

SECTION

BIOZONE'S ULTRAVIOLET LIGHT

Ultraviolet Germicidal Irradiation

Ultraviolet light, specifically in the UVC wavelength, has been proven safe and effective for almost 100 years in applications of killing harmful microorganisms through a process called photochemistry. Photochemistry is the chemical reaction or change in material caused by exposure to light energy. The process typically requires the use of photons in the ultraviolet spectral range. Ultraviolet radiation serves to excite or cleave chemical bonds and leads to the desired photo induced reaction. Energetic ultraviolet radiation is useful for disinfection purposes. For this application, the fundamental physical requirement for the ultraviolet light source is sufficiently high photon energy (wavelength) at the required intensity. When sufficient photon energy is present, ultraviolet light becomes particularly useful in the destruction of contaminating organic compounds. Almost all indoor contaminants are organic. Organic compounds are carbon based. Many common organic compounds are based on the carbon and hydrogen combination, or hydrocarbons. Hydrocarbons can be toxic volatile organic compounds such as formaldehydes and benzenes. Airborne, indoor dust particles like dander, hair, dust mites, feces, etc. are based upon organic compounds generally associated with the lipid group. Biological contaminants like bacteria, viruses, and fungi are carbon based. Photochemistry can break down these harmful organic molecules. A wavelength of 254 nanometers is the recognized standard for optimum ultraviolet germicidal killing power.

The effectiveness of ultraviolet light on organic contaminants is determined by the amount of UV radiation emitted by a UV source (expressed in terms of microwatts per square centimeter— $\mu\text{W}/\text{cm}^2$), and the length of time the contaminant is exposed to the irradiation (expressed in seconds). The "dose" a contaminant receives is the amount of radiation emitted multiplied by the exposure time in seconds and is expressed in microwatt seconds ($\mu\text{W}/\text{cm}^2/\text{sec}$). The dose required to destroy most contaminants is well documented and accepted by government agencies around the world. See the following Dose for Destruction Table at the end of this section.

The radiation emitted at the surface of ultraviolet lamps is very high and any microorganism that comes in contact with the UV lamp will be destroyed almost instantaneously. However, as distance between the lamp and the contaminant increases, destruction rates decrease dramatically. As such, a superior designed ultraviolet purifier would strive to keep contaminants as close to the UV lamp as possible while ensuring adequate exposure time for maximum destruction effectiveness. Biozone's portable, stand alone units are engineered in this matter providing a minimum **dose of 7000 $\mu\text{W}/\text{cm}^2/\text{sec}$** . As certified by EITL, and resulting in a high level of contaminant destruction with a single pass (see Dose for Destruction Table). With higher air flow rates and temperature fluctuations, multiple lamps may be required for required results as well as multiple air lamp passes.

Ultraviolet Germicidal Irradiation as a purification method used in Biozone products is approved by:

SECTION 1

UV DOSAGE FOR DESTRUCTION

Ultraviolet energy levels at 254 nanometer unit wavelength required for 99.9% destruction of various microorganisms:

<u>BACTERIA</u>	<u>COMMON NAME</u>	<u>µw/cm²/sec.</u>
Bacillus anthracia	Anthrax Virus (not spouse)	8,700
Agrobacterium tumefaciens	Crown Gall Disease (plants)	8,500
Bacillus Megatherium	Wet wood Disease	2,500
Bacillus subtilis	(vegetative)	11,000
Corynebacterium diphtheria	Tetanus/ Lockjaw	23,000
Escherichia coli	Diphtheria	6,500
Legionella bozemanii	E-Coli	7,000
Legionella dumoffii	Pontiac Fever	
Legionella gormanni	Pontiac/Legionnaires	
Legionella micdadei	Pontiac/Legionnaires	
Legionella longbeachae	Pontiac/Legionnaires	
Legionella pneumopeghila	Legionnaires Disease	
Leptospira interrogans	Infectious Jaundice/ Leptospirosis	
Mycobacterium tuberculosis	Pulmonary Tuberculosis	
Neisseria catarrhalis	Meningitis, Endocarditis, Pneumonia, Bronchitis, Otitis Media, Sinusitis	
Proteus vulgaris	Urinary Tract Infection, Bacteremia, Pneumonia and Focal Lesions	
Pseudomonas aeruginosa	Laboratory Strain	
Pseudomonas aeruginosa	Environmental Strain	
Rhodospirillum rubrum	Bacterium	
Salmonella enteritidis	Typhoid Fever, Enteric Fever, Osteomyelitis	
Salmonella paratyphi	Para-Typhoid Fever Enlargement of Spleen	
Salmonella typhimurium	Gastroenteritis	
Salmonella thphose	Typhoid Fever, Enteric Fever Typhus Abdominales	
Serratia marcescent	Septicaemia, Abscesses, Burn Infections, Osteomyelitis	
Shigella dysenteriae	Dysentery—Enteric Infection	
Shigella flexneri	Dysentery	
Shigelli sonnei	Enteric Infection	
Staphylococcus epidermis	Bacteraemia, Wound Infection, Endocarditis, Catheter-Related	
Staphylococcus aureus	Sepsis, UT I, Toxic Shock Syn- drome, Eye Infection, Osteo- myelitis Staphylococcal Diseases, Impe- tigo, Toxic Shock Syndrome,	

