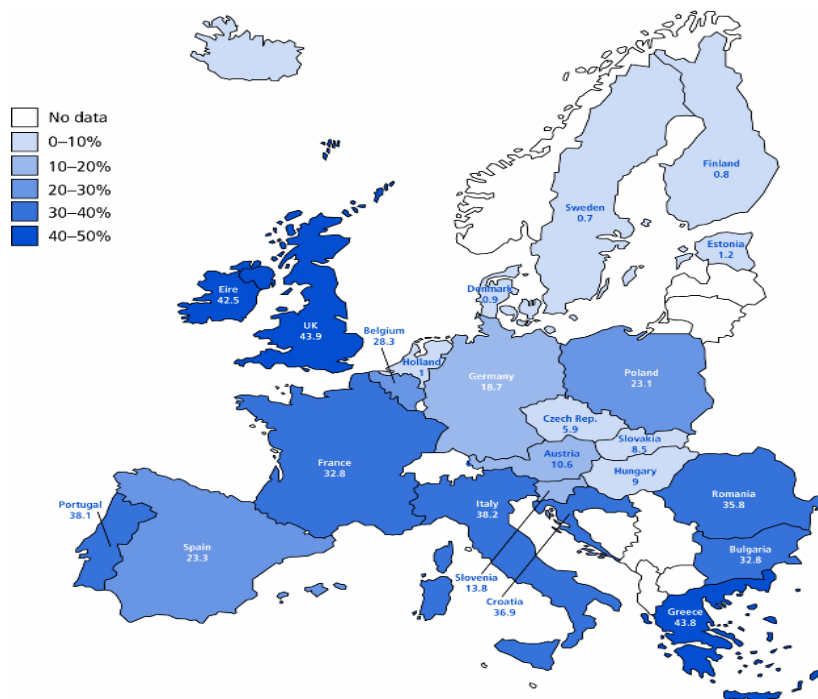




Manufacturers can partner with the market leaders in anti-microbial technology, BioCote. BioCote provide unique anti-microbial solutions for a wide range of products and applications. Manufacturers' products can be available with added BioCote anti-microbial protection unique in the marketplace.

Infection control is becoming increasingly important within healthcare environments with the target being the prevention of healthcare associated infections (HAI). The level of awareness in the general public has increased mainly due to the media and governments highlighting the issues and statistics of HAI's in particular MRSA.



Map shows Levels of MRSA bloodstream infections across Europe.

A lot of work has been carried out to highlight the issues related to healthcare infections and in particular MRSA. Solving the problem is now a key issue, particularly for infection control teams. Education on standard infection control procedures such as hand washing and proper cleaning is a major area for

concentration. In addition to this we should also look at all available technology to assist reducing potential cross-contamination.

BioCote® is an exciting development, utilising the natural properties of silver in providing continuous antimicrobial properties to products and equipment used in the healthcare environment. These products inhibit the growth of a **wide range** of micro-organisms such as Staphylococcus aureus, Pseudomonas aeruginosa and E-coli.

A major benefit of using BioCote is its ability to inhibit the growth of bacteria between cleans. When a surface is cleaned the number of bacteria on the surface is reduced. However before the surface is next cleaned it can be recontaminated resulting in bacteria levels increasing. A BioCote treated surface will keep the number of bacteria to a minimal between cleans. BioCote offers the healthcare industry a second line of defence against healthcare acquired infections.

BioCote Limited provides total hygienic solutions based around its silver technology providing antimicrobial powder coatings, plastics and fabrics. BioCote partners with companies providing products into the Healthcare sector. Products are targeted in areas where hygiene is important or desirable and antimicrobial products can be used effectively in addition to the current infection control procedures.

Traditionally it is thought that cross-contamination spreads via hand contact, however the route of cross-contamination is not only limited to hand contact; as such it is essential to provide additional barriers to all key areas.

BioCote develops key partnerships with leading healthcare companies providing products where microbial cross-contamination can be of issue in hospitals and which can be the source of cross-infection. BioCote microbiologists work in conjunction with infection control teams to identify the highest risk areas within the hospital environment and look to find solutions to key products highlighted. Products protected with BioCote include nurse call systems, doors and door handles, cubicle curtains, bath lifts and waste bins to name a few.





