

Cutimed® Sorbact® made easy

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Introduction

Bacterial colonisation and infection may contribute to delayed healing and present a major challenge for wound care clinicians¹. Intervention with antimicrobial dressings using active ingredients is recommended to control bacterial load and prevent spreading infection². Cutimed® Sorbact® (BSN medical) is a range of non-medicated dressings that has a unique bacterial binding action using the principle of hydrophobicity to remove bacteria and fungi from a wound. These products can be used to reduce bacterial loads and provide an alternative to silver, iodine, PHMB and other antimicrobial agents.

Authors: Probst A, Norris R, Cutting KF. Full author details can be found on page 6.

What is Cutimed® Sorbact®?

This is a range of primary wound contact dressings that includes Cutimed® Sorbact®, Cutimed® Sorbact® Gel and Cutimed® Sorbact® Hydroactive. These products have been developed for the treatment of infected wounds and fungal infections. They can be used on all types of wounds, from lightly to highly exuding and from contaminated and colonised to infected wounds (Table 1).

Unlike traditional antimicrobial dressings, they do not contain any chemically or pharmacologically active substances and rely on a physical mode of action using a hydrophobic coating made from dialkylcarbamoylchloride (commonly known as DACC) to reduce the bacterial load in a wound³.

What is DACC?

DACC is a synthetically produced derivative of a naturally occurring hydrophobic fatty acid, which is also found in spiders' webs. The droplets of water that form on a spider's web are a visible indication of its hydrophobic properties.

DACC encourages a natural hydrophobic interaction (Box 1) whereby hydrophobic organisms are attracted and irreversibly bound in an aqueous environment and held together by the surrounding water molecules.

This principle has been applied to the wound care environment to provide an alternative approach to reducing bacterial burden.

Box 1 What is meant by hydrophobic interaction?

A surface is **hydrophobic** if it cannot be wetted by water (water repellent). A surface is **hydrophilic** if it can be wetted by water.

Hydrophobic interaction can be demonstrated simply by adding a little oil to a bowl of water. After gently stirring, water droplets will form on the surface of the water. If left to stand for a few minutes, the hydrophobic effect will cause the droplets to gather together into one larger drop of oil.

Most organisms that are pathogenic or impede wound healing have hydrophobic properties⁴. When they come into contact with DACC, which is also hydrophobic, the microorganisms are irreversibly bound to the DACC by excluding the water molecules around them.

What is the role of DACC in wound care?

Cutimed® Sorbact® is coated with DACC, resulting in a dressing with highly hydrophobic properties⁶. Most microorganisms found in a wound have hydrophobic properties^{3,4}. In the presence of moisture, when microorganisms come into close contact with DACC, they become irreversibly bound to the dressing as a result of hydrophobic interaction. Once bound to the dressing these microorganisms are rendered inert and prevented from reproducing or releasing harmful toxins³. The hydrophobic microorganisms are then removed with each dressing change, helping to reduce the bacterial load in the wound bed and leaving the non-hydrophobic microorganisms to stimulate healing³⁻⁷.

Why is it important to reduce the bioburden in wounds?

Infection not only impairs healing, resulting in morbidity and hospitalisation, but in the absence of careful management, can lead to a rapidly spreading infection with the loss of an affected limb or even death⁸. Debridement (removal of devitalised tissue) is an integral part of good wound practice and is vital when reducing bacterial burden within the wound⁹⁻¹¹. Debridement is often the first component of care and can be supported through autolysis and the use of dressings to lower the bioburden in the wound¹².

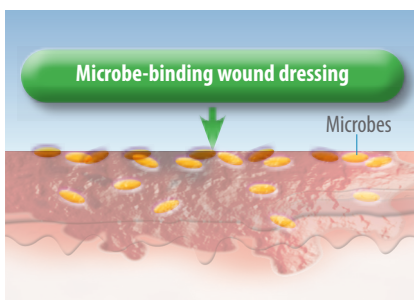
The effects of bacteria in a wound are often described as a continuum that extends from contamination through to colonisation and infection with invasion of the tissues². Identification of wound infection is a clinical skill and it is important that early signs of infection are detected promptly to help reduce patient morbidity.

