



Runfold Plastics Ltd

“Runfold Plastics’ new development for plastic components is in the forefront of the fight against MRSA”

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Runfold Plastics' new development for plastic components is in the forefront of the fight against antimicrobial resistance, which is a major threat to public health

There is growing concern about the problems of antimicrobial resistance and in particular the increasing problem of MRSA. For several years alarm has been expressed and in the past 12 months two World Health Organisation meetings have been prompted by increased anxieties. Runfold Plastics Ltd has appreciated the problems involved with antimicrobial resistance and has concentrated its efforts on developing its revolutionary product for use in these medical applications.

Runfold Plastics Ltd Antimicrobial Masterbatches for Health Care

Runfold Plastics antimicrobial masterbatches offer properties which can contribute to better management of Methicillin-Resistant *Staphylococcus Aureus* (MRSA) in hospitals and nursing homes.

What is MRSA?



Multi resistant *Staphylococcus aureus* (MRSA)

Staphylococcus aureus, often referred to simply as "staph", is a bacteria commonly found on the skin and is often found in 20–30% of the noses of normal healthy people. Occasionally, staph can get into the body and cause an infection. This infection can be minor such as a skin condition, or serious such as a blood infection or pneumonia.

Most strains of this bacterium are sensitive to antibiotics and infections can be effectively treated. Methicillin is a class of antibiotic commonly used to treat staph infections. Although this class of antibiotics is very effective in treating most staph infections, some staph bacteria have developed resistance to methicillin and can no longer be killed by this antibiotic. These resistant bacteria are called methicillin-resistant *Staphylococcus aureus*, or MRSA.

Who gets MRSA?

Most patients from whom MRSA is isolated are colonised with this organism rather than infected. Colonisation means the presence of the organism on the skin, or in the nose or at the back of the throat but without any illness. However if a patient also has an inflammation or fever associated with the presence of MRSA then they are considered to be infected.

A proportion of patients are at greater risk and MRSA infection usually develops in hospital patients who are elderly or very sick. Alternatively, they may have an open wound such as a bedsore or a tube (such as a catheter) going into the body or have recently undergone surgery. A proportion of patients become infected particularly if they have been put at greater risk following an operation, or have a malignancy, or the presence of a bladder catheter, intravenous infusion or surgical drain. These patients may then develop illnesses such as wound and skin infections, urinary tract infections, pneumonia or 'blood poisoning'.

How is MRSA treated?

Where infection is present, antibiotics commonly used to treat methicillin sensitive *S.aureus* are not effective. Other antibiotics such as Vancomycin and Teicoplanin are therefore often used. However these two antibiotics are expensive, may be toxic and have to be given by intravenous infusion.

How is the spread of MRSA prevented?

The single most important infection control measure is scrupulous hand-washing by hospital staff to prevent cross-contamination. Patients with MRSA should be physically isolated in a single room with the door remaining closed and the room regularly damp-dusted, or the patient should be nursed in a special ward away from other non-infected patients.

How can Runfold Plastics antimicrobial masterbatch help in the fight against cross-contamination of MRSA?

Runfold Plastics' revolutionary masterbatch contributes to better hygiene and helps prevent cross-contamination of MRSA. It works by inhibiting the multiplication of microbes thus reducing their populations and is particularly effective against MRSA. The superior performance against the MRSA strain has meant the product has become increasingly popular in medical applications. At relatively low doses the antimicrobial shows a dramatic reduction in MRSA on a plastic substrate.

The unique performance of Runfold Plastics antimicrobial is related to its patented release system, which relies on an ionic bond with free Ag⁺ (silver ions) to keep it stable. JMAC works by release on demand and is therefore unlike other systems, which have no control over the antimicrobial release, or rely on ceramic/glass barriers. This unique system of silver ions results in excellent anti-wash characteristics.

Overleaf are results showing the effectiveness of Runfold Plastics antimicrobial masterbatch against MRSA

Laboratory Evaluation of The Effect of Runfold Plastics' Antimicrobial Masterbatch in PVC Film on MRSA – Application Medical Wall Covering

The sample of PVC film showed a dramatic reduction in MRSA count after the first count of 24 hours and continued to reduce over subsequent date lines.

SAMPLES

- Control
- PVC film containing Runfold Plastics Antimicrobial

The MRSA used was a wild strain taken from Liverpool Royal Infirmary.

INVESTIGATION

To determine in the laboratory the antimicrobial surface activity of the PVC film samples.

METHOD

A grid consisting of 1cm x 1cm squares was drawn on the surface of each film sample. A bacterial inoculum of MRSA was prepared. 50ul of the bacterial preparation was inoculated onto the squares on the surface of each film sample, and the baseline count of the inoculum determined.

The film samples were stored under humid conditions at 20°C for the duration of the test. At each time point an inoculated square was swabbed and the swab shaken in peptone polysorbate diluent for two minutes. Two plates were prepared using Tryptone Soya Agar and incubated at 30°C for 48 hours.

The total viable counts for each sample were determined on a baseline count, 24 hours, 48 hours, 72 hours and 7 days.

As you will see our viable count test method is solely dependent upon an actual bacterium count on the surface of the film measurement rather than an arbitrary halo measurement.

ANTIBACTERIAL ACTIVITY TEST RESULTS BASED ON SIMILAR DATA

Sample	Baseline count	24 hours	48 hours	72 hours	7 days
Control	300000	210000	450000	280000	80000
With Additive	300000	120	<10	<10	<10

CONCLUSIONS

The PVC containing the antimicrobial exhibited a log 3 reduction after only 24 hours and <10 within 48 hours. This increased activity may be desirable for critical medical applications.

Other Applications

- Hospital Flooring and wall covering
- Mattress Protectors
- Sharp-safe box
- Medical drapes
- Medical gloves
- Medical gowns
- Pens and clip boards
- Footwear
- Any other portable item that may be taken from ward to ward



Other Benefits of Runfold Plastics' Antimicrobial Masterbatch

Runfold's antimicrobial has many benefits over organic systems, which have traditionally been the popular choice of the market over previous years.

The antimicrobial is not associated with side effects, which are often seen with organic systems such as skin rashes. The problems occur with the organic systems due to the high mobility of organic molecules, which also result in a shortened product life. These problems appeared to be an unavoidable consequence of adding an antibacterial to plastic, but with Runfold's antimicrobial masterbatch this is no longer the case.

Runfold Plastics' product is vastly superior to organic antimicrobials owing to its exceptionally low toxicity, which has resulted in it gaining many FDA and EU approvals. This includes registration under the EU Biocide Directive.

Its high heat stability in processing temperatures $> 500^{\circ}\text{C}$ compared to $220^{\circ}\text{C}+$ for typical organics such as the Tricolsan additive gives it another significant advantage.