



ZOONO ANTIMICROBIAL PROTECTION: CHILD EDUCATION CASE STUDY

Introduction

Zoono is an innovative technology that aims to improve health and well-being by providing pioneering, durable germ protection. Zoono Group Ltd is a Global Biotechnology company that develops and manufactures a suite of long-lasting, scientifically validated antibacterial solutions. As a company, Zoono not only believes in its technology being able to provide enhanced antibacterial protection within industry, healthcare, transport, and household settings, but regularly carries out in-field trials to prove it. It is important to note the limitations of traditional disinfection products using harsh chemical ingredients such as bleach or alcohol. These products tend to only be effective whilst wet and recontamination of surfaces and skin can occur once the product has dried. Misconception about how long alcohol-based hand sanitisers remain effective for has come to light in various studies published online, with some members of the public not realising these products are only effective for around two minutes. It is important to continue with routine cleaning procedures after the application of Zoono to prevent dirt build up blocking the Zoono antibacterial layer from being able to work effectively.

Testing was carried out across 10 Child Education Facilities in Australia (Melbourne, Victoria) to assess the performance of Zoono Z-71 Microbe Shield Surface Sanitiser when utilised in conjunction with the normal cleaning routine. It is widely accepted that germs spread quickly in areas where there are high volumes of people, through close contact and via environmental surface contamination. Research has also found that children are among those most at risk for both catching and spreading infections due to the nature of their interactions (Danon *et al.*, 2013). The high levels of footfall in busy buildings makes the opportunity for germs to spread incredibly easy. The trial was designed to assess the benefit of applying Zoono by taking ATP measurements pre-application and again at several time points post-application, as a method of assessing product efficacy and its ability to reduce levels of surface contamination over time.

The Zoono Technology

Zoono provides non-leaching, colourless and alcohol-free surface sanitiser that will modify the way the surface interacts with microbes. Zoono Z71 Microbe Shield is scientifically proven to be a longer-lasting water-based protectant that has a similar toxicity level to Vitamin C. Zoono provides an invisible protective barrier that covalently bonds to a range of surfaces to provide long-lasting protection against numerous pathogens. A positively charged layer of microscopic pins attract and lyse negatively charged pathogens. This invisible layer of pins causes the cell wall to rupture resulting in the pathogen breaking up with lethal effect.

It is well documented that pathogens can last for long periods of time on hands and surfaces (Hirose *et al.*, 2020; Rawlinson, Ciric and Cloutman-Green, 2020). It is also evident that traditional disinfection has limited disruptive effect, as they are only active during their wet phase, allowing recontamination to occur once the surface has dried. Surfaces that look and smell clean can quickly become a source of numerous germs, enabling the spread and transmission of disease. A recent study found that a particular strain of COVID-19 present on a hospital bed was able to spread



to 18 other surfaces within 10 hours (Rawlinson, Ciric and Cloutman-Green, 2020). This is where Zoono products come into play. Zoono bridges the gap between routine cleaning processes, modifying the surface to be disruptive to bacteria and other pathogens. As is widely understood, regular disinfection products, whilst can be effective at the point of application, do not provide any longevity and recontamination of surfaces can begin as soon as the disinfection product has dried. Therefore, the risk of transmission from surfaces to hands and vice versa can be for many hours before the surface is re-cleaned with standard disinfectants (depending on how regularly surfaces are cleaned within the normal cleaning schedule). Zoono Z-71 Microbe Shield Surface Sanitiser is designed to act as a foundation beneath regular cleaning to enhance the effectiveness of the cleaning program. Standard infection prevention and control practices without the additional benefit of antimicrobial/antibacterial coatings (AMC's) leaves reinfection opportunity between the routine cleaning processes.

Benefits of Zoono Z71 Microbe Shield include:

- Longer-lasting, effective for up to 30 days
- Ready to Use formulation
- Water based (does not contain alcohol)
- Does not promote microbial mutation (superbugs)
- Shelf-stable for 3 years
- Non-damaging to surfaces
- Not flammable
- Non-staining
- Odourless

Zoono has quantitative data supporting its efficacy from many internationally recognised laboratories. Zoono also enjoys registrations and approvals in numerous major countries, including Europe, America and Australasia.