Acute wound infection is easily diagnosed using the classic signs, including erythema, swelling, local warmth/heat and pain. These may be accompanied by purulent discharge and pyrexia. Identifying

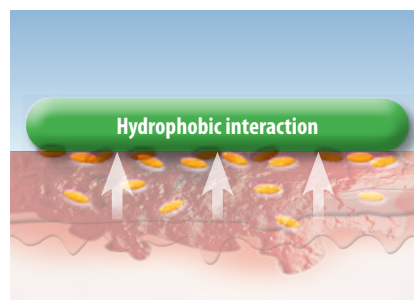
Cutimed® Sorbact® made easy



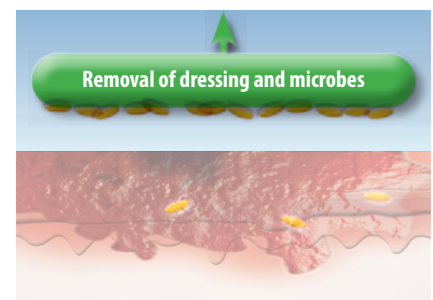
Figure 1 Cutimed® Sorbact® is able to bind bacteria and fungi, which are removed at dressing change. This mode of action is different to traditional antimicrobial dressings that kill bacteria using chemical agents



The wound dressing is applied to the wound bed



In the presence of moisture, bacteria and fungi are bound to the DACC coating by hydrophobic interaction



With each dressing change, the bound microorganisms are removed from the wound bed

infection in chronic wounds is more challenging and clinicians may need to rely on a range of criteria that have been shown to be relevant to different wound types⁸. These are sometimes of a subtle nature and will only be detected by consistent and repeated observation⁸.

Routine or indiscriminate sampling (swabbing) is rarely justified due to the drain on human and financial resources^{2,13}. However, selective swabbing can provide useful information on the presence of potential pathogens and local micro-ecology.

The role of antimicrobial wound dressings in reducing bioburden

Recent guidelines on the management of wound infection suggest that most topical antimicrobial dressings reduce wound bioburden by killing bacteria². Wound dressings containing antiseptic agents such as silver, honey, and iodine as well as wound dressings impregnated with polyhexamethylene biguanide (PHMB) are among the most common antimicrobial wound dressings¹⁴. These dressings have a broad range of antimicrobial activity and can be used to treat localised wound

infection and/or to provide a barrier to microorganisms in wounds at high risk of infection or re-infection¹⁴. Where indicated, antimicrobial dressings can be used in preference to topical or systemic antibiotics¹⁵⁻¹⁷.

When antimicrobial dressings are used to treat cases of systemic or spreading infection, this should be in conjunction with prescribed treatments such as systemic antibiotics^{2,18}.

However, antimicrobial dressings should be restricted to limited periods of time and reviewed on a regular basis (ie every two weeks)^{2,19}. These recommendations were developed because of a growing concern regarding the widespread misuse and long-term use of antimicrobial substances and the perceived high costs associated with their use in health services.

Unlike traditional antimicrobial dressings, Cutimed® Sorbact® does not contain antiseptic agents and instead works by the binding of bacteria and fungi to the dressing, with no disruption to the cell wall and no systemic absorption. The microorganisms are removed with the dressing and there is no cell debris left in the wound⁶.

Efficacy of DACC in reducing bacterial load

In-vitro testing and studies using a simulated moist wound environment have shown that the use of a hydrophobic dressing (Cutimed® Sorbact®) can reduce microbial load in a wound³. The DACC-coated dressing demonstrated a binding action to common wound pathogens, including *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida albicans* and was found to be most effective in wounds with moderate to high levels of exudate³. In addition, Cooper and Jenkins²⁰ have demonstrated a potential role for DACC in the management of biofilms and multi-resistant organisms.

Benefits of using Cutimed® Sorbact®

The main benefits include:

- **The products do not contain an active antimicrobial agent and so there is no consequential risk of resistant bacterial strains. Bacteria and fungi cannot become resistant to this sequestration (uptake by bacterial binding) process. This means that the**

treatment does not have to be discontinued after two weeks.

- No chemically active substance is donated to the wound bed from the dressing with no risk of sensitisation, skin staining or systemic absorption. This may be of particular significance when dressings need to be used for a long time or when treating infants, children, adolescents and pregnant women^{21,22}.
- There is no known risk of allergic reactions to DACC^{23,24}.

