



AIR PURIFIER TESTING

Microbiological Analysis in Air

Oct – Dec, 2019

Dept. Biotechnology, Fac. Science, Mahidol University

LUNA

Featuring: **NASA DEVELOPED TECHNOLOGY**



Owner's Manual

Photocatalytic Oxidation Air Purification System.

For Use with model:
LUNA LNT26000



Made in the U.S.A.

AIR FOR LIFE UK LTD

Technology

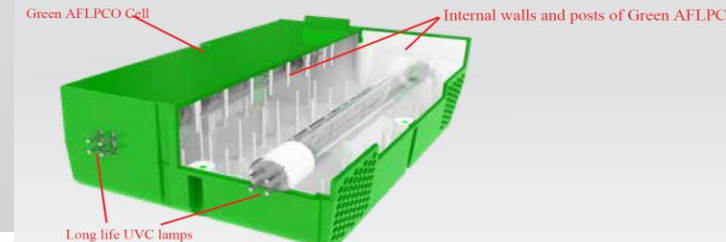
Green AFLPCO

At the core of the Green AFLPCO Cell, a germicidal UVC lamp deactivates the DNA of bacteria, viruses and other pathogens, thus destroying their ability to multiply and cause disease. Photons created by the UVC lamp react with our proprietary nano AFLPCO catalyst to create a blanket of redundant oxidizers that not only clean your air of bacteria, mold, viruses, VOCs, ethylene and odors, but also sanitize surfaces.

The LUNA utilizes our proprietary catalyst superior to any catalyst currently on the market. It contains nine rare catalyst metals and nano size particles to increase the kinetic rate of reaction creating millions of redundant oxidizers.



By utilizing a broad spectrum 254nm UV light we achieve the same oxidizing and ionizing benefits found in nature, created by the sun. Combining the UV light with our nano catalyst we achieve unparalleled results.



AFL Plasma

They use cold plasma technology that splits water vapor into positive and negative ions that are discharged into the air. These ions attach themselves to allergens such as smoke, dust, pollen, dander, and much more. The particles continue to bond to each other until they are heavy enough to drop out of the air and collect in filters. The positive and negative ions attack odors and other contaminants and convert them into oxygen, water vapor, and carbon dioxide, neutralizing odors and greatly improving your Indoor Air Quality (IAQ).

The AFL Plasma ionizers prevent allergens from reproducing by removing hydrogen and disrupting the DNA of the pathogen. As an added benefit, static electricity is quickly reduced!

