

What is “stabilised” chlorine dioxide?

“Stabilised” chlorine dioxide is the accepted and recognised term for a weakly buffered, stable solution of sodium chlorite which releases chlorine dioxide by chemical reaction under acidic conditions. The term “stabilised chlorine dioxide” is recognised by the FDA, US EPA and NZ ACVM, and products with this active ingredient are accepted as producing chlorine dioxide, which is an approved sanitiser widely used in agriculture, horticulture, hospitals and water treatment facilities.

Sodium chlorite, which is a precursor of chlorine dioxide, is approved by the US FDA under chapter 173.309 and by the US Environmental Protection Agency (EPA) under 9150-2. It is also the key ingredient of other products, Biowash & Oxywash, approved by the New Zealand ACVM as a C43 & C61 sanitiser.

How does Vetsan work?

The sodium chlorite formulation in Vetsan is stabilised in solution by the addition of a small quantity of sodium bicarbonate, holding it in a slightly alkaline pH range. Because the solution is slightly alkaline, no reaction will occur and the solution is stable with no significant loss of efficacy. When sodium chlorite contacts an acid, it reacts to produce chlorous acid which converts to chlorine dioxide. The breakdown products of chlorine dioxide are chlorite and chloride, both of which are harmless to people, animals and the environment.

When Vetsan is sprayed on to a surface, two things can happen.

1. As it comes into contact with micro-organisms which are slightly acidic, chlorine dioxide gas is released killing the micro-organism.
2. If it dries, the sodium chlorite remains on the surface for up to 7 days, unless it is washed off, or used by killing micro-organisms. When bacteria, viruses or other micro-organisms land on the surface, they are slightly damp and acidic, and chlorine dioxide gas is produced killing the micro-organisms. In this manner, Vetsan remains effective and provides residual protection.

Micro-organisms involved in calf scours exist in a slightly acidic environment, with their optimal pH range for growth being 6.5 – 7.5. This is sufficiently acidic to enable the chemical reaction to occur and for chlorine dioxide to be generated when the buffered sodium chlorite solution (Vetsan) contacts the contaminated surface.

This reaction can be demonstrated by adding a small quantity of citric acid to Vetsan which will cause chlorine dioxide gas to be generated and released from solution. The presence of chlorine dioxide can be detected by smell or by using a chlorine dioxide test strip. Once the gas is released, there is an instant kill, but there is no persistent residual activity.

Vetsan, a sanitiser based on “stabilised chlorine dioxide” technology has been used by the veterinary industry for over 10 years. The active ingredient is tested by NZ Laboratories for chlorine dioxide using the Iodometric method AWWA, 4500Cl B to confirm the strength prior to manufacture.

Substantial trial work has been done in New Zealand testing the active ingredient of Vetsan using a modification of the British Standard BS EN 1040 1997 for activity against *Strep uberis*, *Strep agalactiae*, and MR *Staph aureus* at concentrations of 10, 20, 40, 80 and 158 ppm. An immediate >5.0 log reduction was seen for all three at a concentration of 80 and 158 ppm. After 5 minutes of contact time, this included the 40 ppm level.

Further testing was carried out against; *Listeria monocytogenes*, *Salmonella typhurimurium*, *Pseudomonas aeruginosa*, *Staph aureus*, *Clostridial difficile*, *Campylobacter jejuni*, *E coli*, *Trichphyton mentagrophytes* and *Legionella pneumophilia* at dilutions ranging from neat through to 1:100 with results showing a 5-log reduction at the 1:38 dilution and a 2-log reduction at the 1:100 level.

Testing has also been conducted on horticultural pests such as, *Pseudomonas (PSA-v)*, *Botrytis cinerea*, *Geotrichus* (kiwifruit and potatoes), *Fusarium graminearium*, *Phytocinnamon*, *Pythium* and Grape Downy Mildew.

Vetpak and the importer of the active ingredient, Scitex NZ Ltd, are confident that our products are effective against the pathogens listed in our literature. While many tests have been conducted overseas and relate to the end state product chlorine dioxide, we have conducted our own testing in New Zealand with our own products and are confident that they will reproduce results consistent with all other chlorine dioxide products under the most demanding situations.

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