



History, Development and Modification of Photo-Catalytic Oxidation technology to apply to Air Purification

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Abstract

The unprecedented situation with COVID-19 has drawn attention of the whole world towards the air quality and air purification processes. We are in the time of need of a much advanced air purifier that works without a filter to improve the air quality with a greater extent than the existing air purifiers in the market. Therefore, it is necessary that we develop and modify the existing air purification technology to destroy the airborne pathogens and purify the air completely. With decade research in aerobiology and biotechnology the development of the AHPCO technology developed an air purification system that uses Advanced Hydrated Photo Catalytic Oxidation (AHPCO) and Nanotechnology to reduce indoor aeroallergen to improve air quality and better food preservation. Air Oasis air purifiers utilizes a new generation of AHPCO technology that does not rely on filters or air passing through the air purifier. This new technology simply produces a blanket of redundant oxidizers that not only clean the surrounding air, but sanitizes surfaces as well.

Methods – Data Collection

- We have been analyzing the daily aeroallergen by using the coated Melinex tape from the Burkard Volumetric Spore Trap. Exposed, stained Melinex tape was observed under a BX-40 Olympus microscope.
- We have been assessing the unique air purifiers built by Air Oasis that target the particulate matters in the air as well as on the surface and sanitize the air eventually. We have evaluated the air purifiers, namely, *i-Adapt* III and I, Bi-Polar Unit and Mobile Sanifier (Figs. 1A-D) in reducing the aeroallergen: pollen, bacteria, fungal spores and hyphae, dust particles, fibers, animal dander and VOCs_{4,5} in the indoor air.
- Petri plates were stored in a refrigerator until ready for use. Parafilm was used to contain the controls and test plates. At the end of each experiment the plates were placed in an incubator set to 37 degree Celsius for 48 hours to observe growth.
- We prepared slides from bacteria and fungi collected from the incubated Petri plates and stained them with Gram staining. The slides were observed under BX-40 Olympus microscope. The images were captured at oil immersion lens, 100X.