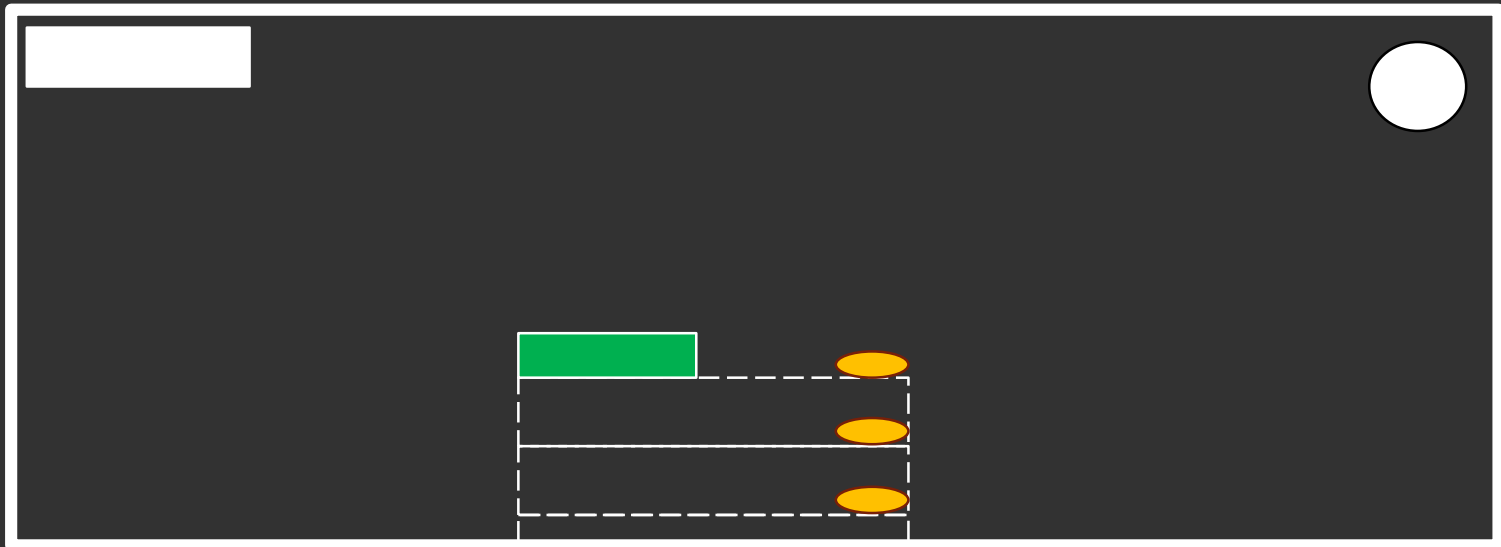


6 LAB AND 2 OFFICE SPACES

NO	Lab	Description	Duration
1	K610	Molecular genetics, BSL-2	Oct 15 – Oct 28
2	K609	Bacterial and Cell Culture Incubation	Oct 15 – Oct 28
3	BT103	Tissue culture	Oct 28 – Nov 18
4	BT209	Plant biotechnology	Oct 28 – Nov 18
5	BT116	Animal cell culture	Nov 18 – Nov 25
6	BT113A	Molecular cell biotechnology	Nov 18 – Nov 25
7	BT212	Department office	Nov 25 – Dec 2
8	K625	Common room	Nov 25 – Dec 2

TESTING DESIGN

- Plate sedimentation Assay + Aerobic plate count (AOAC/BAM)
- Using plate count agar (standard medium for detecting bacteria, yeasts, and molds)
- 1-meter distance from generator and 3 height-level positions: 0, 50, 100 cm below generator level



- Incubate promptly for 48 ± 2 h at 35°C

TESTING DESIGN

- Three replication were done and analyzed with scientific statistics.
- In addition, swab the surface and streak on PDA for identifying suspected fungi
- If low amount of air-borne microbes (>10 CFU/plate), active air monitoring will be applied



TESTING HYPOTHESIS

Air check

- Detection of air microbes before and after using this air purifier system. Tested time is 0, 8 and 24 hour working.

