Virus Testing Results

Antibacterial Reduction Efficiency

Final Results- 03.04.2020

1. Scope

This report summarizes the final results of the Ray Filter media antibacterial efficiency tests performed by Aura during March 2020.

2. Methods

The tests were performed in a GIB lab by the leading of Glukhman Vladimir, PhD. We used the settling plates method for these tests with plates containing TSA medium (Trypticase soy agar) for both bacteria, yeast and mold growth. Each plate was settled for 3, 5, 24, 48 hours after the treatment. The incubation was done in a calibrated incubator. A final count of the plates was performed in the end of the incubation. The different treatments tested were the following:

- ✓ Control Carbon filter
- ✓ Carbon filter with copper (13.5 GSM)
- ✓ Control Copper coat (13.5 GSM)
- ✓ Control Hepa (E10) - matrix
- ✓ Hepa (E10) – matrix with Copper (13.5 GSM)

3. Results

The results of each plate were calculated by the following formula:

$$redution\ efficiency\ (\%) = 1 - \left(\frac{CFU\ of\ the\ tested\ plate}{CFU\ of\ the\ control\ (average\ of\ 3\ plates)}\right) * 100$$

*CFU- colony forming units

E. Coli

Escherichia coli (abbreviated as *E. coli*) are bacteria found in the environment, foods, and intestines of people and animals. *E. coli* are a large and diverse group of bacteria. Although most strains of *E. coli* are harmless, others can make you sick.

The CFU of E. Coli is presented in Fig 1.

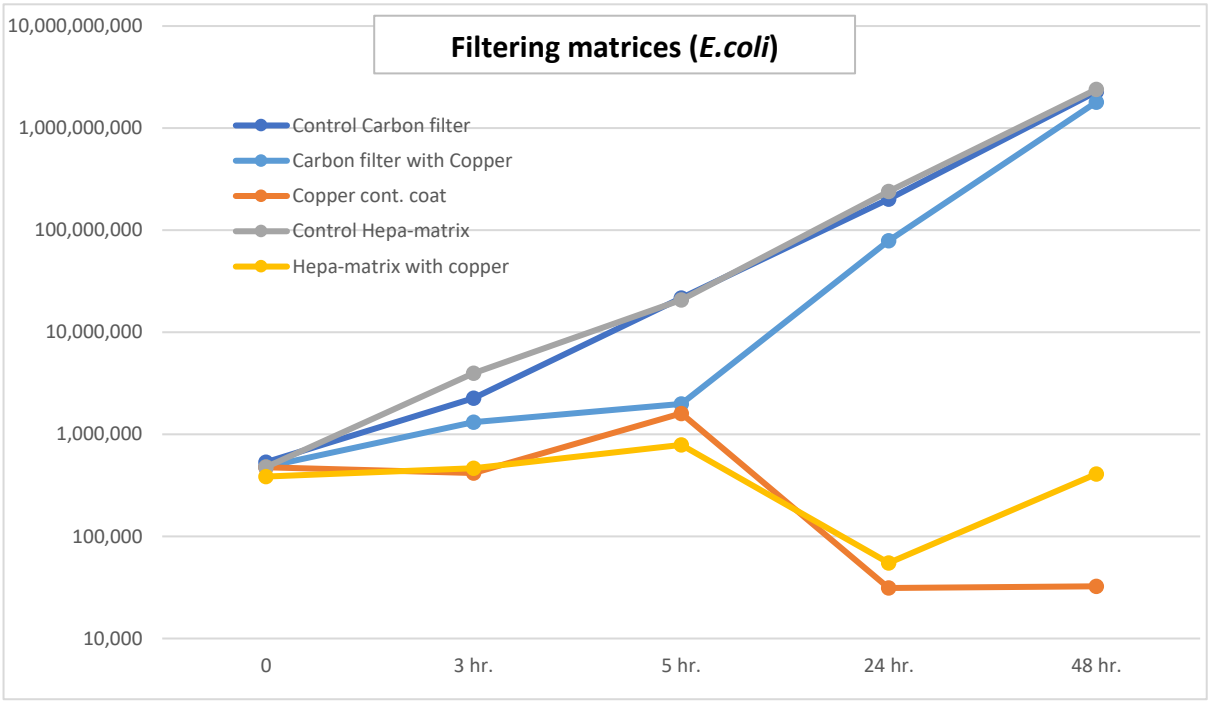

Figure 1

As shown in Figure 1, the most efficient treatments based on these results are the HEPA + Copper treatment resulting in a **99.98% effectivity**, compared to Copper only (99.99%). The Carbon + Copper alone had an efficiency of about 20.9% after 48 hours.

Staphylococcus Epidermidis

Staph Epidermidis is part of the normal human flora, typically the skin flora, and less commonly the mucosal flora. It is a facultative anaerobic bacteria. Although S. epidermidis is not usually pathogenic, patients with compromised immune systems are at risk of developing infection.

The CFU of Staphylococcus Epidermidis is presented in Fig 2.