AHPCO

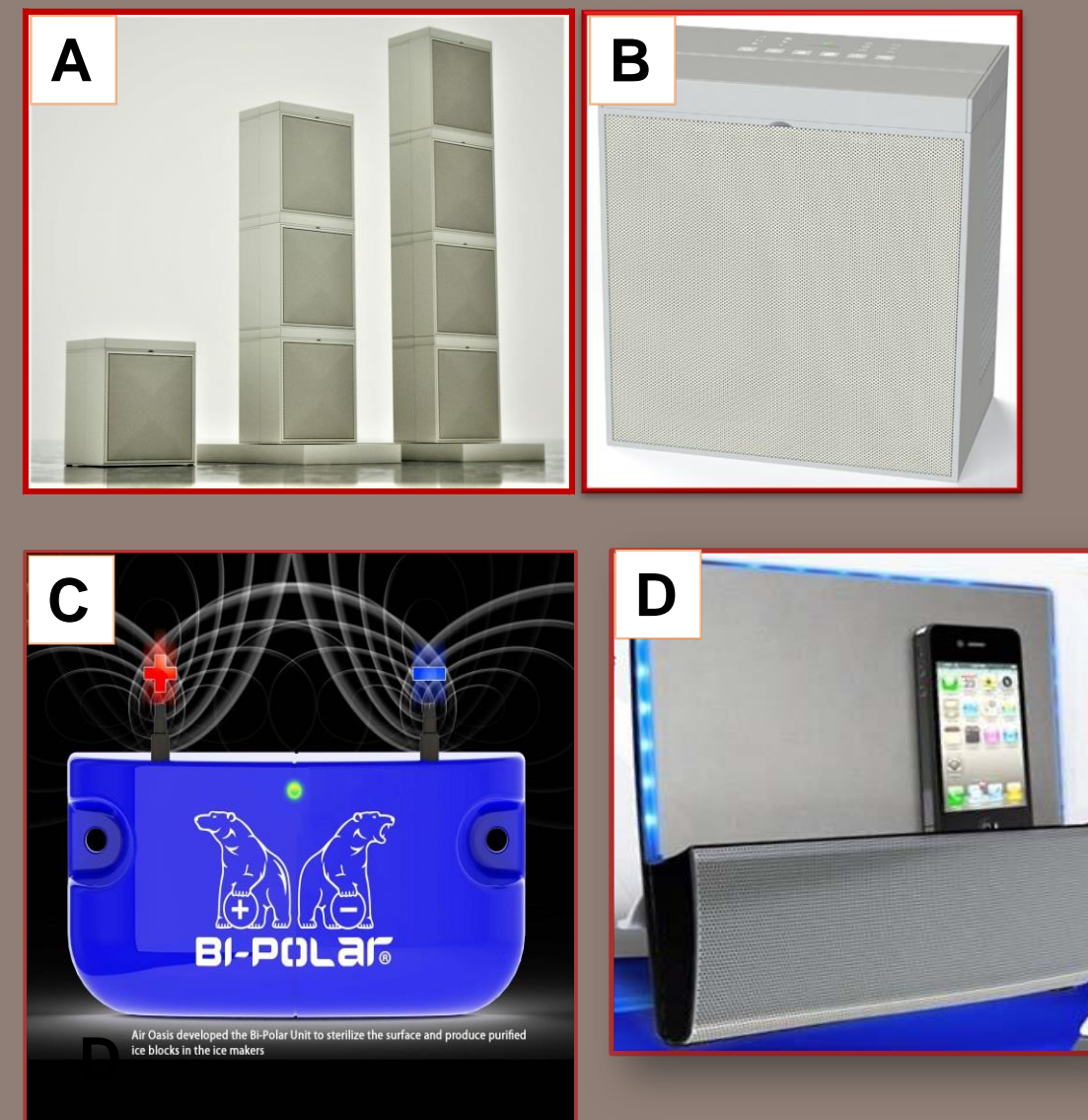


Fig.1A. *i-Adapt* III ; B. *i-Adapt* I, C. Bi-Polar Unit; D. Mobile Sanifier.