Air monitoring

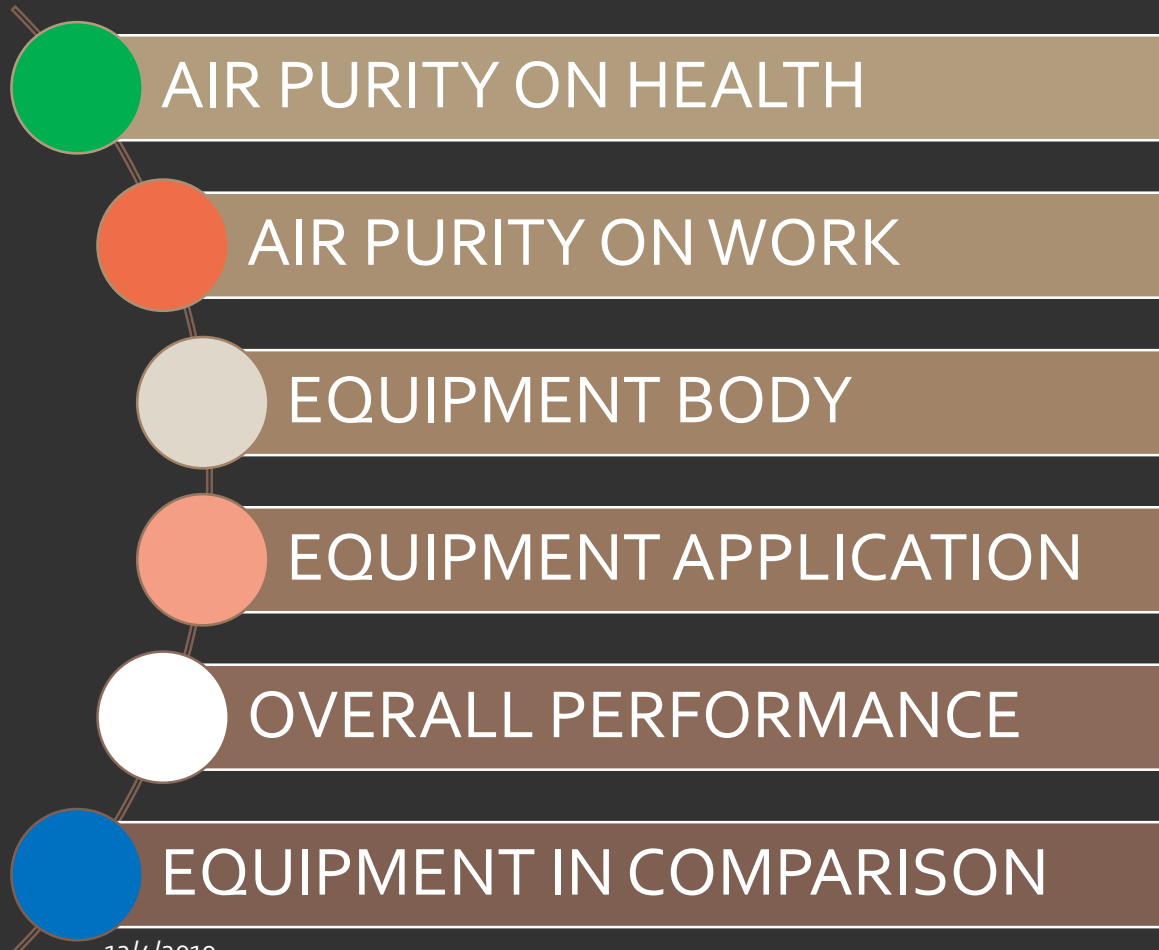
- After turn on the air purifier system, how long does it take for cleaning and how long it contain in the acceptable clean?

Air sterility

- Is this air purifier system can replace the fumigation? And how long does it take for one complete sterility?

- Report: 5 days after testing period of each lab for microbiological analysis and 10 days for user reviewing.

