UNIVERSITA' DEGLI STUDI DI MILANO
ISTITUTO DI MICROBIOLOGIA
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Evaluation of the anti-microbial activitv of Polygiene resin against Methicillin Resistant *Staphylococcus aureus* (MRSA)

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INTRODUCTION

Perstop entrusted us to carry on an evaluation study of the antimicrobial activity of Polygiene resin against Methicillin Resistant *Staphylococcus aureus* (MRSA).

The customer supplied us the Polygiene moulded resin.

AIM OF THE STUDY

The aim of the study was to determine the bactericidal activity of Polygiene resin against *Staphylococcus aureus* Methicillin-resistant strains (MRSA), isolated from biological materials obtained by hospitalised patients.

MATERIAL AND METHODS

We were supplied by the customer with a proper number of rectangular pebbles (sides 5.2 x 6.2 cm), marked as resin A.

Staphylococcus aureus Methicillin-resistant strains (n° 3 and n° 18) were isolated from hospitalised patients affected by serious infections.

The strains n° 3 and n° 18 are resistant to methicillin with M.I.C. (Minimal Inhibitory Concentration) superior to 128 mg/L.

These strains were cultured in Brain Heart Infusion broth (DIFCO) and kept in thermostat at 37°C for 18-24 h in order to obtain a luxuriant microbial multiplication, with a bacterial concentration near to 10^9 C.F.U./ml.

The tests will be performed in strict conditions of asepsis.

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The broth-cultures will be properly diluted in order to obtain a final microbial concentration of about 1.0×10^4 CFU/ml.

On different plates containing the Polygiene resin samples, 3 ml of each broth-culture will be added and the same quantity was placed on a sterile culture plate. The latter will be used as a control to quantify the microbial inoculum in contact with Polygiene resin samples and to monitor the trend of the microbial inoculum in contact with an inert matter such as plastic.

The microbial concentration of each strain kept in contact with Polygiene resin samples will be verified at the following times: 0, 4h, 8h and 24 h.

During the tests the plates containing the Polygiene resin samples will be placed inside sterile Petri dishes and kept at room temperature.

At different times 100 µl of inoculum will be collected from the surface of the different plates and Petri dishes, diluted 1:10, 1:100 and 1:1000 and transferred to Mueller Hinton agar plates (DIFCO). Different dilutions of the collected samples will be uniformly inseminated on the surface of each culture plate in order to obtain a suitable microbial growth to allow an adequate reading of the results. Each culture plate, inseminated with MRSA, will be cultured at 37°C for 24-48 h. Culture plates will be read only when containing from 30 to 300 colonies. The number of colonies counted in each culture plate will be multiplied by the inverse factor of dilution in order to determine the number of microbial cells on the Polygiene resin samples. The bactericidal effect will be defined as occurring when there was a reduction of 99.9% of the original bacterial inoculum.

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RESULTS AND CONCLUSIONS

The results obtained in this study are shown in Table 1 and in Figure 1 and 2.

Staphylococcus aureus Methicillin-resistant strains (MRSA) have been isolated from pathological material obtained from hospitalised patients affected by serious infections. These strains are notoriously resistant to most antibiotics and their eradication usually proved very difficult.

Polygiene Resin (A) demonstrated a good bactericidal effect against the two MRSA strains. In fact, as is shown in figure 1 and 2, after 24 h of contact with the resin, the whole bacterial inoculum was killed. During the first 8 h no bactericidal effect was seen.

So, we can conclude that, after 24 h of exposition, the bactericidal action of Polygiene resin (A) against MRSA strains is excellent.