SECTION 1**CONTINUED**

<u>BACTERIA</u>	<u>COMMON NAME</u>	<u>μw/cm²/sec.</u>
Staphylococcus aureus cont.	Food Poisoning	7,000
Strptoccus faecalis	Urinary Tract Infection and Bacte- rial Endocarditis	10,000
Streptococcus hemolyticus	Various Infections	5,500
Streptococcus lactic	Various Infections	8,000
Viridans streptococci	Invasive Infections	3,800
Vibrio cholera	Cholera	6,500

SECTION 1

BIOZONE'S PHOTOCATALYTIC OXIDATION

Photocatalytic Oxidation

Photocatalytic Oxidation (PCO) is an emerging technology that provides chemical free oxidation of VOCs and microbes along with regenerating capability to preclude the issues associated with media replacement and disposal. Photocatalytic chemistry has been extensively studied over the last 25 years for removal of organic and inorganic compounds from contaminated air and water. PCO utilizes ultraviolet light in conjunction with a semiconductor photocatalyst and breaks down contaminants into non-toxic compounds such as CO₂, H₂O and simple mineral acids. When the photocatalyst is irradiated with photons from an ultraviolet light source, the band gap energy of the catalyst is exceeded and an electron is promoted from the valence band to the conduction band. The resultant electron-hole pair reacts with contaminants causing a step-by-step oxidation of the molecule. The catalyst itself is unchanged and no residue from the reaction remains. These attributes provide an effective process for removing and destroying pollutants such as VOCs, bacteria, viruses and fungi in indoor air.

Research indicates the photocatalysts need to be illuminated with UV light of at least 3000 W/cm² for effective VOC conversion. Residence times for single pass applications are to be on the order of 0.5 seconds or greater. For optimum oxidation of contaminants, the relative humidity should be between 20% - 60%, since minimum moisture levels are required for the required chemical reactions which primarily involve the reaction with hydroxyl radicals (OH) and super-oxide ions produced in the PCO process. OH is 206% more powerful than chlorine and 157% more powerful than peroxide.

Biozone's portable, stand alone air purifiers utilize PCO as part of their air purification methodology. Aluminum and aluminum oxide have small photoelectric work functions and therefore upon their illumination by ultraviolet light emit photoelectrons producing a photocatalyst. Biozone also offers PCO units that utilize Titanium Dioxide (TiO₂) as the photocatalyst which is preferred material and produces enhanced purifying results.

Photocatalytic oxidation technology has been studied and endorsed by the EPA, Sandia National Labs, US Department of Defense, US Department of Energy, the National Energy Labs, American Lung Association, Industry Canada—Environmental Affairs Branch, and numerous universities around the world.

Photocatalytic Oxidation as a purification method used in Biozone Products is approved or recognized by:

SECTION

BIOZONE'S PHOTOPLASMA

PHOTOPLASMA

Biozone Scientific can enhance the benefits of ultraviolet light and photocatalytic oxidation through the creation of photoplasma. The ultraviolet light, photocatalysts and photoplasma remove contaminants from air and surfaces by utilizing the principles of photochemistry, photoplasma, and photoionization through the photoelectric effect. While these methodologies have been well studied and documented by the scientific community, the synergy of their interaction produces a unique and superlative way of cleaning air and surfaces of contaminants.

