



BIOXY S
SOLID PERACETIC ACID – SANITIZER
Unique to  **atomes**
VIRULICIDAL - BACTERICIDAL- FUNGICIDAL- ALGICIDAL

DESCRIPTION

BIOXY S is a powdered product that generates peracetic acid once diluted in in water. **BIOXY S** was formulated to sanitize surfaces and medical instruments in hospital and medical clinics.

DIRECTIONS FOR USE

Use **BIOXY S** on previously cleaned medical equipment. Use at a concentration of 0.1% (1 g **BIOXY S** in 1 liter of water). This concentration of 0.1% yields 500 ppm of active peracetic acid. Allow instruments to be submerged in this solution for at least 10 minutes. Active ingredients break down into water, oxygen and vinegar).

Chemical sterilant in 20 minutes : Use at a concentration of 1% (10 g **BIOXY S** in 1 liter of water). This concentration of 1% yields 5000 ppm of active peracetic acid.

PROPERTIES

Appearance: White powder

Odour: Mild

Specific gravity @ 25°C: 1.350±0.050

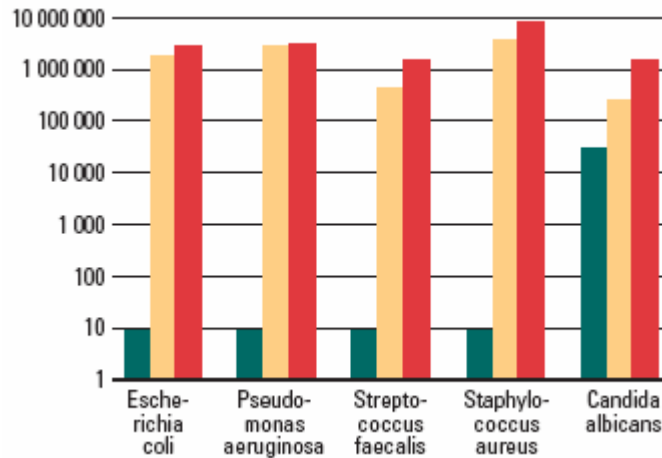
Solubility: Complete



Comparison between BIOXY S vs Liquid Peracetic Acid

Description	BIOXY S - atomes	Liquid Peracetic acid
Activity	50% active (10 times more concentrated)	5% active
Concentration used	0.1% 0	1%
Physical status	Solid	Liquid
Transportation	Safe	Hazardous
Odor	No odor	Offensive Strong acetic acid smell
pH	Reacts with water to generate peracetic acid at neutral pH levels	The pH is highly acidic
Corrosion / surfaces	No induced corrosion	Extremely corrosive to surfaces
Handling / employees	Safe to handle	Extremely dangerous to handle
Storage	Requires a limited place (10 times more concentrated)	Requires large and a secured space to prevent leaking
Chemical stability	Stable	Decomposes if exposed to heat or organic materials

LABORATORY STUDY ON BIOXY S



Surviving germs: Green (0.5 g/L BIOXY S) – Orange (0.3 g/L Sodium percarbonate) – without additive; after 15 minutes at 25°C

Biocidal efficiency of the BIOXY S

The antimicrobial action of peracetic acid and of hydrogen peroxide has long been known. While peracetic acid displays effective bactericidal, viricidal and fungicidal properties, hydrogen peroxide has a particularly antiseptic and bacteriostatic action. Its sporicidal properties are also to be emphasized. Both supplement each other ideally. Both perborates and percarbonate are suitable as a source for hydrogen peroxide. 95% of the microorganisms are destroyed by the persalt, but destruction rates of >99.99% are achieved only by the addition of **BIOXY S**. Even at temperatures below 40°C, where the activity of hydrogen peroxide – in particular is not very good, the efficiency can be improved by using **BIOXY S** and the spectrum of activity can be broadened considerably.

BIOXY S displays excellent effectiveness towards a wide spectrum of pathologically active germs. This is true especially with low application temperatures and short reaction times. At room temperature no significant effect is established with percarbonate alone. The addition of **BIOXY S** results in effective destruction (> 99.99%) even with contact times of less than 15 minutes. This is particularly of interest in countries with cold wash conditions or for the use in disinfectants.



Also effective against yeast fungi

The yeast fungus *Candida albicans* proves to be particularly stubborn when treated with oxygen releasing disinfectants. Its growth is hardly impaired by detergents without any bleaching system. Even at 40°C the addition of perborate alone does not lead to the desired effect. A significant reduction in germs even at 40°C can be achieved **BIOXY S**.