Examples of BioCote protected products



It is important, of course, that the BioCote® products are utilised as an addition to the current cleaning and infection control procedures such as:

- Regular hand washing, especially when in contact with patients
- Regular cleaning of equipment and environments
- Use of protecting equipment such as gloves/masks etc.

BioCote® products still require cleaning and should not be considered either as a replacement or alternative to good hygiene practices. However, they do provide the optimum level of due diligence currently available against the proliferation of disease-causing bacteria in a wide range of areas where there is potential for growth.

The Mode of action of Silver

The active ingredient utilised in BioCote is the element silver in the form of silver ions. It is well known that silver is an excellent natural antimicrobial with a high efficacy against microbes, but low toxicity against non target organism.

The Silver ions are incorporated during the material manufacturing process and are therefore present and active for the whole life of the finished product. The addition of the active ingredient does not affect the performance of product in any other way than imparting anti-bacterial qualities.

Silver ions are slowly released from an inorganic matrix via an ion exchange mechanism. The release of silver ions is slow but fast enough to maintain an effective concentration on or near the surface of the material.

When the silver ions reach the surface of the micro organism its mechanism of antimicrobial action begins. Silver ions can bind with cell surfaces and cause disruption in cellular membrane function. However it is believed that antimicrobial activities of silver depend upon binding within the cell. Once inside the cell silver ions bind readily with electron donor groups. A prime target for silver ions is cellular thiol (-SH) groups. These are commonly found in critical proteins (enzymes).

Enzymes become denatured resulting from conformational changes caused by the binding of silver ions. Many of the enzymes denatured by silver ions are needed in the production of cellular energy. Once the energy source is removed the cell cannot maintain osmotic pressure and necessary substrates will leak out of the cell and the microbe will quickly die.

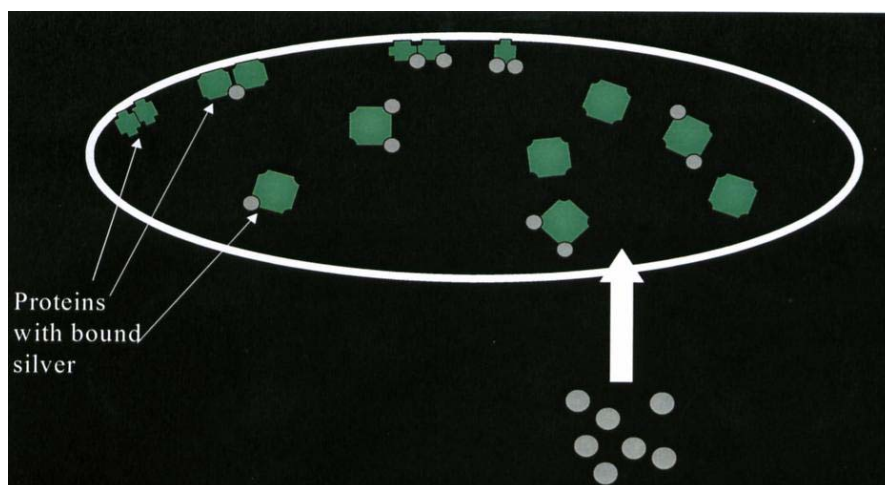
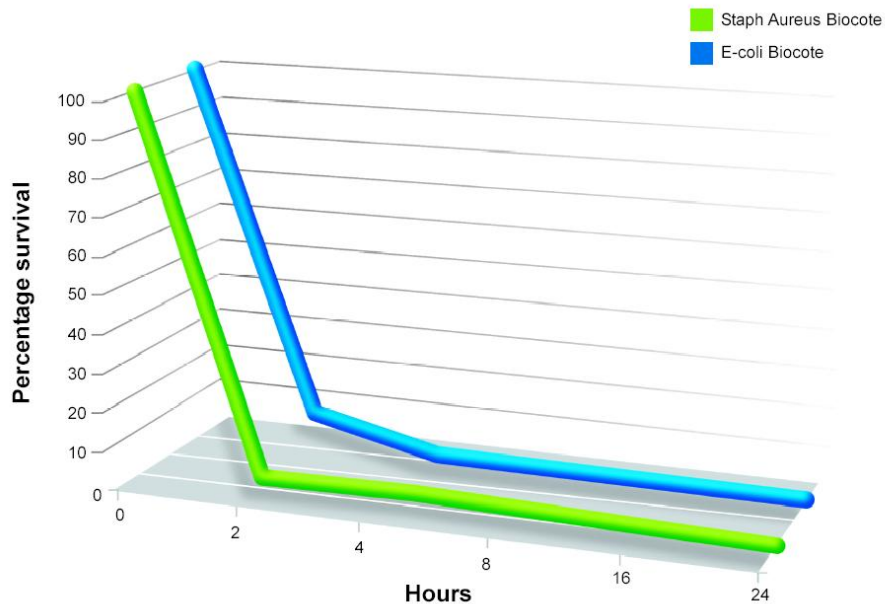