Ultraviolet wavelengths in the 160-280 nanometer bandwidth not only break down electron bonding of an organic molecule, but also initiate the formation of a photoplasma. A plasma is an excitation of gas by radio frequency energy. In our case, we excite gases by the energy from ultraviolet light waves. We create a highly energized gaseous state. The plasma, or highly energized gaseous state, is aggressive and highly reactive and contains excited atoms and molecules, ionized gases and free electrons. It can destroy just about all organic contaminants. The destruction mechanism primarily involves the photodissociation of molecular oxygen leading to the formation of reactive oxygen species, such as atomic oxygen, molecular singlet oxygen, ozone, hydroxyl radicals and superoxide ions.

In addition, the photocatalyst described in the previous section on PCO emits photoelectrons that are used to charge fine particles in a gas which are then removed from the air stream as they attach to oppositely charged surfaces. This electrically charging of dust and other particulates can remove particles as small as .001 micron. It should be noted that each of the electron ejections can cause multiple ionization events. For example, in the photoelectric effect, the photon undergoes only one interaction, yet thousands of ionizations can be caused by the resultant electron and its products.

Using plasmas for contaminant removal is a relatively new technology. However, since contaminant destruction actually occurs through attack by atomic oxygen and oxygen radicals created by plasma, the science of the contaminant removal is universally understood. Biozone's standalone, portable air purifiers combining ultraviolet germicidal irradiation, photocatalytic oxidation and photoplasma demonstrate high levels of contaminant reduction with results substantiated by FDA and USDA certifies laboratories, Pennsylvania State University, China Academy of Military Medical Sciences, and EITL (see included test documentation).

**Photoplasma as a purification method used in Biozone
Products is recognized by:**

SECTION 2

BIOZONE'S TEST RESULTS & REPORTS

- **Endorsements, Testing Organizations, User Testing Validation**
 - **USDA Certified Laboratory - Vallid Labs: Test Results**
- **FDA Certified Laboratory - Tri-Tech Analytical Laboratories: Test Results**
- **Penn State University Biology Department: Results of Experiment**
 - **China Academy of Military Medical Sciences: Test Results**
 - **Environmental Industries: Test Results**
 - **Envirogen International Testing Laboratory: Test Results**
 - **Environmental Safety Award**
 - **EPA Registered Manufacturer Certificate**
 - **Summary Statements from Clinical Evaluations**
 - **Biozone Statement of Safety and Effectiveness**
 - **A Few of Biozone's Customers**

SECTION 2

BIOZONE'S TEST RESULTS & REPORTS

BIOZONE SCIENTIFIC

Endorsements, Testing Organizations, User Testing Validation

Advanced Wellcare Group

The Allergy and Asthma Center

AsthmaLife - Allergy and Asthma Control Programs

Glen Park Clinic

International Council on Active Aging

Club Management Services (Health and Fitness Industry)

Bio Health International

Dog Gone (International Newsletter to pet owners)

Environmental Industries

New Air Technologies

Green Home

Coca Cola Quality Assurance

All Creatures Great and Small

Penn. State University Aerobiological Engineering Department

FDA Registered Testing Laboratory - Tri-Tech Labs

USDA Registered Testing Laboratory - Vallid Labs

China Academy of Military Medical Sciences

Envirogen International Testing Laboratory

Biozone is an EPA Registered Establishment - #71500

Media:

Biozone Air Purifiers were featured on the Today Show

Biozone was featured in Florida USA Today

USDA Certified Laboratory - Vallid Labs Summaries

Test #2

Description: Measure the reduction of bacteria in an airstream passing through a Biozone Model 2000 Air Purifier

Results: 99% reduction of airborne bacteria

Test #4

Description: Measure the amount of normal flora on surfaces before and after the use of a Biozone Model 2000 Air Purifier

Results: 99.4% reduction in Standard Plate Count and 85% of yeast and mold count after 3 hours of device operation

Test #5

Description: Measure the reduction of surface bacteria on surfaces before and after the use of a Biozone Model 2000 Air Purifier

Results: 96% reduction of surface bacteria

Complete Test Results on Following Pages

**Biozone's Application of Ultraviolet Light Technologies
for Indoor Air Contaminant Reduction**

By controlling critical ultraviolet components, Biozone can provide advanced purifying processes to meet the most demanding applications. From traditional ultraviolet germicidal irradiation, to utilization of appropriate catalysts for photocatalytic oxidization systems, to integration of higher energy levels of UV for advanced photoplasma systems, Biozone's systems can provide innovative light-wave based solutions to reduce indoor air contaminants.

