

EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF A DRY-STEAM ATOMISING SYSTEM (SANI SYSTEM® POLTI)

C. Farina¹, R. Giancola², G. Russello¹, S. Perin¹, G. Perotti³

1. Microbiology Unit, 2. Orthopaedics and Traumatology Unit, 3. Facility Medical Management, San Carlo Borromeo Hospital, Milan, Italy

Introduction

The problem of nosocomial infections is becoming more and more significant due to the increased use of invasive procedures (operations, diagnostic, therapeutic and clinical monitoring procedures) and due to the changed epidemiological conditions as a result of the significant presence among the hospitalised population of elderly people and immuno-depressed, transplant and neoplastic patients.

The consequences for the patients can be serious in terms of complications and prognosis, and those for the Healthcare Organisation can be important due to the modification of the environmental microbial eco-system. The consequences for the community may also be significant in terms of the associated costs. For this reason, it would seem advisable to implement a range of measures in the nosocomial environment aimed at containing the risk of intra-hospital microbial transmission.

Aims

One of the aims of the study was to investigate the *in vivo* antimicrobial (antibacterial and antifungal) effectiveness of the Sani System® sanitising method (Polti S.p.A., Bulgarograsso, Italy). This new method was compared with the conventional method commonly adopted by the personnel of the Orthopaedics and Traumatology Unit of San Carlo Borromeo Hospital in Milan for sanitising flat surfaces, floors and walls, medical and surgical devices, bedding and furniture.

A further aim of the study was to investigate the *in vitro* antibacterial effectiveness of treatment with the Sani System® sanitising method

in respect of tested micro-organisms in known quantities on inert materials such as plastic, metal and glass.

Sampling methodology

26 sites were identified from which to take samples for quantitative and qualitative testing. These microbiological tests were conducted in an Orthopaedics and Traumatology Department, specifically in the plaster room, in the out-patient facility and in the operating theatre. Each site was inspected before and after the sanitising treatment. Each of the sites was subjected to the above indicated sanitising methods:

- 0.6 % sodium hypochlorite solution (for all the surfaces with the exception of the metal surfaces, for which a 0.5 % polyphenol solution was used (sanitisation with the conventional method);
- Sani System® sanitising method.

Results

The results obtained with 20 seconds Sani System® sanitising treatment on flat surfaces, floors and walls, medical and surgical devices, bedding and furniture are shown in **Figure 1**, while the results obtained on the same sites following sanitisation with the conventional method are shown in **Figure 2**.

Figures 3 - 5 show the logarithmic reduction obtained with 30 seconds Sani System® sanitising treatment on inert materials such as plastic (**Figure 3**), metal (**Figure 4**) and glass (**Figure 5**).