Diagram: Representation of silver ions binding with critical proteins within a bacterial cell

Extensive independent testing has been carried out on a wide range of bacteria including MRSA and E.coli. Products have been tested for the simulated life of the product /material with no significant reduction in the antimicrobial performance noted, therefore demonstrating the antimicrobial efficacy for the life of the product/material.



A major reason for using Silver is that in some instances bacteria can mutate and change against controlling factors, such as antibiotics. In the case of silver the likelihood and severity of resistance is low due to the simplicity of its effects on micro organisms. To our knowledge there is no genus or species of bacteria intrinsically resistant to silver, part of the reason being the fact that multiple binding sites are used. It has been shown that any resistance would be extremely difficult to transfer from one generation to the next and is therefore a minimal concern in the use of Silver.

Unlike antibiotics and antimicrobials like Triclosan, silver has been used as an antimicrobial in different forms for thousands of years. Yet the likelihood of silver resistant strains is extremely low compared to the relatively high number of bacteria resistant to antibiotics and Triclosan. There is also no incidence of silver resistance from the use of silver based antimicrobials impregnated into plastics and textiles; this is despite extensive use for years in countries such as Japan

Research suggests that the genes and proteins involved in silver resistance are totally different from those related to antibiotic resistance. Therefore cross resistance between different types of antimicrobials is not likely.

Intrinsic resistance can be a problem for antimicrobials like triclosan due to “holes” in their spectrum of activity. Silver has no such “holes” in its spectrum of activity and this is therefore not a problem.

Silver is being used widely within industry currently especially in wound dressings for example Johnson and Johnson using Actisorb silver 220 dressings and silver coating catheters from companies such as Bard.

The healthcare sector has no problem with silver and its use within medical establishments due to the unlikelihood of resistance.

The best way to implement Silver systems is in conjunction with cleaning systems. This results in a two pronged attack against micro organisms, with silver and good cleaning complementing one another offering the maximum line of defence possible.

BioCote advocate that all protected products are cleaned in accordance with cleaning regimes and procedures in place.



LABLAB

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Jahresbericht 2013
Anzahl Aufträge: 1.234
Umsatz: 1.234.567 €
Zustimmung: 2014/01/01

CERTIFICATE OF ANALYSIS

Werkstoff: **PMMA 3333**

Referenz: **MS3333**

Test	Result	Unit	Ref
Formaldehyd	<0,1	%	Referenz über 24 Wochen
Phenol	<0,1	%	Referenz über 24 Wochen
Acetaldehyd	<0,1	%	Referenz über 24 Wochen
Hydroperoxyde (peroxydicarbonsäure, Hydroperoxydicarbonsäure)	<0,1	%	Referenz über 24 Wochen
Formaldehyd-äquivalent	<0,1	%	Referenz über 24 Wochen
Phenol-äquivalent	<0,1	%	Referenz über 24 Wochen
Acetaldehyd-äquivalent	<0,1	%	Referenz über 24 Wochen
Hydroperoxyd-äquivalent	<0,1	%	Referenz über 24 Wochen
Formaldehyd-äquivalent	<0,1	%	Referenz über 24 Wochen
Phenol-äquivalent	<0,1	%	Referenz über 24 Wochen

Comments: **Microbiological results not shown**

Lab Director: *[Signature]* Lab Manager: *[Signature]* Lab Technician: *[Signature]*

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