Biozone's methods and products have been approved and tested by government agencies, independent laboratories, universities, customers, and by Envirogen International Testing Laboratory (EITL), the Company's in-house testing lab.

THE FOLLOWING SECTIONS PROVIDE VALIDATION AS TO THE EFFICACY OF BIOZONE'S ULTRAVIOLET LIGHT TECHNOLOGIES.

**SECTION 1 - DESCRIPTIONS AND APPROVALS OF
ULTRAVIOLET METHODS**

SECTION 2 - BIOZONE'S TEST RESULTS & REPORTS

Vallid Labs, Inc.
608 Thompsonville Rd
Suffield, CT 06078
Phone: 860 668-4330
Fax: 860 668-5595
Email: vallid.lab@snet.net

BioZone Scientific
1190 18th Street
Vero Beach, FL 32960

March 27, 2000

Reporting on samples taken at Vallid Labs using the BioZone air filter on Tuesday, March 21, 2000 for analysis. The following are the procedures and the results of the tests. Lab # VL-31300 Test 2

Test 2

Purpose

Measure the amount introduced Enterobacter aerogenes coming into the air purifier compared to the amount of introduced Enterobacter aerogenes exiting the Biozone air purification.

Method

Using a Biotest air sampler, the introduced Enterobacter aerogenes coming into the air purifier was collected directly from the air after introduction using a spray bottle with a suspension of Enterobacter aerogenes. Samples were taken again at the outlet vent with the UV/O₃ lamp on. All testing was run in triplicate. Numbers reported are averages of triplicate results.

Results

<u>Sample</u>	<u>Enterobacter aerogenes/ft³ of air</u>
<u>Enterobacter aerogenes</u> in air before fan	<1,100
<u>Enterobacter aerogenes</u> in air directly after treatment	10.85

Sincerely,

Debra Vallides
Vallid Labs, Inc
PH#-0542, EPA-CT00077
USDA-0978,3734

Vallid Labs, Inc.
608 Thompsonville Rd
Suffield, CT 06078

Phone: 860 668-4330
Fax: 860 668-5595
Email: vallid.lab@snet.net

BioZone Scientific
1190 18th Street
Vero Beach, FL 32960

March 27, 2000

Reporting on samples taken at Vallid Labs using the BioZone air filter on Tuesday, March 21, 2000 for analysis. The following are the procedures and the results of the tests. Lab # VL-31400 Test 4

Test 4

Purpose

Measure the amount of surface flora before air purification compared to the amount of normal surface flora after 3 hours of BioZone air purification.

Method

Using a swabbing method, the normal surface flora was collected before air purifier was run. The O3 and UV were then turned on for 3 hours with an average O3 concentration of 0.04 PPM, and Swab samples were taken again. Standard Plate Count (SPC) and Yeast & Mold (Y&M) counts were done. All testing was run in triplicate. Numbers reported are averages of triplicate results.

Results

<u>Sample</u>	<u>SPC/in2</u>	<u>Y&M/in2</u>
Normal surface flora Of untreated surface	46	2
Normal surface flora after 1/2hr O3 exposure	42	0.7
After 2 hr O3 exposure	1.7	1.7
After 3 hr O3 exposure	0.3	0.3

Sincerely,

Debra Vallides
Vallid Labs, Inc
PH#-0542, EPA-CT00077

Vallid Labs, Inc.
608 Thompsonville Rd
Suffield, CT 06078
Phone: 860 668-4330
Fax: 860 668-5595
Email: vallid.lab@snet.net

BioZone Scientific
1190 18th Street
Vero Beach, FL 32960

March 27, 2000

Reporting on samples taken at Vallid Labs using the BioZone air filter on Tuesday, March 21, 2000 for analysis. The following are the procedures and the results of the tests. Lab # VL-31500 Test 5

Test 5

Purpose

Measure the introduced Enterobacter aerogenes on a surface before air purification compared to the amount of introduced Enterobacter aerogenes on the same surface after 3 hours of Biozone air purification.