Effective sterilization

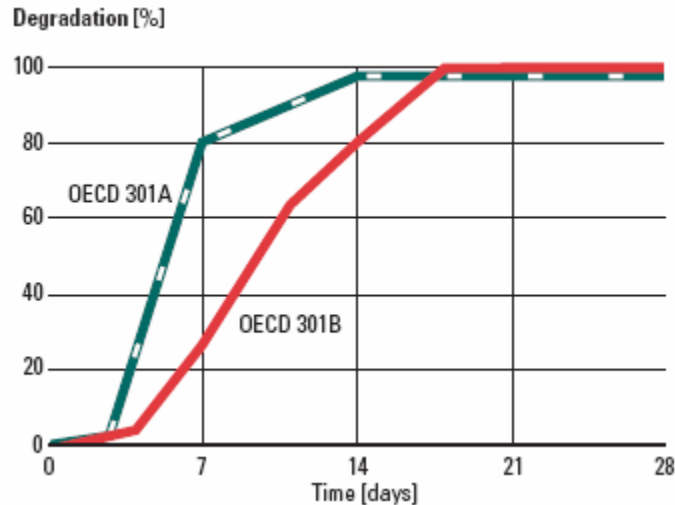
The antimicrobial activity of the **BIOXY S** system starts even under cold wash conditions. Under these conditions perborates or hydrogen peroxide alone only display inadequate action.

BIOXY S in the environment

BIOXY S is especially environmentally friendly when combined with percarbonate. In the process it is decomposed into diacetylenediamine (DAED) and peracetic acid (PAA), which is reduced to acetic acid. If excess peracetic acid gets into the effluent, it is decomposed catalytically by metal traces instantaneously. DAED is mineralized within a short time. Environmentally friendly percarbonate is decomposed in the washing process into sodium carbonate and hydrogen peroxide, out of which water is formed following the transfer of oxygen.

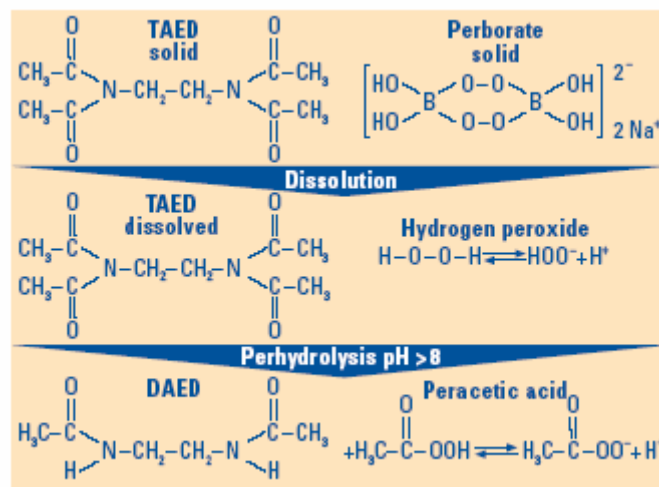
Biological degradability of BIOXY S

The biodegradability of **BIOXY S** was investigated in numerous different tests. Degradation values >95% within 28 days' test duration prove their rapid degradation free of metabolites. **BIOXY S** is therefore to be classified as easily biodegradable according to the OECD. The occurrence of acetylenediamine or free ethylenediamine as an interim stage of the degradation was ruled out by analytical methods.



Ecotoxicological data of BIOXY S

BIOXY S must be considered for an ecological assessment. The LC50 values towards water organisms which were observed prove that they are uncomplicated compounds with regard to acute toxicity. **BIOXY S** is classified in water hazard class 0. Sequestration, heavy metal remobilization or metal fixation are not observed with **BIOXY S** nor with DAED.





Mechanism of the perhydrolysis

On dissolving the persalts in water, hydrogen peroxide is released, which rapidly dissociates under the alkaline conditions of the washing liquor. The formation of perhydroxyl anions necessary for the perhydrolysis stage is promoted by a high pH value ($pK_a \text{ H}_2\text{O}_2 : 11.3$).

Two molecules of peracetic acid are released by nucleophilic attack of the OOH^- ions on the instable imide bonds of the TAED molecule in **BIOXY S**. Since the perhydrolysis takes place much more quickly than a hydrolysis reaction, this side reaction can be largely excluded, providing the pH value is below 11. The formation of diacyl peroxide is not observed when using **BIOXY S**.