UNIVERSITÄTSKLINIK FÜR INNERE MEDIZIN I

Abteilung für Infektionen und Chemotherapie
Mikrobiologische Laboratorien 3P

Univ. Prof. DDr. A. Georgopoulos
Währinger Gürtel 18 - 20, A - 1090 Wien, Austria
Tel.: +43 1 40400 5139 *Fax*: +43 1 40400 5167
e-*mail:* apostolos.georgopoulos@akh-wien.ac.at

24. 2. 2003

R E P O R T

AKACID FOR THE DECONTAMINATION OF ROOMS

Diseases like the plague or cholera have caused millions of deaths in past decades. Today, at the verge of the 21st century, we have overcome these scourges of mankind, but new threats have emerged: nosocomial infections (hospitalism) and bioterrorism. Especially bioterrorism gives a new dimension of terror to ancient diseases like the pox, which we all believed defeated a long time ago.

Also infections by common agents like pneumococci or Enterobacteriacae pose a problem due to the increasing resistance rates of these agents against various antibiotics. The chain of infection, the spread of these resistant agents from rooms or devices to humans is crucial. Prophylactic measures for the termination of this chain of infection are of vital importance. Therefore decontamination and disinfection in the hospital setting as measures of prophylactic hygiene are the key to the successful fighting against infectious diseases.

By acting rapidly and biocidally, disinfectants can prevent the spread of resistant agents of infectious diseases. Substances like formaldehyde, which are currently in use for the decontamination of rooms, have severe disadvantages. Due to its toxic properties formaldehyde may be used only in dedicated areas and with a range of technical controls. Additionally, the long time of elevated air-concentrations prevents a quick or mobile use.

Concern about these issues has stimulated great interest in new substances with biocidal properties like Akacid. Akacid is non-toxic for humans and animals. It is also friendly to the environment. Additionally, in-vitro laboratory tests have shown that Akacid posesses excellent activity against bacteria, fungi, spores and viruses.

The present study demonstrates the activity of Akacid as gaseous disinfectant in the decontamination of a closed room, which had been contaminated by microorganisms.

Material and Methods

In order to evaluate the activity of Akacid as room disinfectant, a room of approx. 35 m^2 was chosen. To obtain a real-life setting, devices like personal computers, telephones or radios were left in the test room. Additionally viable microorganisms were brought into the room.

Microorganisms: Staphylococcus aureus ATCC 6538, Escherichia coli ATCC 10536, Bacillus subtilis spores ATCC 6633-CH-3 and Aspergillus fumigatus ATCC14110 at concentrations ranging from $1x10^8$ to $1.7x10^9$ KFU/ml suspension were used for all tests.

Microbiological carrier: Microorganisms were inocculated as suspension onto plastic boards and evenly distributed. For each strains eight plastic boards (10x20 cm) were used. While six of these boards were distributed in the test room (ground, ceiling and wardrobe), two were put into a control room where no decontamination was performed.

Active substance: 18 ml Akacid plus (CH 1007 CAS No. 37452-91-5 polyoxyalkylen-guanidin-hydochloride) were diluted in two liters of water (0.02% aqueous solution).

Nebulizer: Nebulizing was done using a UVL-aerosol-nebulizer for 15 minutes with an aerosol of 10 µm diameter.

Recovery of microorganisms: Four and 24 hours after decontamination contact plates were obtained from the inoculated plastic boards, using Envirocheck-Rodac-GKZ plates (containing neutralizer).

Determination of colony counts in the air: Additionally, colony counts of the air were performed using the “Air sampler RCS plus” (Biotest) and Rose-Bengal agar strips for total colony counts. Both in the test room and the control room 1 m^3 air were sampled for determination of colony counts.

Results and Conclusion

The results of the colony count determinations both in the test room and the control room are summarized in Table 1. It is evident that after four hours the air in the test room was free of any microorganisms.
While recovery of microorganisms from the plastic boards out of the control room showed stable growth at each time point, the plastic boards from the test room were free of growth. Table 2 demonstrates this.

Akacid, “the friendly biocide”, is a substance that fits with its many positive characteristics perfectly into our time. Another important feature is the good activity against aggressive agents of both community-acquired and hospital-acquired life-threatening infections by agents like Bacillus anthracis, Legionella pneumophila, Helicobacter pylori, multiresistant staphylococci, enterococci, Pseudomonas species and fungi. First test results have also shown good efficacy against viruses like Hepatitis virus, pox virus, or HIV.
Therefore it can be said, that Akacid is a valuable substance for decontamination of rooms. It is able to cover all ranges of clinical hygiene and disinfection both in industrial and private sectors. In the form of a nebulizer Akacid can easily be used for decontamination of airplanes and other transportmedia, buildings like airports or embassies and other exposed objects and of course also for exposed human beings. Akacid can also be used in prophylaxis because it is not toxic to skin and remains stable over a long period of time.

As a conclusion it can be summarized that Akacid is at present the only disinfectant that has no toxic effects on humans or environment and is suited for both the prophylaxis of contamination and decontamination of a variety of dangerous microbiological agents.

Vienna, 21st of Februray 2003

Univ.Prof.DDr.A.Georgopoulos (MD, PhD)

Table 1 Total colony counts in test-room and control-room

Time-point	CFU/m^3 air	
	test-room	control-room
before decontamination	> 400	420
4 hours after decontamination	0	400
24 hours after decontamination	0	>400

Table 2 Contact plates from plastic boards

Strains	Location of boards	Recovery from contact plates after decontamination	
S. aureus ATCC 6538		4 hours	24 hours
	C	0	0
	G	0	0
	W	0	0
	C	s	s
E. coli ATCC 10536	C	0	0
	G	0	0
	W	0	0
	C	s	s
B. subtilis ATCC 6633 CH3			
	C	0	0
	G	0	0
	W	0	0
	C	s	s
A. fumigatus ATCC 14110			
	C	0	0
	G	3 colonies	0
	W	10 colonies	4 colonies
	C	s	s

C=ceiling, G=ground, W=wardrobe, C=control, S=spread