



YANEX-5 MICROBIOLOGICAL ASSESSMENT REPORT

Customer: Hytech Ireland
The Marina,
Co. Dublin

Report No: 03-26-02-20
Analysis Date: 18-02-20
Report Date: 28-02-20
Site: Irish Defence Air Corps
Casement Aerodrome,
Dublin

Summary:

Hytech Ireland requested Foodtech Laboratories Ltd. to carry out an independent assessment of the Yanex-5 pulsed UV disinfection process within a helicopter, Eurocopter EC135

Objective:

To assess the effectiveness of the Yanex-5 pulsed UV disinfection process against residual organisms within the helicopter.

Equipment:

Yanex-5 Pulsed xenon UV bactericidal Unit

Merck MAS 100 Microbial Air Sampler

Materials:

(TSA) Tryptic Soy Agar 55mm Contact and Agar Plates ~ Tryptic Soy Agar contains digests of soybean meal and casein, making it suitable for the growth of a wide variety of fastidious and non-fastidious microorganisms.

(BP) Baird Parker 55mm Contact Plates ~ Baird-Parker Agar is a moderately selective and differential medium for the isolation and enumeration of *Staphylococcus aureus* in foods, environmental, and clinical specimens.

(VRBGA) Violet Red Bile Glucose Agar 55mm Contact Plates ~ Violet Red Bile Glucose Agar (VRBGA) is a solid medium for selective and differential isolation of Enterobacteriaceae in foods and environmental samples. The Enterobacteriaceae group includes lactose-fermenting coliform bacteria, lactose-nonfermenting strains of *E. coli*, and lactose-nonfermenting species, such as *Salmonella* and *Shigella*.

(SDA) Sabouraud Dextrose Agar Plates ~ Sabouraud Dextrose Agar is a selective medium used for the growth of yeasts, moulds and aciduric bacteria in food and environmental samples.

Analytical Laboratory:

ALS Life Sciences Ireland, 17025 Accredited, INAB Registration 166T

Method:

5 TSA, BP and VRBGA Agar Contact Plates were sampled from 5 various locations, all of , all of which were situated within direct exposure to the pulsed UV radiation from the Yanex-5 unit. The surfaces tested were Seat, Bench, Handle, Floor and Cargo Bay Barrier.

Air samples (100 Litres) were obtained by aspiration method using a MerckMAS-100 Air Sampler from two locations, Cargo Bay and in the middle of the passenger chamber. The air samples were impacted onto TSA and SDA Agar Plates.

The Yanex-5 unit was suspended from the ceiling within the passenger chamber and run for 24 minutes operating under a general bacterial disinfection setting. Surfaces were exposed to High-intensity (25,000 W/cm²) pulsed continuous ultraviolet irradiation (190-300 nm) generated by the xenon flash lamp.

After the UV irradiation process was carried out repeat air samples were taken from the same locations, contact plates were taken from beside the original sampling sites.

All samples taken were labelled, placed into sealed containers and transported to the laboratory for analysis and reporting.

Results

TSA Surface Contact Plate ~ Total Viable Count CFU per Plate			
Site	Before Treatment	After Treatment	% Change
Cargo Bay Barrier	34	22	-35.3
Handle	1	<1	-
Floor	29	34	+17.2
Seat	1	<1	-
Bench	27	3	-88.9

VRBGA Surface Contact Plate ~ Enterobacteriaceae CFU per Plate			
Site	Before Treatment	After Treatment	% Change
Cargo Bay Barrier	<1	<1	-
Handle	<1	<1	-
Floor	<1	<1	-
Seat	<1	<1	-
Bench	<1	<1	-

BP Surface Contact Plate ~ Staphylococcus aureus CFU per Plate			
Site	Before Treatment	After Treatment	% Change
Cargo Bay Barrier	<1	<1	-
Handle	<1	<1	-
Floor	<1	<1	-
Seat	<1	<1	-
Bench	<1	<1	-

TSA Air Sample ~ Total Viable Count CFU per Plate			
Site	Before Treatment	After Treatment	% Change
Mid Helicopter	6	4	-33.3
Cargo Area	71	16	-77.46

SDA Air Sample ~ Mould CFU per Plate			
Site	Before Treatment	After Treatment	% Change
Mid Helicopter	10	8	-20.0
Cargo Area	4	7	+75.0

Average Summary Results			
	Total Colonies Before Treatment	Total Colonies After Treatment	% Change
Contact Surfaces	96	63	-34.4
Air Sample	91	35	-61.5

Comments and Observations

The contact plates which were applied to surfaces had to be placed onto surfaces beside the original sampling site, this introduces error which must be taken into consideration when assessing the results.

There were no detections of Enterobacteriaceae or Staph aureus. The Total Viable Counts detected on the surfaces prior to UV treatment were generally low, indicating that the surfaces had been cleaned and sanitized at some stage.

The floor Total Viable Count showed an increase of 17.2%, the failure to disinfect the surface may have been due to the vertical surface position from the Yanex-5 Unit as discussed on the day of sampling. After treatment there was an average Total Viable Count reduction of 34.4% c.f.u per plate and a significant reduction of 88.9% for the bench (Counts of less than three were excluded from calculation, considered insignificant).

The air samples were taken from two different locations, the middle of the helicopter and the rear cargo bay. The U.V treatment did not show any significant impact on mould within the air samples. There were elevated Total Viable Counts detected in the air sample for the Cargo Bay, 71 c.f.u per plate prior to treatment, after treatment there were 16 c.f.u per plate showing a significant reduction of 88.9%.

The performance of the Yanex-5 unit correlates with previous efficacy studies carried out, "Evaluation of the disinfection procedures efficacy of pulsed UV units usage in healthcare facilities providing outpatient treatment" carried out in the Central Research Institute of Epidemiology of Rospotrebnadzor.

Managing Director,



Eric Goodwin