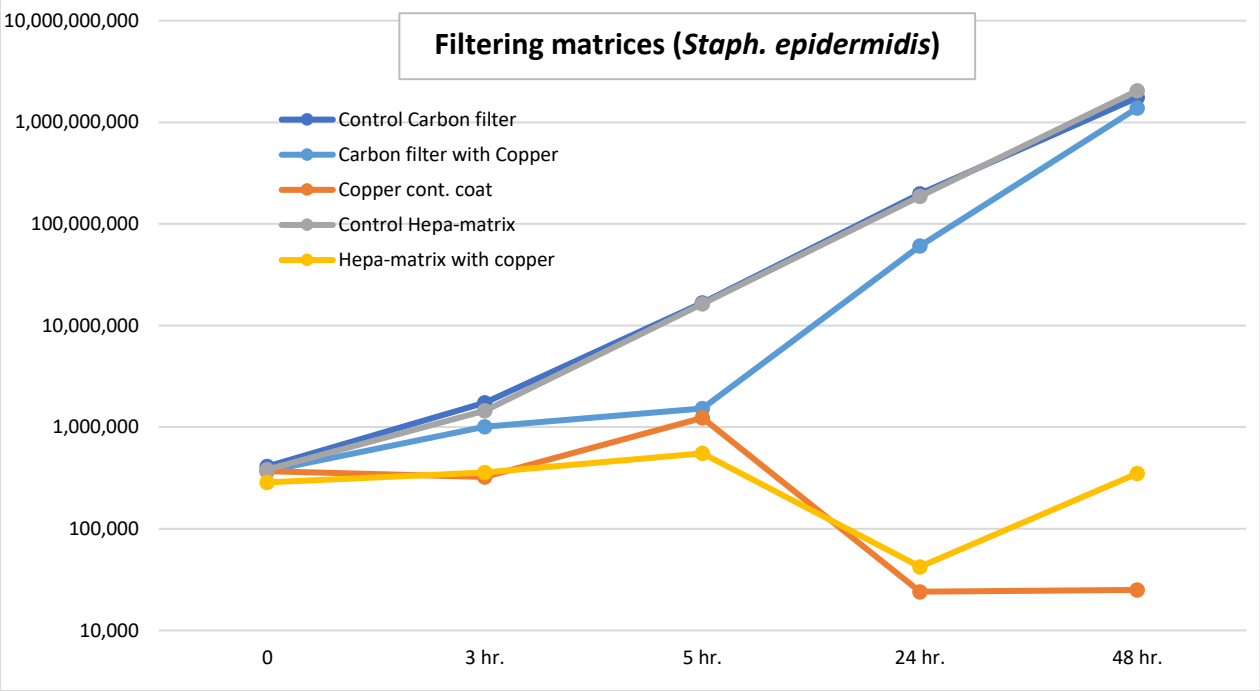

Figure 2

As shown in Figure 2, the most efficient treatments based on these results are the HEPA + Copper treatment resulting in a **99.98% effectivity**, compared to Copper only (99.99%). The Carbon + Copper had an efficiency of about 20.9% after 48 hours.

Candida Albicans

Candida Albicans is part of our natural microflora — or the microorganisms that commonly live in or on our bodies. It can be found in the GI tract, the mouth, and the vagina. Most of the time it causes no issues, but it's possible for overgrowths and infections to happen. Candida albicans is the most prevalent cause of fungal infections in people.

The CFU of Candida Albicans is presented in Fig 3.

