



Aviation case studies

Firma Technologies is a hygiene consultant and product distributor in Asia Pacific that supports patented and anti-microbial technologies (TiTANO®/TiOMOULD®) with Health Solutions Complete (Hecosol GmbH).



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REAL TEST WITH *ASPERGILLUS FUMIGATUS*

Test against significant mould growth reduction with TiTANO®.

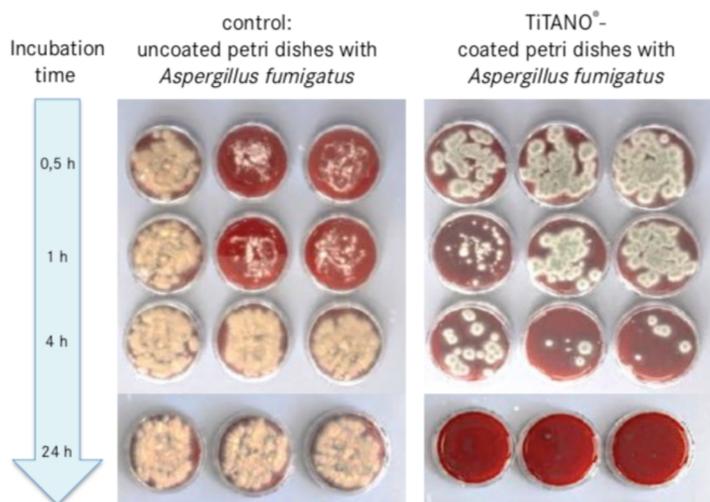
Based on ISO 22196 standards.

Set up

Petri dishes coated with and without TiTANO® solutions were covered with *Aspergillus fumigatus*.

Results

Strong in vitro efficacy of TiTANO® against *Aspergillus fumigatus*. Demonstrated significant efficacy against Norovirus and against gram-negative and positive bacteria.



1

Improve general hygiene

With better cleaning and disinfection procedures.

2

Promote better hand disinfection protocols

With better cleaning and disinfection procedures.

3

Increase anti-microbial surfaces

With better cleaning and disinfection procedures.

4

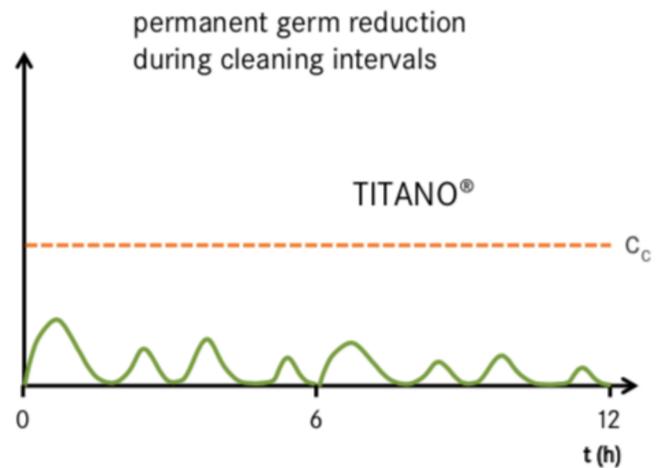
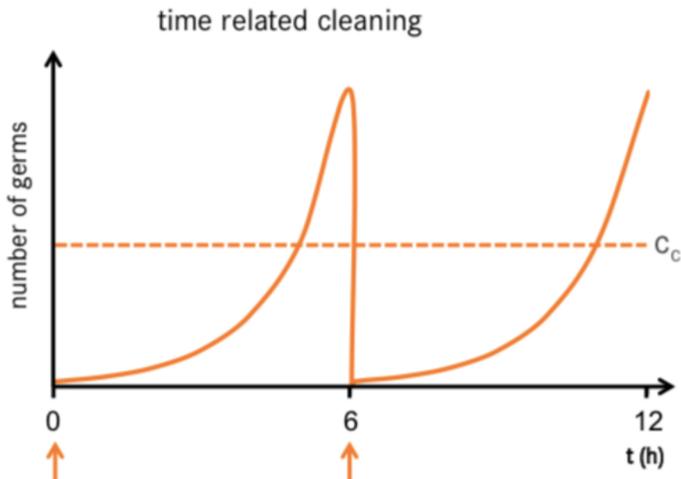
Improve immune system

We believe that many little steps can lead to a general improvement of the hygienic conditions in your workplace

ISO 22196 (JIS, T = 35°C; humidity: 95%)

Germ	Time h	Efficacy R _L	Reduction (%)
<i>Escherichia coli</i>	24	4,2	> 99,999
<i>Staphylococcus aureus</i>	24	4,1	> 99,999
<i>Listeria monocytogenes</i>	24	3,9	> 99,999
<i>Bacteriophage MS2 (Noro virus)</i>	24	5,7	99,999

DEMONSTRATED BACTERIAL MANAGEMENT ON SURFACES WITHOUT TiTANO®



PROPOSED SOLUTION TO PERMANENTLY REDUCE GERM COUNT WITH TiTANO®

- Cleaning is not necessarily effective with the permanent accumulation of new germs.
- Germs have a high chance of spreading from surface to humans.
- Critical concentrations (c) might increase infection risk.
- Bacterial growth on surfaces in global airline networks are ideal for the outbreak of pandemics.
- TiTANO® supports the hygiene and cleaning processes to reduce infection risks on all surfaces.