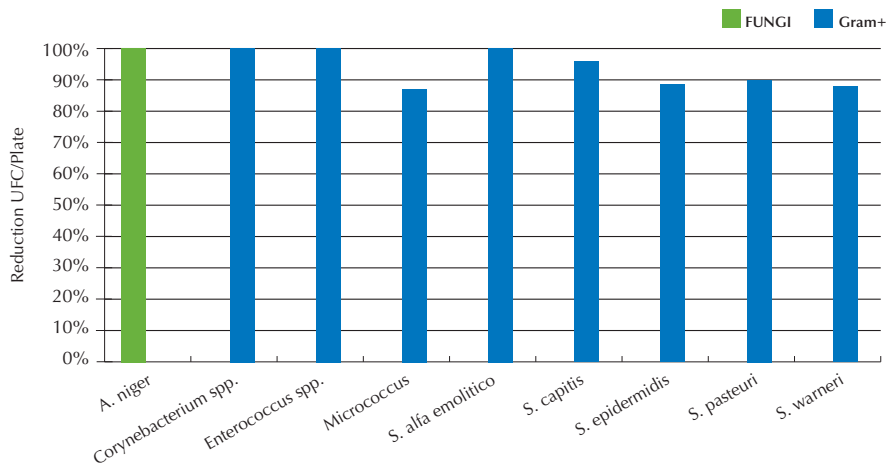


Figure 1. Sanitisation of devices and sites with Sani System®

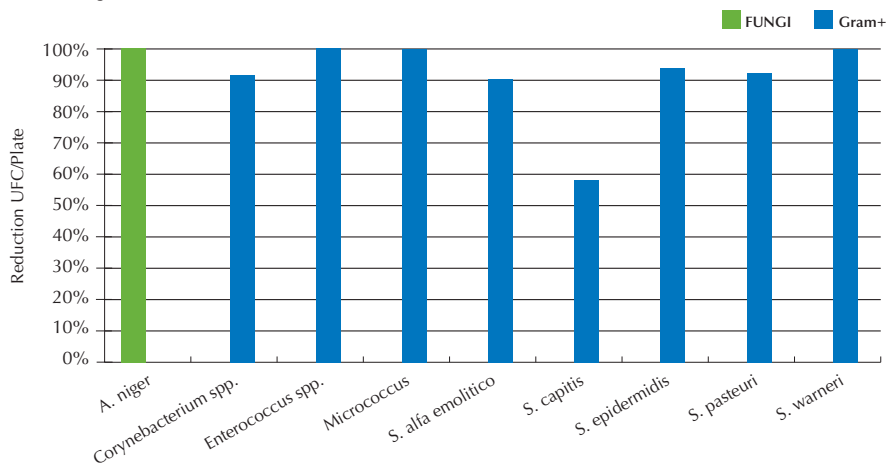


Figure 2. Sanitisation of devices and sites with conventional method

Figures 1 and 2.

Microbicidal activity found in respect of microorganisms following the sanitisation with the SaniSystem® sanitising method (**Figure 1**) and following the conventional method (**Figure 2**). The charts show the percentage decrease calculated in UFC/plate of the bacterial and fungal stigpes considered globally at all sampling points.

Figure 3. PLASTIC

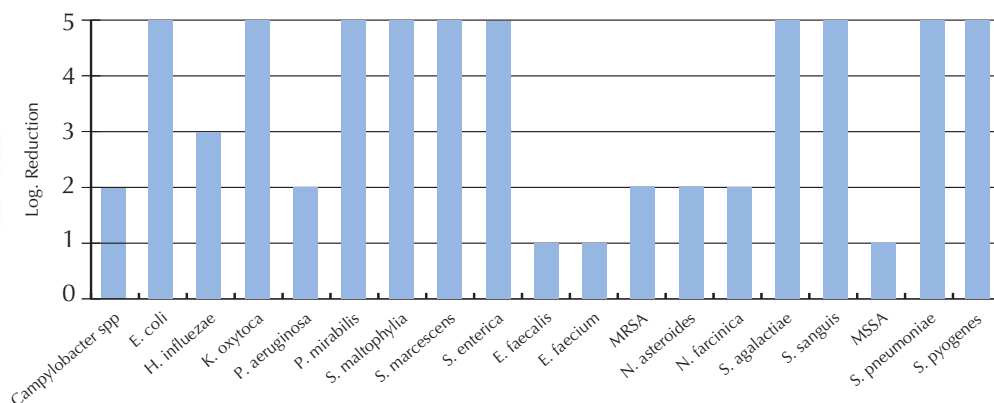
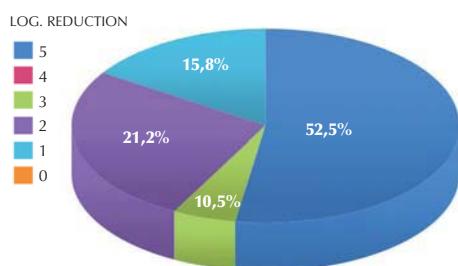