Method

Using a swabbing method, the introduced Enterobacter aerogenes was collected before air purifier was run. The O3 and UV were then truned on for 3 hours with an average O3 concentration of 0.04 PPM, and Swab samples were taken again. Standard Plate Count (SPC) was done. All testing was run in triplicate. Numbers reported are averages of triplicate results.

Results

<u>Sample</u>	<u>Enterobacter aerogenes/in2</u>
<u>Enterobacter aerogenes</u> of untreated surface	>120,000*
<u>Enterobacter aerogenes</u> after 1/2hr O3 exposure	>120,000*
after 2 hr O3 exposure	3,000*
after 3 hr O3 exposure	4,800*

Sincerely,

Debra Vallides
Vallid Labs, Inc
PH#-0542, EPA-CT00077

FDA Certified Laboratory - Tri-Tech Analytical Laboratories Summaries

Test #3

Description: Measure the reduction of bacteria (*Listeria Monocytogenes*) on surfaces after use of Biozone Powerzone I Model.

Results: 3 log reduction (99.9%) after 1 minute of treatment
5 log reduction (99.999%) after 2 minutes of treatment

Test #4

Description: Measure the reduction of bacteria (*E. coli* 0157) on surfaces after use of a Biozone Powerzone I Model

Results: 4 log reduction (99.99%) after 1 minute of treatment
5 log reduction (99.999%) after 2 minutes of treatment

Test - Biozone Photoplasma Experiment

Description: Measure the reduction of surface bacteria (*E. coli*, *Salmonella*, *Listeria*) on surfaces before and after use of a Biozone Air Purifier

Results: After 24 hours of use, there was no remaining bacteria

Complete Test Results on Following Pages

DISINFECTION VALIDATION PROCESS

OVERALL CONCLUSION DATA

The concentration of bacteria recovered from all inoculated treated samples analyzed show at least a 3 to 5 log reduction. This factor proves that the disinfectant process utilized in this study is effective in inhibiting the most common bacterial problems in producing a high quality product.

The concentration of E. coli (O157) bacteria recovered from only a one minute exposure treated samples, show a 5 log reduction. This factor proves that the disinfectant process utilized in this study is effective in inhibiting the most common bacterial problem in producing a high quality product.

DISINFECTION VALIDATION PROCESS

TEST RESULTS:

3. REDUCTION Listeria monocytogenes CONTAMINATION - NOT TREATED (NT) VERSUS TREATED (T)

<u>AVERAGE OF 7 SAMPLES</u>	<u>RESULTS</u>	<u>UNITS</u>
ONE (1) MINUTE TIME, EXPOSURE LEVEL A		
#1 - #7 Listeria monocytogenes/NT	5 10(7)	CFU's
#1 - #7 Listeria monocytogenes/T	2 10(2)	CFU's
	% Reduction	<u>3 LOG</u>
TWO (2) MINUTE TIME, EXPOSURE LEVEL B		
#1 - #7 Listeria monocytogenes/NT	5 10(7)	CFU'S
#1 - #7 Listeria monocytogenes/T	2 10(2)	CFU'S
	% Reduction	<u>5 LOG</u>

4. REDUCTION E. coli (0157) CONTAMINATION - NOT TREATED (NT) VERSUS TREATED (T)

ONE (1) MINUTE TIME, EXPOSURE LEVEL A		
#1 - #7 E. coli (0157)/NT	3 10(7)	CFU's
#1 - #7 E. coli (0157)/T	7 10(3)	CFU's
	% Reduction	<u>4 LOG</u>
TWO (2) MINUTE TIME, EXPOSURE LEVEL B		
#1 - #7 E. coli (0157)/NT	3 10(7)	CFU's
#1 - #7 E. coli (0157)/T	7 10(2)	CFU's
	% Reduction	<u>5 LOG</u>

To:

Biozone Scientific
1180 19th Street
Vero Beach, Florida 32960
Attention: Mr Bryan Cecchi

Project:

Biozone Plasma Experiment

Test Protocol

Infect E. Coli, Salmonella, and Listeria; all at 10(2), on to a cutting board and stainless steel utensils.

Place them in a controlled photoplasma environment.

