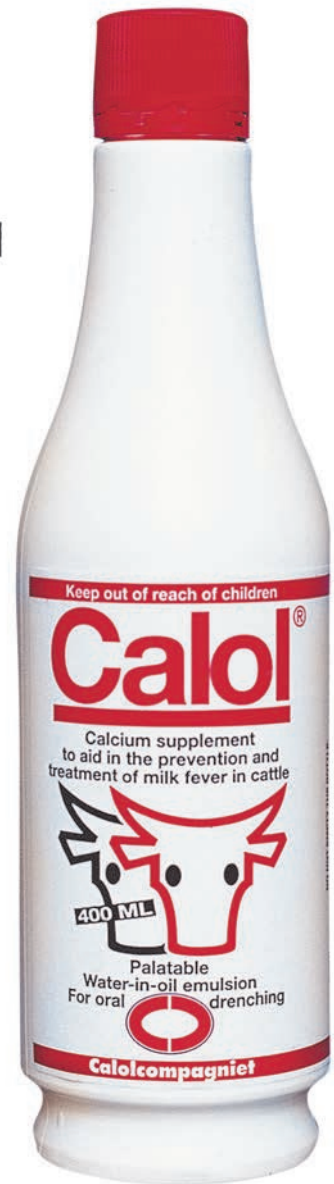
Brand	Biocidal Ingredients	Oxidising yes/no	Parvo log reduction and dilution	Comments
SteriGENE	Poly-hexamethylene Biguanide hydrochloride 2.0% w/w (20g/L) Benzalkonium chloride 1.25% w/w (12.5g/L) Didecyldimethylammonium chloride 2.5% w/w (25g/L)	No	log 4 reduction v parvovirus @1:100 dilution!	Single + double chain Quat Also has PHMB Microemulsion gives greater penetration. Diluted solution stable for 12 months
TriGENE II	Poly-hexamethylene Biguanide hydrochloride Didecyldimethylammonium chloride	No	log 4 reduction v parvo @ 1:50 dilution	Single + double chain Quat Also has PHMB Diluted solution stable for 12 months
F10	Benzalkonium chloride 0.40% Poly-hexamethylene Biguanide hydrochloride 0.03g%	No	Only log 3 reduction v parvovirus	Only Quat is single chain Also has PHMB 10 times less effective v parvo than SteriGENE
Safe 4	Benzalkonium chloride 3% Poly-hexamethylene Biguanide hydrochloride <1%	No	log 3.33 reduction v parvovirus @ 1:100 dilution!	Only Quat is single chain Also has PHMB > 8 times less effective v parvo than SteriGENE
Virkon	Potassium Peroxomono-sulphate (494g/kg)	Yes	log 4 reduction v parvo @ 1:50 dilution	Corrosive, very short shelf life when diluted. Preparations made at a strength corresponding to microbiological test results (e.g. 1 :50 v Parvo) must be used immediately to ensure kill rates are secure. The mix may be unsuitable for its intended purpose within 24 hours.

Parvovirus efficacy comparison





Animal Welfare is Our Business



Expensive Parrots

A man goes into a pet shop to buy a parrot. The shop owner points to three identical-looking parrots on a perch and says, "The parrot on the left costs \$500 dollars."

"Why does the parrot cost so much?" asks the man.

The owner says "Well the parrot knows how to use a computer."

The man then asks about the next parrot and learns that it costs \$1,000 dollars because it can do everything the first parrot can do plus it knows how to use the UNIX operating system.

Naturally, the increasingly startled man asks about the third parrot, only to be told that it costs \$2,000 dollars.

Needless to say this begs the question, "What can it do?"

To which the owner replies,

"To be honest I have never seen it do anything but the other two call him boss!"