USER REVIEWING: SATIFICATION



After Apply Analysis

3 users/lab = 18

5-point scoring
system

1-decimal marking

RESULTS

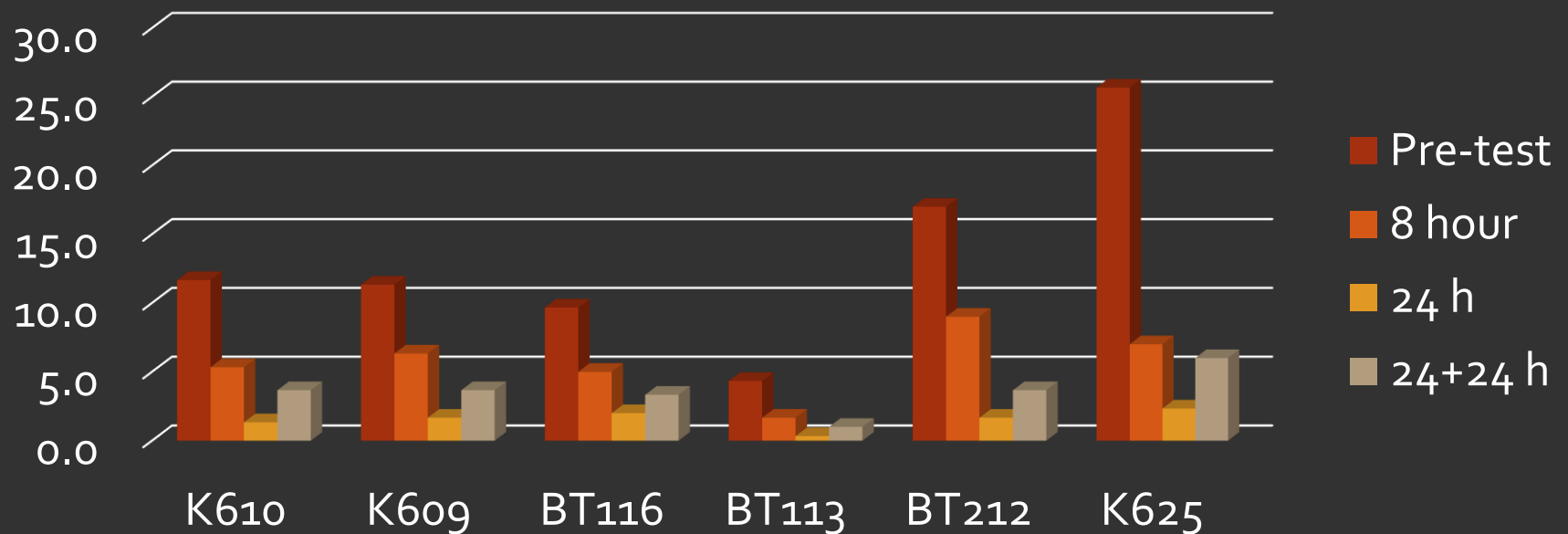
Microbiological Analysis and User Reviewing

Oct – Dec, 2019

MICROBIOLOGICAL ANALYSIS

- All room are in the air-conditioned control during lab/office hours. Some lab were active during all tested time.
- Two tests, sedimentation plate and active-air microbiological testing, were applied.
- Aerobic plate count (AOAC/BAM) standard and incubate promptly for 48 ± 2 h at 35°C