Summary:

After 24 hours there was no remaining bacteria

Test Specifics

Biozone PhotoPlasma Experiment

Tri-tech Lab ID 02-06-1078A

Start time: June 28 10:00

Temperature: 21.5C

Setup: SB

Temperature at 15:50 23.5C

Temperature at 18:20 21.0C

End time: June 29 10:00

Temperature: 22.0C

End: LT

Sample ID	Exposure time 24 hours Test at 10:00	Comments
Cutting Board/Utensils W/E.c S.t. L.m. 10(2)	Negative No Growth	Effective in this experiment

**Penn State University Biology Department Test at Applied
Research Laboratory
Summary**

**Test - Surface Disinfection of E. coli with Low Levels of
Airborne Ozone from a Biozone Powerzone I**

Description: Measure the reduction of surface bacteria (E. coli) over time

Results: 100% reduction after 3 hours of exposure

Complete Test Results on Following Page

Environmental Industries International, Inc.
1180 19th Street
Vero Beach, Florida 32960
Phone (562) 778-4886 Fax (561) 778-8391

INTRODUCTION

This report details the results of a singular Air Quality Study utilizing the Biozone 1000 model air purifier. The purpose of the study was to determine the in-situ results of the Biozone 1000 in a domestic location and its effect in the reduction (if any) of airborne bacteria flowing through a dwelling's ventilating system.

METHODOLOGY

A residential condominium and its independent ventilating system was selected for the Study. The air quality, re. Bacterial content, was measured with Micrology Laboratories Easygel Petri dish system which is a pectin-gel method. The formulation used was the Standard Plate Count formulation. The air in the ventilating system was tested before utilization of the Biozone 1000 and again after 24 hours of use of the device.

The condominium was a 700 sq. ft., single floor dwelling inhabited by two working adults. The condo appeared clean with no noticeable organic odors. A Petri dish was placed inside an outlet vent in the living area. For the initial air test, the prepared Petri dish was uncovered and left exposed to the circulating air for 1 hour the recovered and allowed to incubate for 48 hours. The ventilating system fan was switched for continuous operation.

The Biozone 1000 was placed on a waist high stereo speaker in the living room approximately 7 feet away from the return air vent. The Biozone unit was turned to "High Fan" and allowed to run up for 24 hours. Biozone's photoplasma output contains small amounts of ozone and ozone levels were tested in several areas of the condominium at 8 hour intervals using two monitors, an Ecosensor A-21Z ozone monitor and an Enmet

Ozone Monitor 0800 model. At no time did the ozone levels anywhere in the living area exceed .04 ppm. After 24 hours of continuous operation of the Biozone 1000, another air quality test was performed following the same methodology as previously described.

SUMMARY OF RESULTS

Based on our experience of indoor environments, the bacteria count exhibited in the ventilating system of the dwelling was typical of the air quality found in such testing. However, microbiological analysis of the specific types of bacteria and mold/fungus colonies were not performed. Visual examination of the Petri dishes' bacterial and mold/fungus colonies indicate a significant reduction in counts after the use of the Biozone 1000. There did not appear to be other environmental events or circumstances that would contribute to the result.

CONCLUSION

Analysis of the results would indicate that very low levels of ozone used in the Biozone 1000 had a very positive effect on reducing the presence of airborne microorganisms in the ventilating system. It has been well established that photoplasma is biocidal in nature. Exposure to photoplasma even for short time periods, such as the 24 hours in this study, further support its effectiveness. It can be further suggested that if the ventilating system had been subjected to these purification methods for longer than 24 hours, further reductions in bacteria and mold counts could be obtained.

Environmental Industries International, Inc.
1180 19th Street
Vero Beach, Florida 32960
Phone (562) 778-4886 Fax (561) 778-8391

INTRODUCTION

This report details the results of a singular Air Quality Study utilizing the Biozone 2000 model air purifier.

The purpose of the study was to determine the in-situ results of the Biozone 2000 in a domestic location and its effect in the reduction (if any) of airborne bacteria.

METHODOLOGY

A "typical home" was selected for the Study. The air quality, re. bacterial content, was measured with Micrology Laboratories Easygel Petri dish system which is a pectin-gel method. The formulation used was the Standard Plate Count formulation. The air was tested before utilization of the Biozone 2000 and again after 24 hours of use of the device.