Figure 4. METAL

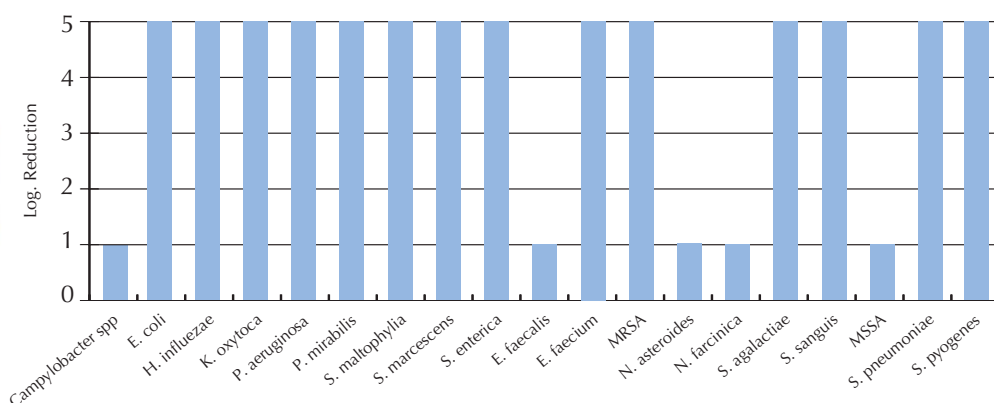
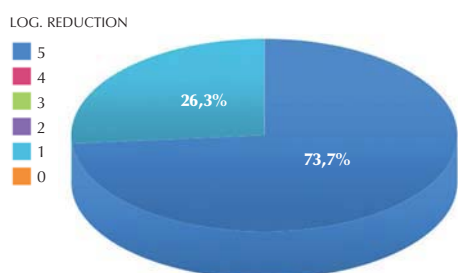
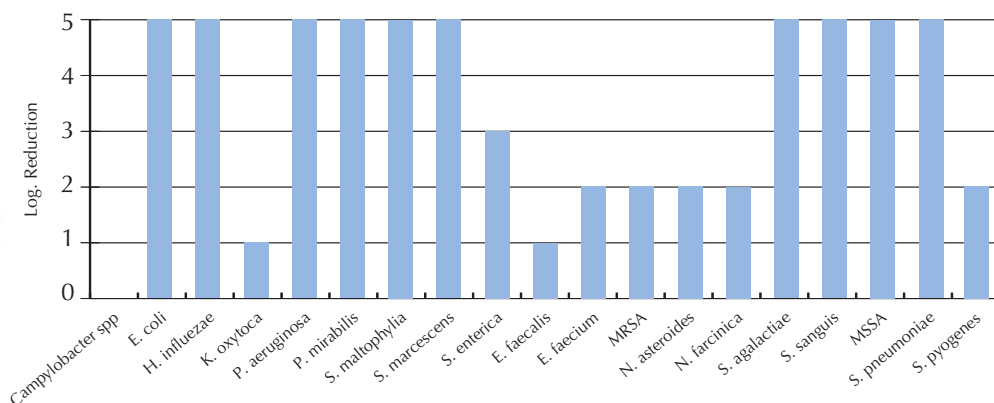
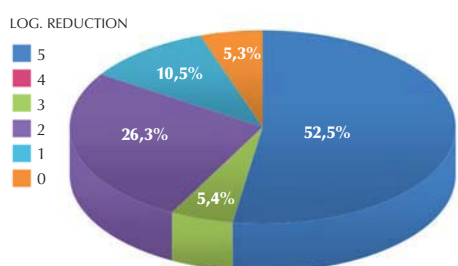


Figure 5. GLASS



Figures 3 - 5.

Antimicrobial activity by the Sani System® method with 30 seconds steaming on inert materials, such as plastic (Figure 3), metal (Figure 4) and glass (Figure 5). The efficiency of the sanitising method on inert surfaces was evaluated for each single strain by calculating the arithmetic means of the logarithmic reductions of the bacterial load before and after treatment.

The charts on the left show the results as a whole, while those on the right show the breakdowns into the various different micro-organisms.

Conclusions:

On the basis of the results obtained, following samplings carried out at the Orthopaedic and Traumatology Unit of the San Carlo Borromeo Hospital in Milan, it was possible to observe an antimicrobial activity of the Sani System® sanitising method on all the micro-organisms tested, many of which are clinically significant, display considerable polychemo-resistance and are certainly “emerging pathogens” in the nosocomial environment. The antimicrobial activity was found both on devices

and sites (Figure 1) and on inert materials (Figures 3 - 5). In standard operating conditions, sanitisation carried out with the Sani System® led to a reduction of the total microbial load of **91.6 %**, as compared with **88.8 %** obtained using the conventional method (Figure 1 and Figure 2); sanitising on inert materials led to a significant logarithmic reduction for **52,5%** of the bacteria tested on plastic and glass and for **73,7%** of the bacteria tested on metal.