SEDIMENTATION PLATE

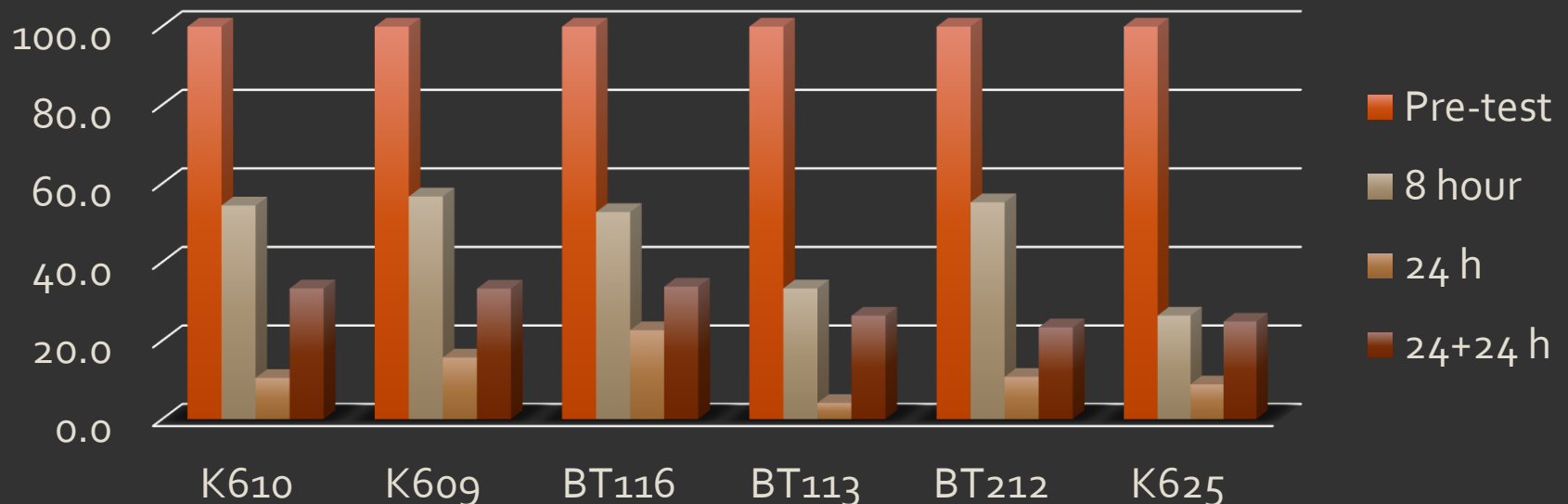


	Pre-test	8 hour	24 h	24+24 h
AV	13.3	5.7	1.6	3.6
SD	3.1	2.1	1.2	1.8

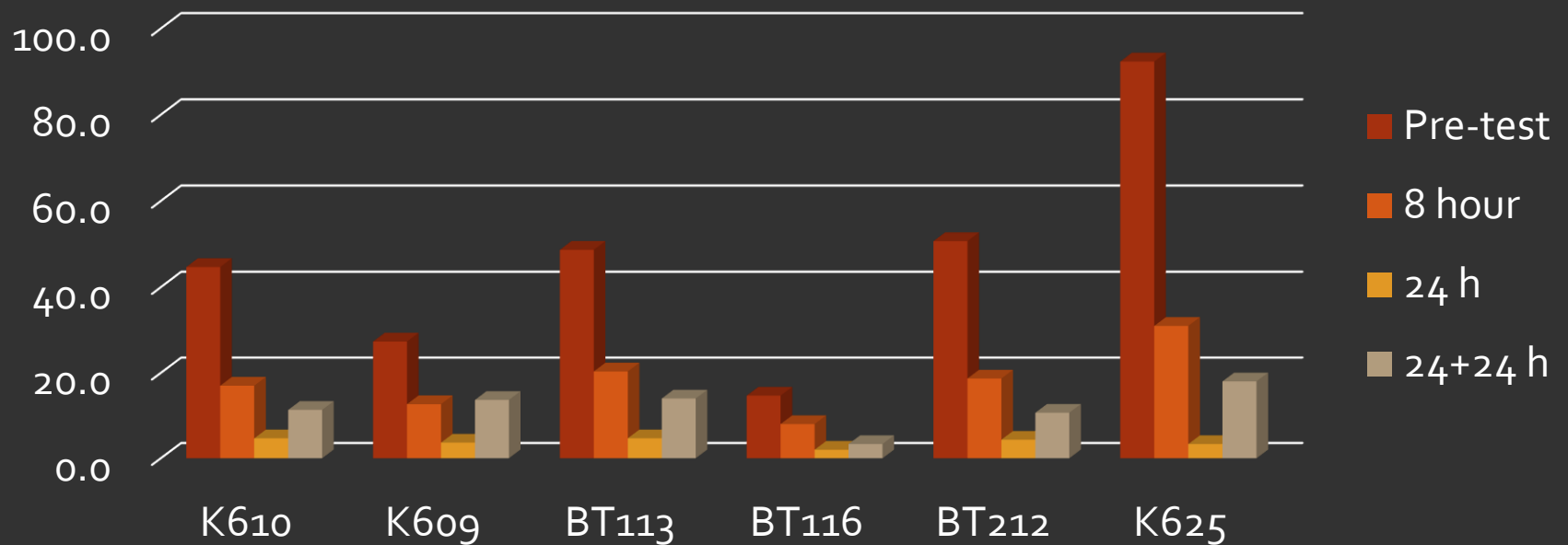
SEDIMENTATION PLATE

6 LAB AND 2 OFFICE SPACES

	Pre-test	8 hour	24 h	24+24 h
AVERAGE	100.0	46.5	12.1	29.2
SD	0.0	22.5	10.4	19.2



ACTIVE-AIR MICROBE TESTING

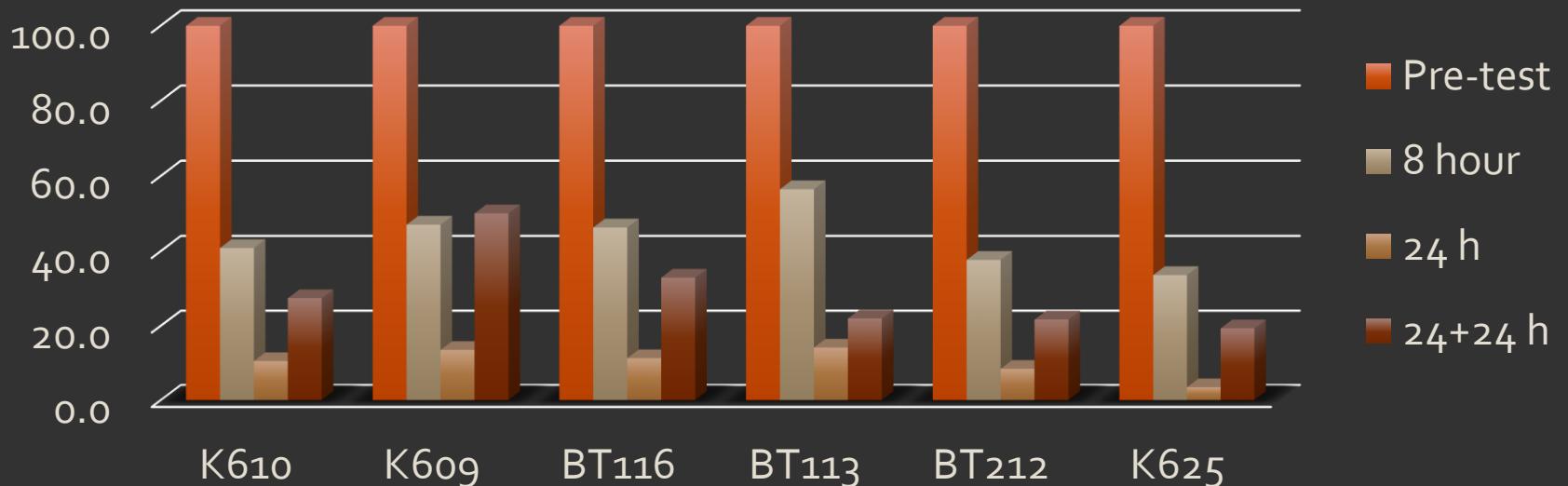


	Pre-test	8 hour	24 h	24+24 h
AV	46.4	17.9	3.8	11.8
SD	9.2	3.9	2.1	4.1

ACTIVE-AIR MICROBE TESTING

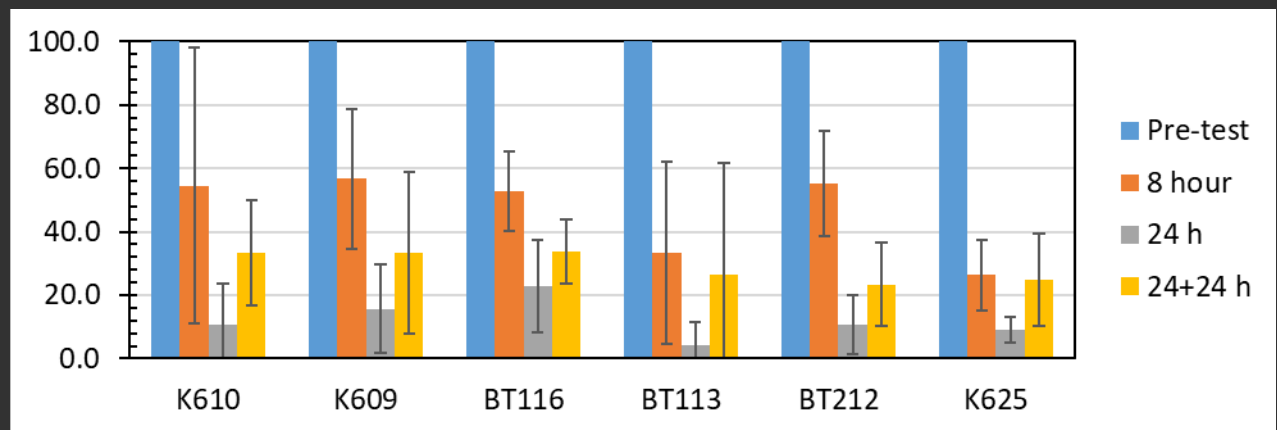
6 LAB AND 2 OFFICE SPACES

	Pre-test	8 hour	24 h	24+24 h
AVERAGE	100.0	43.7	10.3	28.9
SD	0.0	14.4	5.5	12.2

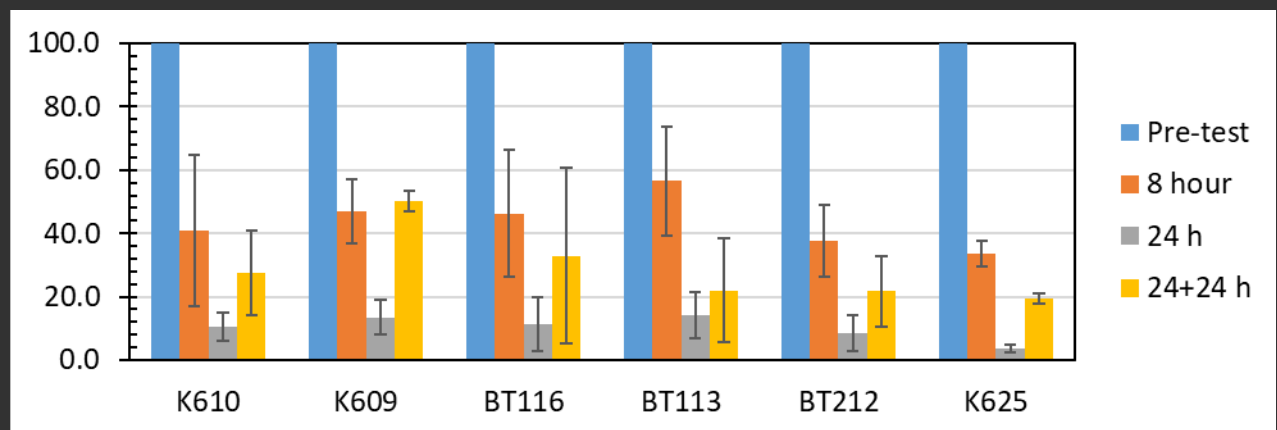


