



## ***A comparison of Virkon<sup>®</sup> versus Hypochlorite***

Hypochlorite, or bleach, is a well known and historically well used biocide and it has a wide spectrum of activity. However there are a number of critical areas where its performance and chemistry are cause for concern:

- **Hypochlorite is rapidly inactivated by organic matter**
- **Hypochlorite in-use solutions are unstable and decompose rapidly**
- **Hypochlorite solutions show variability in actual shelf life**
- **Hypochlorite solutions can be highly corrosive to metal surfaces and will also adversely affect other materials such as silicone sealants**
- **Hypochlorite solutions may cause safety, health, and environmental issues**

Unlike Virkon<sup>®</sup>, **hypochlorite is rapidly inactivated by organic matter** (soil). In other words is ineffective under “dirty” conditions and its biocidal efficacy can only be assured when surfaces are clean. Hence, pre-cleaning is essential. In addition, hypochlorite solution should not be mixed with cationic surfactants.

Hypochlorite is fast acting but **in-use solutions are unstable and decompose rapidly** even at room temperature. As a consequence the level of actives at any one time is uncertain giving rise to unpredictability in biocidal efficacy. In addition a wide range of in-use dilutions is typically recommended depending on the proposed use which can cause confusion as to the appropriate level of actives required. For example 10,000 ppm of available chlorine is required for blood spills and 1,000 ppm for general clinical environmental cleaning. In contrast 1 % **Virkon<sup>®</sup> solutions** remain stable for up to seven days (the activity can be tracked by the degree of fading of the dye present) and are soil tolerant meaning that the same percentage solution can be used for a wide variety of disinfecting situations likely to be encountered.

Given that **Virkon<sup>®</sup>** is a powder it can be directly applied to body fluid spills to absorb and render them harmless (from an infective perspective) without disturbing the spill. Disturbing the spill before the pathogens are killed can spread infection and disease and is not recommended practice. This is an issue for using hypochlorite since a cleaning step is required prior to hypochlorite application, which can result in pathogen dispersal.

Given that hypochlorite solutions are unstable, the amount of actives that are actually present depends on the time between when the material was manufactured and when it's actually used as well as the history of the batch between these times. This **variability in actual shelf life** is causing a lot of problems with suppliers of hypochlorite and other volatile chlorine products in Europe as the new European Biocides Product Directive requires an accurate shelf life to be stamped on biocidal formulations. In order to ensure activity, these may end up being very short. As **Virkon<sup>®</sup>** is securely packaged and a solid, its viable shelf-life is assured.

Another key issue with using hypochlorite as a biocide concerns its materials compatibility. **Hypochlorite solutions can be highly corrosive to metal surfaces**, especially in situations where equipment contains dissimilar metals in contact.



**Hypochlorite will also adversely affect other materials commonly found in industrial, institutional and laboratory settings such as silicone sealants.** Its capacity to degrade textiles/fabrics and dyes is well documented. Virkon<sup>®</sup> has very much greater materials compatibility than hypochlorite and has been used on soft furnishings and carpets without adverse affects being noted.

From a safety, health, and environmental perspective hypochlorite solutions may cause several concerns.

Depending on how it is manufactured, **hypochlorite solutions may also contain trace amounts of mercury.**

**Hypochlorite solutions are irritating** and unpleasant to use. Additionally hypochlorite solutions will evolve chlorine gas when solutions become acidic (such as when hypochlorite solutions are used on urine spills). Not only does this pose a health hazard it also results in rapid loss of biocidal actives. **Virkon<sup>®</sup>** has an excellent health and Safety profile and 1% **Virkon<sup>®</sup> solutions** are non-irritating to the eye or skin. The solutions are also non-sensitising.

There are a number of environmental concerns with hypochlorite usage due to the **formation of AOX (absorbable organic halogens) and chlorinated organics** generally.

**Virkon<sup>®</sup>** is environmentally friendly. There are no known significant environmental affects caused by the component parts of Virkon<sup>®</sup> or its reaction products.

Dr Vince Croud, Technical Director,  
Antec International Ltd – A DuPont Company  
Phone +44 (0) 1787 377305, Fax +44 (0) 1787 375391  
E mail [vincecroud@antecint.com](mailto:vincecroud@antecint.com) <http://www.antechh.com>