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Milan, 22 september 2004

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Table n°1 – Antibacterial activity of Polygiene resin against MRSA strains

Microrganism	Hours	Control CFU/ml	Polygiene CFU/ml
***MRSA* n. 3**			
	0	70000	70000
	4	60000	28000
	8	50000	70000
	24	30000	0
MRSA n. 18			
	0	82000	82000
	4	55000	50000
	8	39000	26000
	24	18000	0

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Figure n. 1 – Killing curves of MRSA n. 3 against Polygiene resin

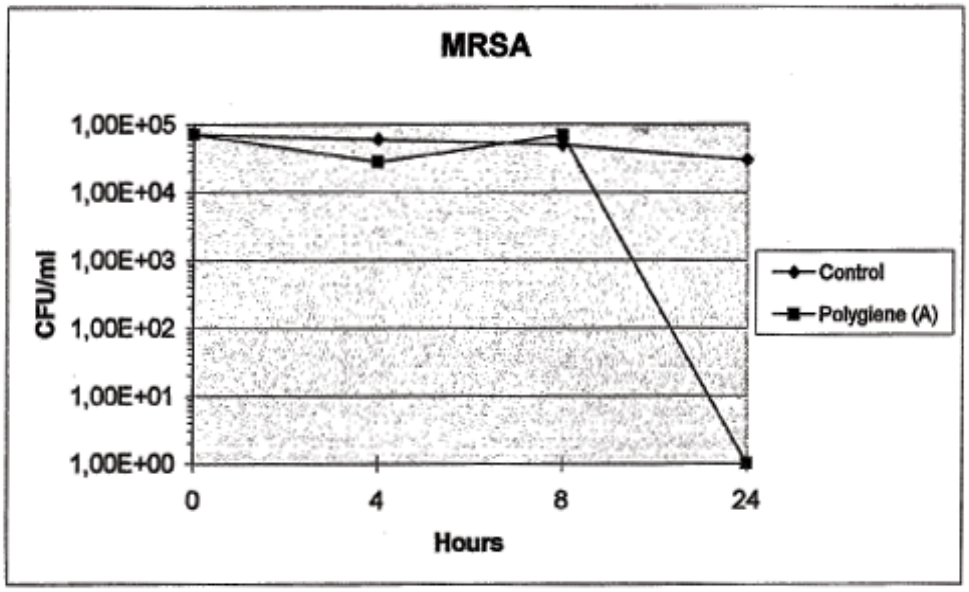

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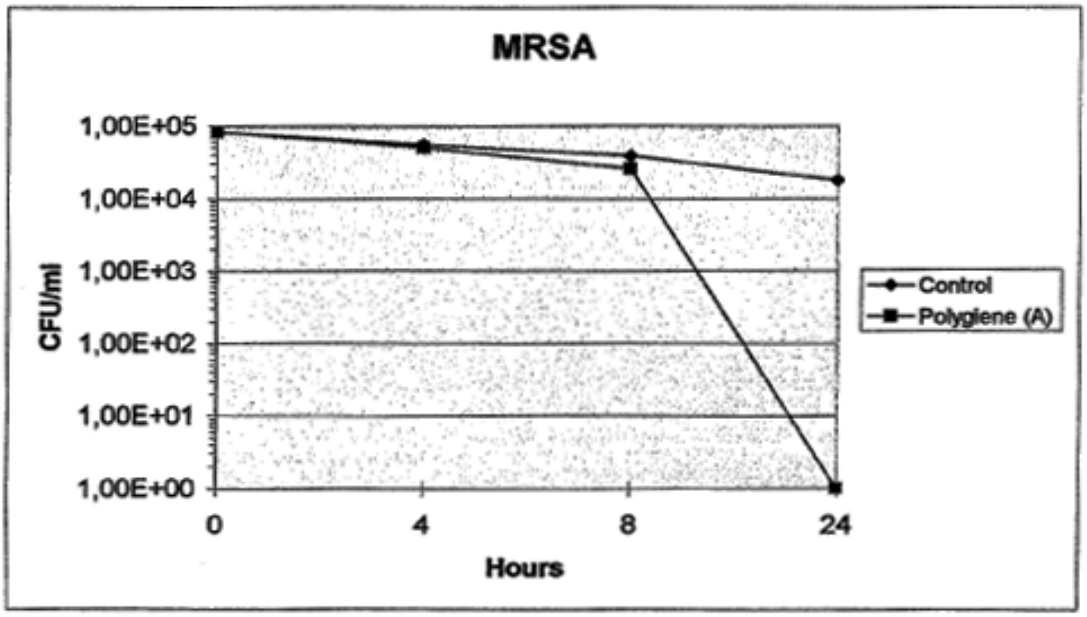
Figure n. 2 – Killing curves of MRSA n. 18 against Polygiene resin



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