MICROBIOLOGICAL ANALYSIS

Plate
Sedimentation
technique



Active-air
microbiological
testing



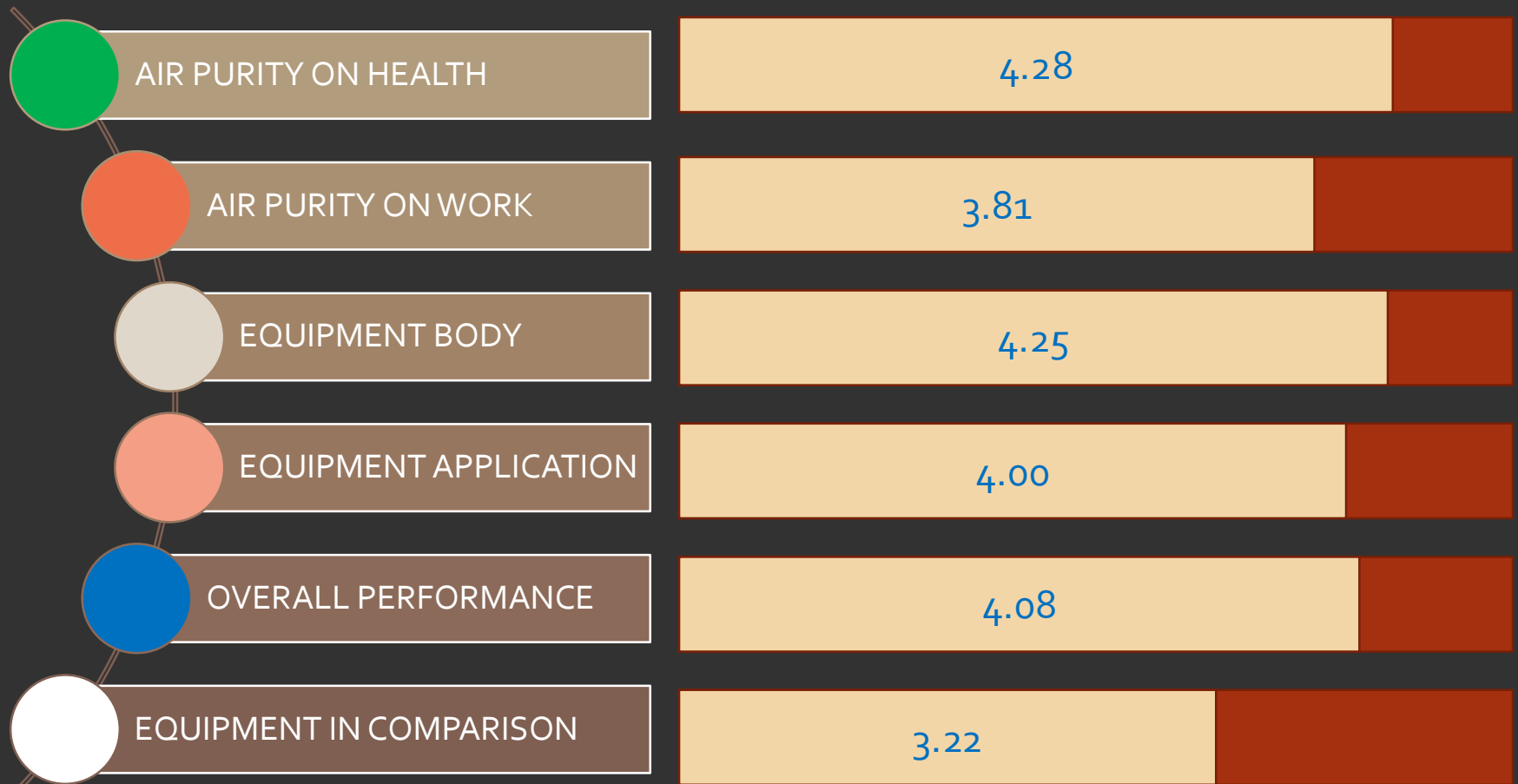
MICROBIOLOGICAL ANALYSIS

- Most tested lab and offices are likely clean before testing due to an observation of less microbes in pretest samples.
- Applying air purifier for 8 hours can decrease the microbial amount in the air greater than 50%.
- Applying air purifier for 24 hours can decrease the microbial amount in the air greater than 80%.
- After turning off the air purifier for 24 hours, the microbes were increased into the air system (given 3 folds of 24-hour and 30% of pretest) from the air condition.

PERFORMANCE AND RECORD

- No alarm of the air purifier during product testing period.
- No electricity shortage of the air purifier during product testing period.
- No contamination was found in the lab during product testing period.
- No serious health problem of the users (particularly infectious diseases) during product testing period.

USER REVIEWING: SCORE



USER REVIEWING: COMMENTS

- SMELL – really strong UV odor (13 counts)
 - NO significant difference during applications (11 counts)
 - A bit hard to work (4 counts)
 - Easy to use (3 counts)
-
- Feel less effective for cleaning
 - Bad smell in the morning and with clothes
 - Feeling of clean room
 - Smell likes an oven in industry/hospital

SUMMARY AND SUGGESTIONS

- Decrease air-borne microbes by >50% under 8 hours and about >80% under 24 hours.
- Recommended to turn on during working hours every day.
- No significant effect on the BSL-2 working.
- No significant effect on the molecular working.
- No significant effect on the animal cell working.
- Strong UV smell may disturb the user feeling; however, no evidence on health problem was found during 5 day applications.
- Not suitable for applying instead of sterilization in the clean room like in the lab due to an incompatibility range of purification.

THANK YOU

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