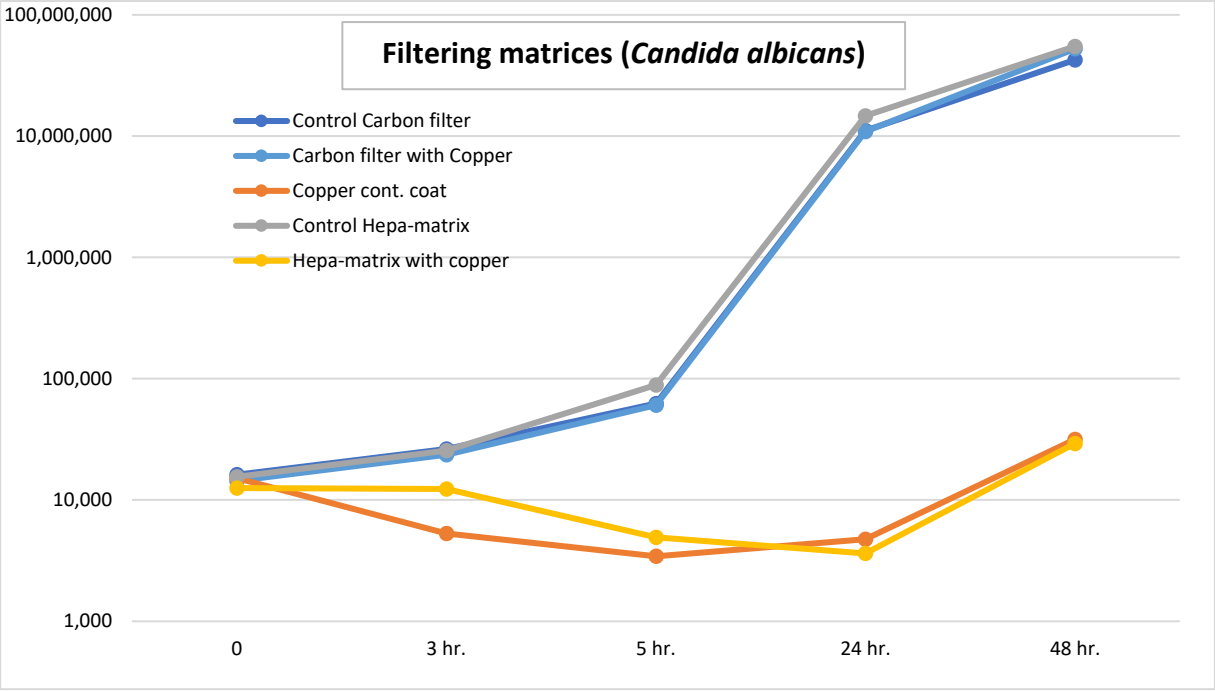

Figure 3

As shown in Figure 3, the most efficient treatments based on these results are the HEPA + Copper treatment resulting in a **99.92% effectivity**, compared to Copper only (99.93%) after 48 hours.

Aspergillus niger

Aspergillus niger (abbreviated as *A. niger*) is a haploid filamentous fungus which is used for waste management and biotransformation's in addition to its industrial uses, such as production of citric acid and extracellular enzymes.

The CFU of A. niger is presented in Fig 4.

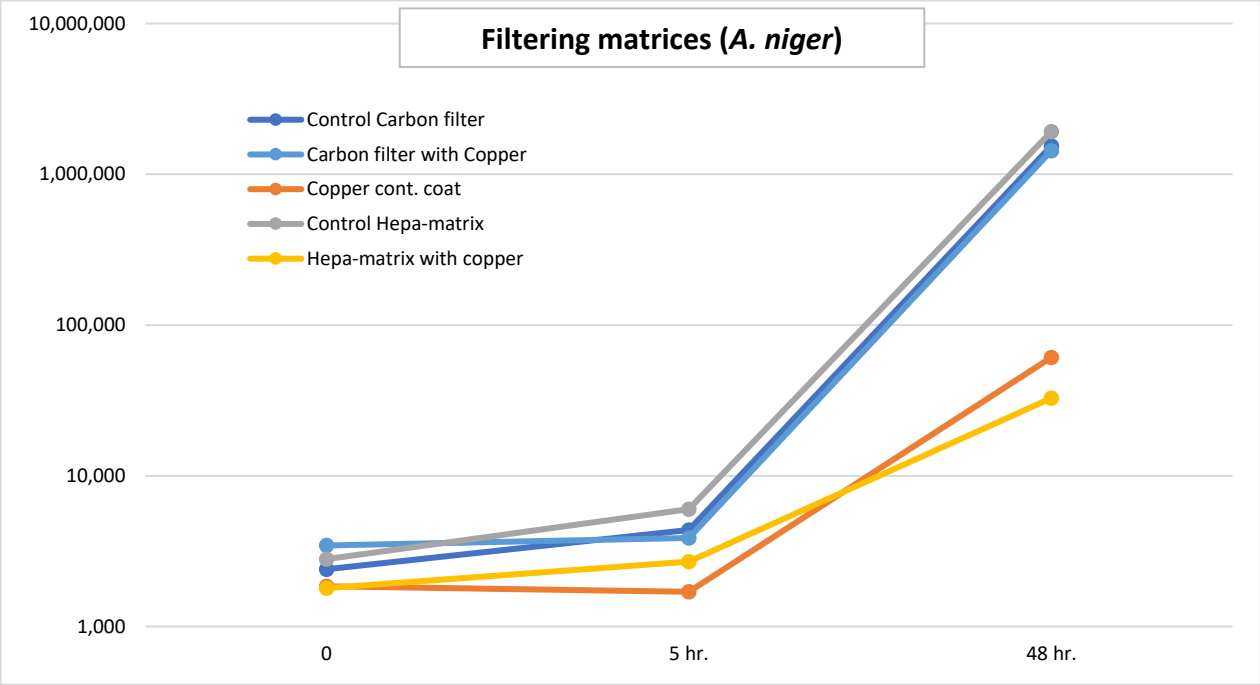

Figure 4

As shown in Figure 4, the most efficient treatments based on these results are the HEPA + Copper treatment resulting in a **98.31% effectivity**, compared to Copper only (96.04%). The Carbon + Copper had an efficiency of about 7% after 48 hours.

4. Conclusions

- The most efficient treatments in terms of bacterial reduction are the HEPA + Carbon (99.9%) after 48 hours exposure.
- It has been shown that the Copper layer of 13.5 GSM was effective in bacterial reduction of 99.9% after 48 hours exposure.
- The media of the Carbon filter is to thick and absorbs most of the treatment and is therefore not relevant to this type of testing as in normal treatment the harmful air would stick to the inside copper layer of the media.

Industrial Biology Expertise and Solutions, com
Glukhman Vladimir, PhD
http://vglukhman.wix.com/gibsite, e-mail:vglukhman@gmail.com
Tel. +972-54-6656638