Reviewing the world air transport network



Can you assess your bacterial risks?

2003: spread of SARS-CoV virus from Guangdong China around the globe.

2009: Influenza A found in North America.

2012: MERS-CoV with the largest outbreaks seen in Saudi Arabia, United Arab Emirates and the Republic of Korea.

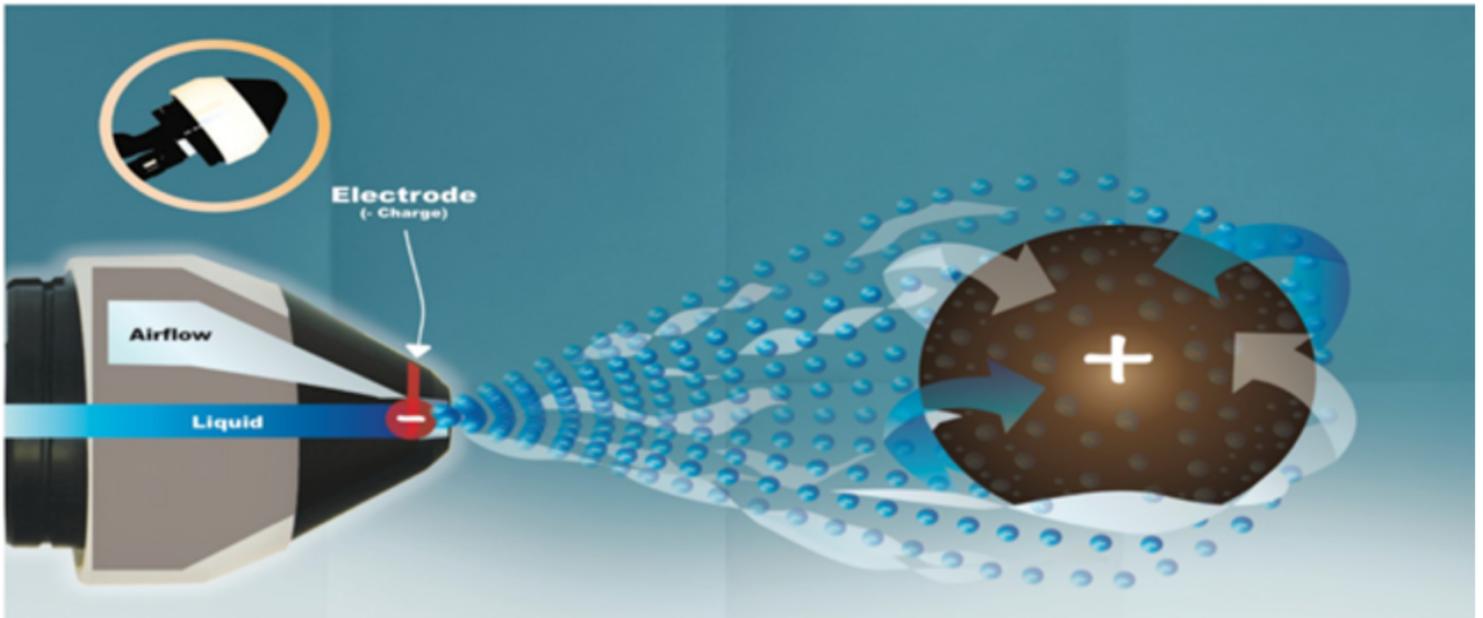
2013: Ebola infecting health-care workers while treating patients and through close contact with carriers.

2016/17: H7N9 infections found with recent exposures to live poultry or potentially contaminated environments.

Classification	Species	Location	Survival (days)
Bacteria	E.coli	armrests	4
		tray table	3
		steel toilet handle	2
	MRSA	tray table, armrest, toilet flush handle, window shade, seat cover & pocket	2-8
Fungi	Aspergillus	tray table, armrest, textile & leather seats	>7
Virus	Influenza A	close to seat pocket	2-3

ACUTELY DISINFECT ALL SPACES WITH TiTANO®

No smell, no aerosols and easy to apply using electrostatic application with acute anti-microbial efficacy.



Step 1	Step 2	Step 3
Liquid and air flow are unified in the spray nozzle with a negative charge.	Charged transfer guarantees application consistency of size and distribution of micro droplets in the air flow.	Charged droplets will be attracted to bind itself to the applied surface

Locations that host a very high density of humans bear a high risk for the spread of infectious diseases.

Germ: Staphylococcus aureus (conc. ca. 1×10^8 cfu/ml)

Setup: surface contaminated with dried bacteria suspension (50 μ l)

Sampling: 30 s, 5 min, 30 min after surface spraying with TiTANO®