Surface Testing

Test Set Up

The purpose of this trial was to assess the performance of Zoono Z-71 Microbe Shield Surface Sanitiser within an Education Facility. As germs spread quickly amongst children, and even more so when there are numerous children mixing within the same area daily. A trial was conducted at a set of 10 Centres at 10 set high touch point areas within each facility between 30th September 2019 – 1st November 2019.

Each individual Centre trial was conducted in conjunction with a representative from the Centres group to oversee that the testing was conducted fairly. During the test period, there were no alterations to the routine cleaning and housekeeping protocols. This was specifically designed so the addition of Zoono to the cleaning routine was the only factor being changed/assessed. This means the difference between the Post-Zoono application results and the baseline results (the results obtained prior to the application of Zoono) can be attributed solely to the addition of Zoono Z-71 Microbe Shield and the enhanced, long lasting protection against germs it provides.

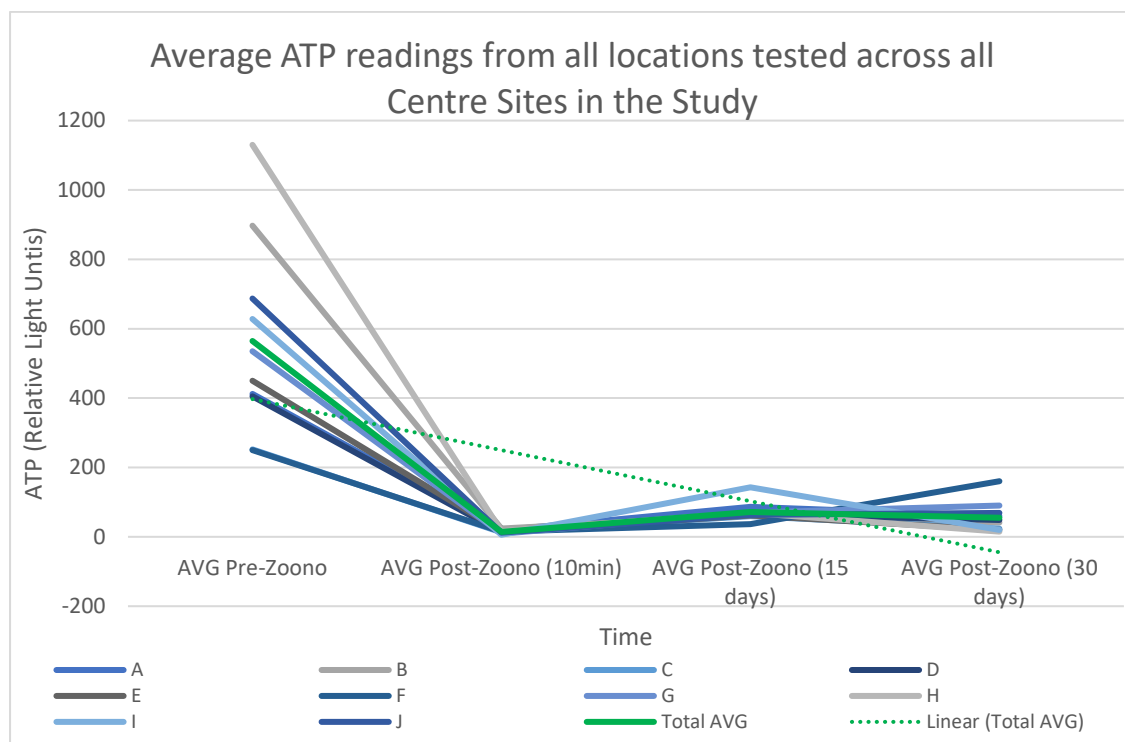
ATP Readings were taken prior to the application of Zoono, and this was used as a baseline reading that was taken to be representative of the normal levels of surface contamination when utilising normal cleaning protocols. ATP testing was used to decipher the surface contamination levels. ATP is



a commonly accepted method of testing surface contamination in many industries including Food Production & Healthcare. ATP detects the presence of Adenosine Triphosphate which is a molecule present in all living organisms and uses the measure of 'Relative Light Units'. Zoono Z-71 Microbe Shield was then applied topically. A secondary reading was then taken to assess surface contamination levels immediately post-application of Zoono. Further readings were taken at 15-days and 30-days post-application of Zoono. Accurate records and photographic evidence of locations were recorded in order to ensure the same areas were tested at each reading.