When is Cutimed® Sorbact® indicated?

The Cutimed® Sorbact® dressing range can be used on:

- Postoperative wounds and dehisced wounds
- Traumatic wounds
- Chronic wounds such as venous, arterial, diabetic foot and pressure ulcers
- Wounds following excision of fistulae and abscesses
- Fungal infections.







Contraindications and precautions

Cutimed® Sorbact® should not be used with ointments and creams containing lipids as these can inhibit the bacteria-binding properties of the dressing. In addition, some disinfectants and antiseptics that are used to clean the wound prior to the dressing change can impair the surface hydrophobicity of microorganisms, reducing the efficacy of the dressing³.

How is Cutimed® Sorbact® applied? Preparing the wound

Prepare the wound bed and periwound skin using appropriate debridement methods and thoroughly cleanse the wound bed according to local protocols. It is important that there are no traces of ointments or creams on the wound as this interferes with the hydrophobic properties of the Cutimed® Sorbact® dressing.

Table 1 Dressing selection guide for Cutimed® Sorbact® product range

Product	DACC type	Method of use	Frequency of change	When to use
Cutimed® Sorbact® Dressing Pad 	DACC	The green side is applied to the wound. Do not cut to size. Use a proprietary bandage, tape or film dressing for fixation	It is recommended to change the dressing every 1-3 days depending on the wound condition*	All types of contaminated, colonised or infected wounds with low to moderate exudate levels
Cutimed® Sorbact® Swab 	DACC	Apply directly to the wound bed unfolded and flat or folded once. Fix with a secondary dressing	It is recommended to change the dressing every 1-3 days depending on the wound condition*	Primary dressing for contaminated, colonised or infected superficial or deep wounds. Suitable for fungal infection in the groin, in skin folds (eg under the breast) or between the toes
Cutimed® Sorbact® Ribbon 	DACC	For filling wound cavities and fistulae or wound pockets. Leave part of the dressing sticking out so it can be easily removed. Fix with a secondary dressing	It is recommended to change the dressing every 1-3 days depending on the wound condition*	All kinds of deep or cavity wounds. Suitable for fungal infection in the groin, in skin folds (eg under the breast) or between the toes
Cutimed® Sorbact® Round Swab 	DACC	For filling wound cavities and wound pockets. Fix with a secondary dressing	It is recommended to change the dressing every 1-3 days depending on the wound condition*	Use for the dressing of small, deep wounds and for wound cleansing
Cutimed® Sorbact® Gel 	DACC + amorphous hydrogel	Apply directly to the wound. Cover with an appropriate secondary dressing that does not absorb the gel from the dressing	It is recommended to change the dressing every 1-3 days depending on the wound condition*	Can be used for all types of dry to low exuding wounds that are contaminated, colonised or infected
Cutimed® Sorbact® Hydroactive 	DACC + absorbent hydrogel	The green side is applied to the wound. The dressing must not be cut to size. Use a proprietary bandage, tape or film dressing for fixation	The dressing should be changed as often as dictated by the wound condition or after 4 days. Change when the dressing is saturated (becomes cloudy or opaque)*	Can be used for low to moderately exuding wounds that are contaminated, colonised or infected, such as chronic ulcers, postoperative dehisced and traumatic wounds

*Note: When using a secondary dressing, this may need to be changed more frequently. For infected wounds, it is important to monitor the wound daily.

PRODUCTS FOR PRACTICE

Selecting the wound dressing

Select an appropriate dressing based on the type, depth and moisture level of the wound (see Table 1).

Applying the dressing

When applying the dressing, it is important to ensure direct contact with the wound surface to avoid any 'dead spaces' where bacteria may thrive. In deep or cavity wounds, apply Cutimed® Sorbact® swabs or ribbon and leave part of the dressing sticking out of the wound so it can be removed easily. Cover with an absorbent Cutimed® Sorbact® dressing pad if required. When additional exudate management is needed, Cutimed® Sorbact® can be combined with most secondary dressings. It can also be used effectively under compression in the treatment of venous leg ulcers²⁵.

How often should the dressing be changed?