AHPCO Food Processing Findings

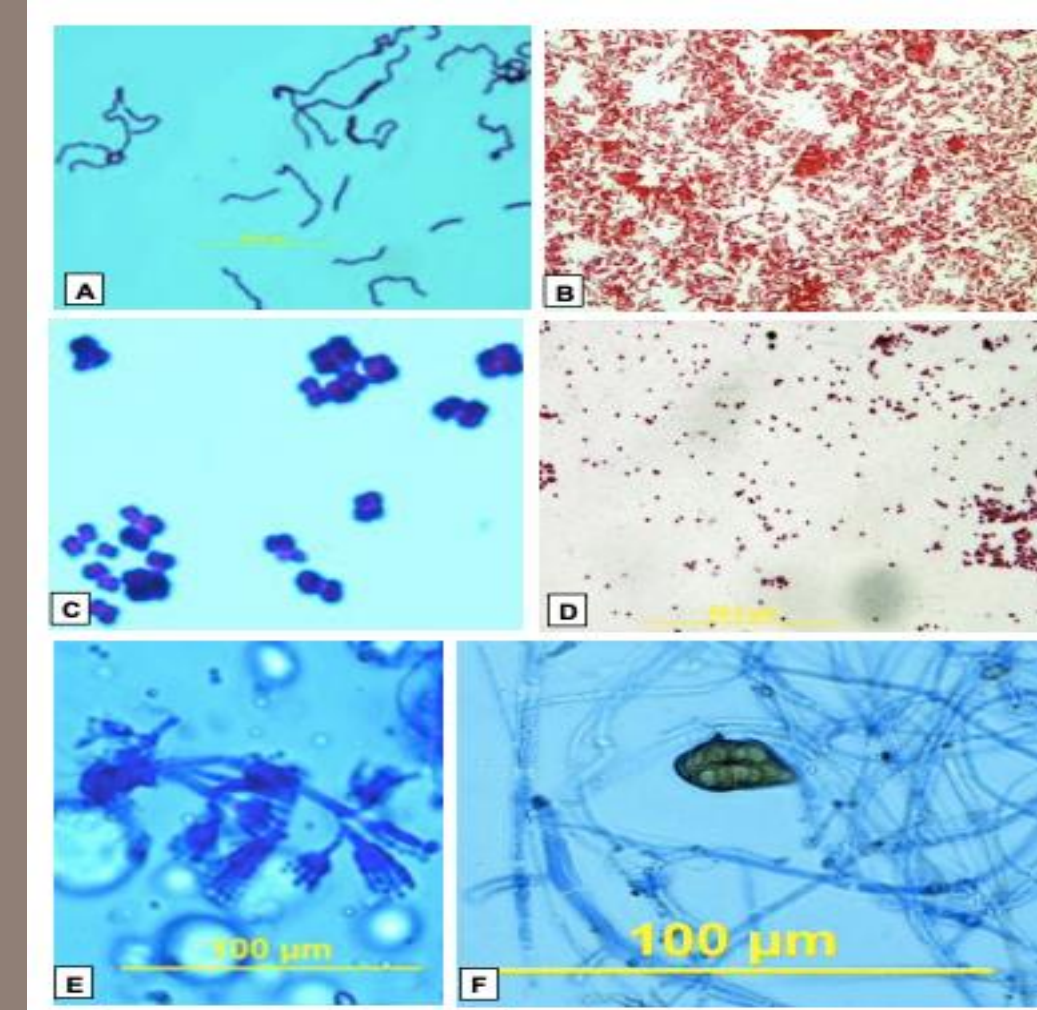
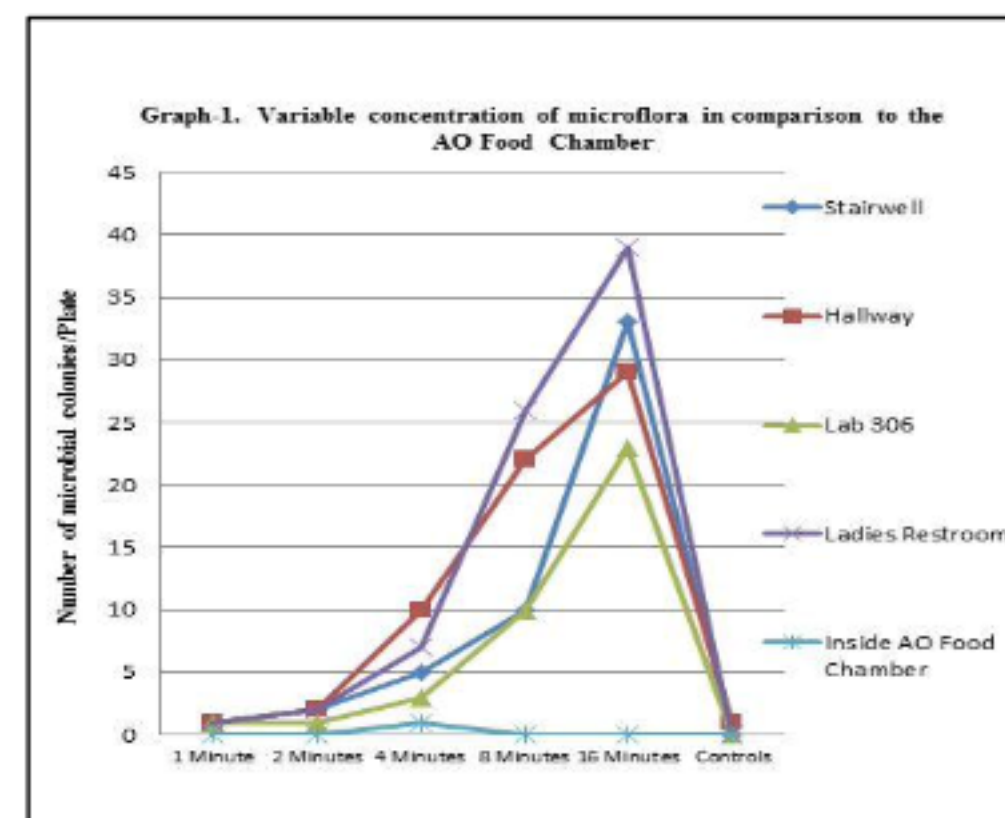
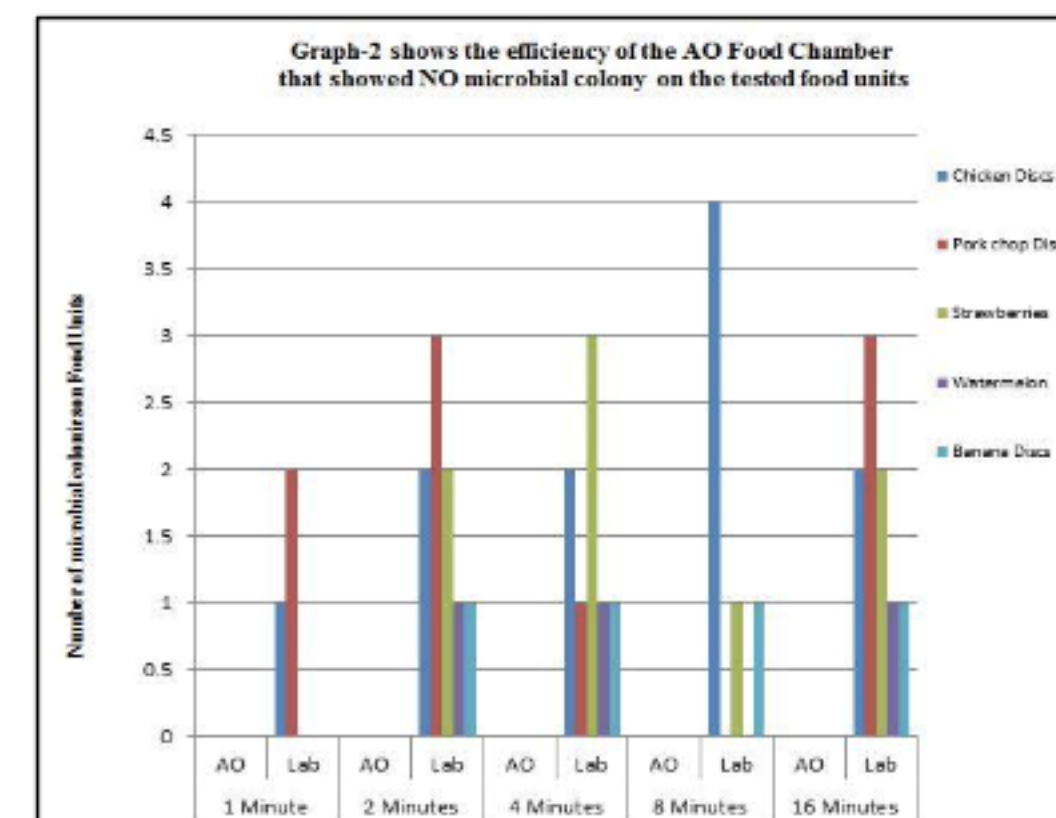