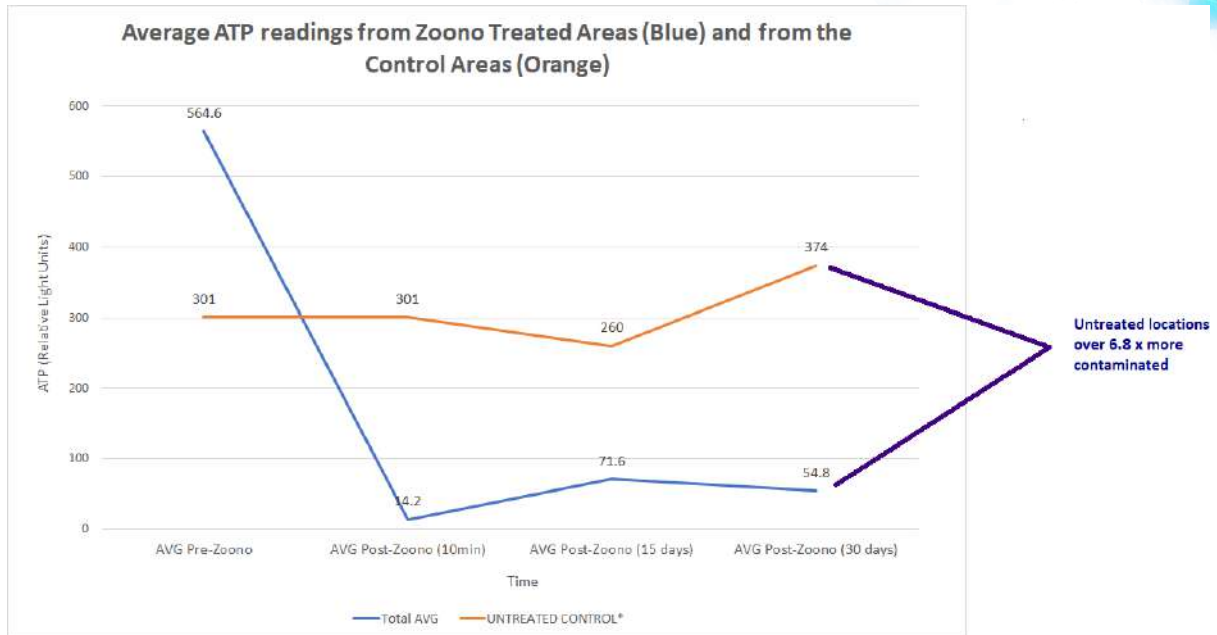
The Data

Graph 4 – Average ATP readings taken from the 10 high touch point areas at each Centre. The locations on the below graph are listed as A-J.





Graph 5 – Average ATP readings taken from the Zoono treated area compared with the control areas



*Please note, the untreated control line is an average of all Centres, to increase the number of included data points and therefore increase the reliability of the data set.

Data Discussion

Graph 4 shows the average reduction in ATP across all 10 high touch point areas tested in the 10 Centres used within the trial (each line A-J represents one Centre, with each data set being an average of all samples taken at that location). A substantial initial decline can be seen, which then remains low over the duration of the testing. At the end of the trial period, all ATP results shown are <100 except one. This result was caused by a single high result in one of the 10 locations tested at that Centre. ATP results being <100 is recognised as clean within the healthcare and food industries.

At 30-days post application, Graph 5 shows the average reduction in surface contamination of 90.3% across all Centres when compared with the baseline results (taken prior to the application of Zoono). Immediately post application of Zoono (Post-Zoono – taken 10 mins after the application of Zoono had thoroughly dried) a reduction of 97.5% can be seen. The average ATP readings at 30-days post-Zoono application can be seen on the Graph as <55. As under 100 is considered clean and <30 considered as better than food safe, this shows the excellent low-level of bio-load achieved across all surfaces. At 30-days post application, the average of ATP readings from the Control areas was 374 RLU and the average of ATP readings from the Zoono treated areas was 54.8 RLU. This shows that at 30-days post application of Zoono, the Control Area was greater than 6.8 times more contaminated than the Zoono treated area.