The frequency of dressing change depends on the level of wound exudate, wound status and bioburden (Table 1). When used on infected wounds, the dressing should be changed daily to monitor the wound

Box 3 Practical tips for the use of Cutimed® Sorbact® products

- Tip 1** When using Cutimed® Sorbact® Hydroactive, the dressing should be applied with care and secured to the wound edge with a proprietary bandage, film dressing or tape. Improved fixation can be achieved by treating the skin with a protective film, such as Cutimed® PROTECT, prior to application.
- Tip 2** To prevent Cutimed® Sorbact® Gel from drying out, the wound dressing can be covered with a foam containing a silicone layer, for example, Cutimed® Siltec.
- Tip 3** The ribbon is suitable for filling fistulae, since it can be removed in one piece when changing the dressing.
- Tip 4** Use swabs for the treatment of fungal infections. If necessary, the swab can then be secured with a retention dressing to prevent shifting. The ribbon can also be used for the treatment of tinea pedis and is easy to apply (Figure 2)

healing process and reduction in bioburden. For wounds at risk of infection the dressing can be changed every 2–5 days.

When should Cutimed® Sorbact® be discontinued?

Cutimed® Sorbact® products can be continued up until there are no clinical signs of infection and the wound is granulating. During the treatment period it is important to review the wound at regular intervals in line with local protocols and record the condition of the wound using photographs where appropriate.



Figure 2 Cutimed® Sorbact® Ribbon can be easily wrapped around the toes to treat tinea pedis

Cutimed® Sorbact® in a patient with an infected venous leg ulcer: a case study

A 75-year-old woman was transferred to the clinic with an infected venous ulcer on the inside of the lower left leg (Figure 3), which was associated with lymphoedema. The wound appeared inflamed with maceration of the surrounding skin.

Treatment

A wound swab taken from the lower leg was positive for *Escherichia coli*, *Pseudomonas* and *Enterococcus* species. Regular treatment included surgical debridement with a curette to prepare the wound bed and reduce the bacterial bioburden. In addition, systemic antibiotics were administered for seven days followed by oral antibiotics for a further week. Cutimed® Sorbact® swabs were applied to the wound, covered with a highly absorbent wound dressing and secured by a bandage. This was followed by manual lymphatic drainage and compression therapy. The wound bioburden was regularly checked by taking wound swabs, which demonstrated a reduction in bacteria in the wound bed.

Outcome

After four weeks as an inpatient the patient was discharged (Figure 4). At this time, there was evidence of granulation tissue formation and the wound had a good blood supply. In addition to surgical debridement and antibiotic treatment, the wound swab was negative for the bacteria found initially and Cutimed® Sorbact® was used safely for more than 21 days.