Fig. 2A showing the Gram positive *Bacilli* from the chicken meat sample exposed in the Lab for 8 minutes. B Gram negative *Bacilli* from meat exposed for 16 minutes in the Lab. C and D showing Gram positive and negative *Cocci* from meat surface exposed to the Lab for 8 and 16 minutes. E and F show fungi from the fruit surface. E. *Penicillium* from strawberry surface and *Alternaria* from surface of a vegetable.

AO Food Chamber Graphs



Graph-1 Variable concentration of micro flora was recorded in comparison to the AO Food Chamber.
Graph-2 shows the efficiency of the AO Food Chamber that showed no microbial colony on the tested food units.



Findings

The AHPCO nanotechnology brought a new era in air purification, advanced contaminant free food processing and a mobile phone Sanifier system that are being marketed. AHPCO nanotechnology has been successfully applied to develop the air purification system, in food processing facility to reduce contamination and to developed cell phone doc and Sanifier that makes the cell phone germ free while charging.

Further Study

We hope to see emerging markets become hotbeds of innovation, especially in efforts to reach the growing middle class and low- income consumers around the globe and how a Nanotechnology research product was developed and can be marketed in many countries.

Conclusion

This technology, if used will prove to be an efficient way of reducing the food contaminants, especially during meat processing that took a toll of thousands of lives in the world.

Sources

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