Observations

- Average reduction in ATP across all locations and all sites at 30 days post application of Zoono is 90.3%
- Immediate average ATP reduction across all sites after the application of Zoono was 97.5%
- All ATP readings were <55 RLU at the 30-day point, measuring as clean based on the food and healthcare industry standards
- Zoono treated surfaces greater than 6.8 x less contaminated than reference control areas

Conclusions

Revolutionising the way surfaces are protected with Zoono's antibacterial technology can help prevent the spread of potentially harmful germs within public spaces, homes and workplaces. Given health, disinfection and personal protection has been catapulted to the forefront of the media over the last year, there is no better time to invest in advancing both personal safety, and the safety of staff, students/childcare attendees and visitors. Given the benefits associated with using Zoono within education facilities, adopting Z-71 into the cleaning routine would benefit overall levels of health and wellbeing, significantly reduce levels of surface contamination, increase safety of staff and students and reduces levels of transmission between personnel on site.

It would be of benefit to employ the use of Zoono Hand Sanitiser within the facilities for staff and students to use at the beginning of each day, also making the product readily available for visitors to use upon entry. This would further help reduce the spread of germs via high touch point areas and skin-to-skin contact. Zoono Hand Sanitiser should be used in conjunction with good hand hygiene to remove large particles that can block the Zoono antibacterial layer from being able to work.



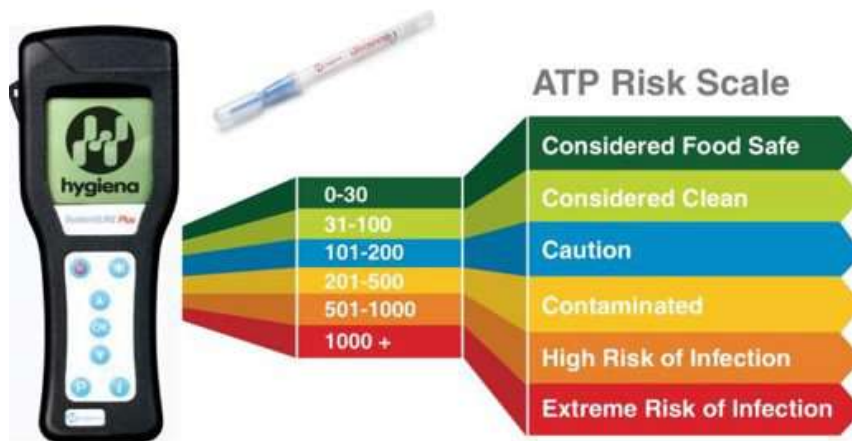
Appendix 1

Raw Data: Surface Testing

Location	AVG Pre-Zoono	AVG Post-Zoono (10min)	AVG Post-Zoono (15 days)	AVG Post-Zoono (30 days)
A	412	19	86	60
B	897	24	62	41
C	252	13	60	24
D	405	13	64	49
E	450	15	62	20
F	250	15	37	160
G	535	9	70	90
H	1130	16	69	15
I	628	6	143	20
J	687	12	63	69
Total AVG	564.6	14.2	71.6	54.8
UNTREATED CONTROL*	301	301	260	374

*Please note, the untreated control line is an average of all Centres, to increase the number of included data points and therefore increase the reliability of the data set.

ATP Risk Scale



ATP testing was used to decipher the surface contamination levels. ATP is a commonly accepted method of testing surface contamination in many industries including Food Production & Healthcare. ATP detects the presence of Adenosine Triphosphate which is a molecule present in all living organisms in the measure of 'Relative Light Units'. The main drawbacks are the lack of specificity of the ATP reading (as it does not decipher between types of germs and cannot differentiate ATP from microorganisms, animals or plants). However, it is used widely and accepted as an estimation of surface contamination and is the only point-of-testing result that can be easily achieved & compared between industries at this time.



References

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Hirose, R., Ikegaya, H., Naito, Y., Watanabe, N., Yoshida, T., Bandou, R., Daidoji, T., Itoh, Y. and Nakaya, T. (2020) Survival of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and Influenza Virus on Human Skin: Importance of Hand Hygiene in Coronavirus Disease 2019 (COVID-19). *Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America*, <https://doi.org/10.1093/cid/ciaa1517>.

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