Figure 3 Wound status on presentation



Figure 4 Wound status after four weeks on discharge

Table 2 Clinical evidence for Cutimed® Sorbact® products

Reference	Title	Type	Goal	Main Findings
Gentili et al. <i>Eur J Clin Microbiol Infect Dis</i> 2011. Epub ahead of print	Panbacterial real time PCR to evaluate bacterial burden in chronic wounds treated with Cutimed® Sorbact®	Non-comparative double-blind study on 19 patients	To assess the usefulness of a panbacterial quantitative real time PCR to quantitate the total bacterial load in chronic wounds treated with Cutimed® Sorbact®	The laboratory results on panbacterial real time PCR show that total bacterial load significantly decreased in 10/15 healing chronic wounds and did not change in 5/5 non-healing chronic wounds
Derbyshire A. <i>Br J Comm Nurs Wound Care Suppl</i> 2010; S24-28	Innovative solutions to daily challenges: Cutimed®Sorbact® follow-up case studies	Follow-up case series in three patients (two with highly exuding leg ulcers and one with extensive solar damage to his scalp)	To assess the efficacy of Cutimed® Sorbact® in wounds of at least four years' duration	All wounds showed improvement with reductions in nursing visits and reduced dressing costs
Skinner R, Hampton S. <i>Br J Nurs Tissue Viability Suppl</i> 2010; 19(11):S30-36	The diabetic foot: managing infection using Cutimed®Sorbact® dressings	Case study approach in four patients with diabetic foot ulceration	To evaluate Cutimed®Sorbact® in terms of tolerability, pain, inflammation, exudate levels and wound healing in four patients with infected diabetic foot ulcers	Cutimed®Sorbact® was easy to use and could be wrapped around the toes. It was well tolerated and offered noticeable relief to patients in terms of pain and inflammation. There was also a reduction in exudate levels, which was associated with a positive impact on quality of life
Powell G. <i>Br J Nurs</i> 2009; 18(15): S30-36	Evaluating Cutimed®Sorbact® : using a case study approach	Case series in six patients with different wound types: highly exuding leg ulcers, pilonidal sinus wounds and fungating wounds	To evaluate the efficacy of Cutimed®Sorbact® in the management of different wound types when critical colonisation and signs of infection are observed	Cutimed®Sorbact® worked well on non-healing wounds with moderate to high exudate levels. All wounds improved, with a reduction in exudate and promotion of wound healing. The author concluded that Cutimed®Sorbact® was an effective treatment when critical colonisation and signs of infection were observed and it should be considered in wounds at risk of infection due to location and aetiology
Johannson et al. <i>J Wound Care</i> 2009; 18(11): 470-3	Open study on the topical treatment of interdigital fungal infections in diabetic patients	Non-comparative, open study over a 14-month period (n=20)	To evaluate the effect of Cutimed®Sorbact® in the treatment of interdigital skin infections in people with diabetes	15 (75%) of the infections had improved or healed after 10 days of treatment. In 55% of patients, the culture showed no growth of fungi after 10 days of treatment. The authors concluded that Cutimed®Sorbact® may be a valuable alternative treatment for interdigital fungal infections
Kammerlander et al, <i>Wounds UK</i> 2008; 4(2): 10-18	Non-medicated wound dressing as an antimicrobial alternative in wound management	Multicentre European postmarketing surveillance study on 116 patients	To assess the efficacy of Cutimed® Sorbact® on different kinds of wounds under conditions of daily clinical practice	81% of patients with an infected wound received effective treatment using the new dressing. 21% of patients' wounds healed during the study and a further 72% showed an improvement in wound healing. Reductions in wound pain were reported and the dressing was reported as being easy to use
Hampton S. <i>Wounds UK</i> 2007; 3(4): 113-19	An evaluation of the efficacy of Cutimed®Sorbact® in different types of non-healing wounds	Observational study in 21 patients with chronic, non-responding wounds	Evaluation of the Cutimed® Sorbact® product range in wounds of at least 3 months' duration	Cutimed®Sorbact® was found to be effective in the treatment and management of non-healing wounds, including leg ulcers, pressure ulcers and a post-surgical wound
Von Hallern B, Lang F. <i>Medizin und Praxis</i> 2005; 8-11	Has Cutimed® Sorbact® proved its practical value as an antibacterial dressing?	Postmarketing surveillance study of 418 patients with contaminated, colonised and infected wounds over a 22-month period	To determine whether a dressing with purely physical effects can reduce the microbial count, especially in colonised and infected wounds, without adversely affecting the wound healing process and can be removed atraumatically and painlessly	Cutimed® Sorbact® was found to be a good alternative therapy option for infected, colonised and contaminated wounds. The physiological wound healing phases were not compromised and there was no pain at dressing changes

Clinical evidence for Cutimed® Sorbact®

There are a number of publications in the form of clinical studies and case reports on the efficacy of Cutimed® Sorbact® (Table 2). These demonstrate that Cutimed® Sorbact® products are effective in the management of infected wounds in different locations and aetiologies. They have been shown to reduce pain, odour and exudate, which can improve patient quality of life⁶. In addition, studies have found that Cutimed® Sorbact® may be useful for chronic wounds that require a longer treatment episode than two weeks or for long-term prophylaxis^{19,26}.

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Summary

Cutimed® Sorbact® binds and removes bacteria and fungi from wounds as a result of hydrophobic interaction, offering an effective and safe treatment for infected wounds. The irreversible binding of pathogenic microorganisms to the DACC coating ensures that bacteria are retained on the dressing, reducing the risk of cross contamination. Studies have demonstrated no toxicity to healthy tissues and no consequential bacterial resistance, which allows Cutimed® Sorbact® to be used for a prolonged period of time in a range of acute and chronic wounds, and may be considered an alternative method for clinicians to prevent and manage local infection.

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