Evaluation of Goldshield Antimicrobial Treated Masks of Polypropylene Against Methicillin Resistant Strain of, Staphylococcus aureus

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Mask Test

Preparation:

Three masks tested.
Dark blue: 5% concentrated product
Light blue: 5% product plus wetting agent
Pink: untreated

Each mask was cut into four equal parts. The elastic bands on the dark and light blue masks were removed, though some stitching still remained. There was no band on the untreated mask. Two sections from each mask were identified as replicates A and two were identified as replicates B. Replicates A were placed into each of three sterile culture containers. B replicates were also placed into each of three sterile culture containers for a total of six separate cultures. Each culture container held two mask sections, one to be used for the 2 hour time point and one to be used for the 24 hour time point.

A methicillin resistant Staphylococcus aureus patient isolate was grown overnight in a muehler-hinton liquid broth culture. Titer was determined by optical density and liquid culture was diluted to a concentration of $1x10^7$ organisms per mL. Mask material in each culture container was inoculated with $5x10^7$ organisms. All liquid was absorbed by the material, though total absorption took longer for the dark blue and pink masks.

Masks were incubated at 35°C without CO_2. At 2 hours, one mask section from each of the six containers was selected and placed into sterile jars into which 100 mL of sterile saline was added. The jars were vigorously shaken for approximately 2 minutes. Aliquots of the saline solution were taken and dilutions were made for 10^0, 10^1 and 10^2. 100 microL from each dilution was plated as a lawn on to TSA plates containing 5% sheep blood. Plates were incubated at 35°C without CO_2 for 24 hours and colony forming units were enumerated. Plates were placed back into incubation for a further 24 hours for a total of 48 hours and colony forming units were enumerated again.

At 24 hours post inoculation, the remaining mask sections were removed from each of the six containers and sampled as previously described.

Results Table

Mask	**2h**			**ave**	**24h**			**ave**
untreated	**dilution**	**24h**	**48h**		**dilution**	**24h**	**48h**	
	1	TNC	TNC		1	TNC	TNC	
rep A	10	TNC	TNC		10	TNC	TNC	
	100	600	TNC		100	1320	TNC	
	1	TNC	TNC		1	TNC	TNC	
rep B	10	TNC	TNC		10	TNC	TNC	
	100	1500	TNC	1050	100	1836	TNC	1578
5% conc		**24h**	**48h**			**24h**	**48h**	
	1	0	0		1	0	0	
rep A	10	0	0		10	0	0	
	100	0	0		100	0	0	
	1	1972	TNC		1	12	12	
rep B	10	271	TNC		10	4	4	2
	100	19	22	10	100	0	0	
5%+ wetting		**24h**	**48h**			**24h**	**48h**	
	1	0	0		1	0	0	
rep A	10	0	0		10	0	0	
	100	0	0		100	0	0	
	1	0	0		1	0	0	
rep B	10	0	0		10	0	0	
	100	0	0	0	100	0	0	0

TNC = too numerous to count

Conclusion

At the 2 hour evaluation, the 5% concentrated product resulted in a reduction in bacterial load of 99.05%. The mask treated with the 5% solution plus the wetting agent resulted in a 100% reduction.

At the 24 hour evaluation, the 5% concentrated product reduced bacterial load by 99.99%. The mask treated with the 5% solution plus the wetting agent resulted in 100% reduction.

Reductions were calculated using the number of colonies obtained from blood plates after 24 hours of incubation.