The "typical home" was a 2000 sq. ft., single floor dwelling inhabited by two adults, two children and one cat. The home appeared clean with no noticeable organic odors. A Petri dish was placed in the family room and another Petri dish was placed on a dresser in the master bedroom. For the initial air test, the prepared Petri dishes were uncovered and left exposed to the air for 1 hour the recovered and allowed to incubate for 48 hours.

The Biozone 2000 was placed on a portable table in the family room (a multi-use area) approximately 12 feet away from where the Petri dish was exposed in the family room and 47 feet from the Petri dish location in the master bedroom (not in the line of sight - around 2 corners). The Biozone unit was turned to "High Fan" and allowed to run for 24 hours. No additional mechanical methods were used to enhance air circulation, ie. no ceiling fans or the home's ventilating system. Biozone's photoplasma output contains small amounts of ozone so the ozone levels were tested in

both areas of the home at 8 hour intervals using two monitors, an Ecosensor A-21Z ozone monitor and an Enmet Ozone Monitor 0800 model. At no time did the ozone levels anywhere in the family room exceed .03 ppm and no more than .02 ppm in the master bedroom.

After 24 hours of continuous operation of the Biozone 2000, two more air quality tests were performed following the same methodology as previously described.

SUMMARY OF RESULTS

Based on our experience of indoor environments, the bacteria count exhibited in the family room of the dwelling as well as the master bedroom area were on the low side of the typical air quality found in most homes. However, microbiological analysis of the specific types of bacteria and mold/fungus colonies where not performed.

Visual examination of the Petri dishes' bacterial and mold/fungus colonies indicate a significant reduction in counts after the use of the Biozone 2000. There did not appear to be other environmental events or circumstances that would contribute to the result.

CONCLUSION

Analysis of the results would indicate that photoplasma combined with the germicidal effects of the UV lamp used in the Biozone 2000 had a very positive effect on reducing the presence of airborne microorganisms. It has been well established that photoplasma and UV light are biocidal in nature. Exposure to these methods even for short time periods, such as the 24 hours in this study, further its effectiveness. It can be further suggested that if the indoor air had been subjected to these purification methods for longer than 24 hours, further reductions in bacteria and mold counts could be obtained.

Envirogen International Testing Laboratory Summaries

Test - Condominium

Description: Demonstrate the reduction of airborne biological contaminants in actual residential setting utilizing a Biozone Air Purifier Model #InDuct 1500

Results: Demonstrated positive reduction in airborne microorganisms

Test - Vehicle

Description: Demonstrate the reduction of selected airborne contaminants inside an automobile utilizing a Biozone Air Purifier Model #50V

Results: Demonstrated positive reduction in airborne particles, VOC's and microorganisms

Test - Food Shelf Life Extension

Description: Demonstrate the extension of shelf life of various produce products when stored in a refrigerated environment by removing food spoilage organisms through the use of a Biozone unit.

Results: Demonstrated significant improvement in produce quality and shelf life extension

Complete Test Results on Following Pages

INDOOR AIR QUALITY TEST UTILIZING A BIOZONE AIR PURIFIER

INTRODUCTION

This report details the results of a singular Air Quality Study utilizing the Biozone 1500 InDuct model air purifier.

The purpose of the study was to determine the in-situ results of the Biozone 1500 in a domestic location and its effect in the reduction (if any) of airborne bacteria flowing through a dwelling's ventilating system.

METHODOLOGY

A residential condominium and its independent ventilating system was selected for the Study. The air quality, re. Bacterial content, was measured with Micrology Laboratories Easygel petri dish system which is a peccin-gel method. The formulation used was the Standard Plate Count formulation. The air in the ventilating system was tested before utilization of the Biozone 1500 and again after 24 hours of use of the device. The condominium was 2300 sq. ft., ocean front, single floor dwelling inhabited by two retired adults. A petri dish was placed inside an outlet vent in the master bedroom. For the initial air test, the prepared petri dish was uncovered and left exposed to the circulating air for 1 hour then recovered and allowed to incubate for 48 hours. The ventilating system fan was switched for continuous operation. The condominium had two-zone heating/cooling (two air handlers). A Biozone 1500 was installed (per instructions) just past each air handler. The Biozone units are designed to operate when the ventilating fan is activated. Biozone's photoplasma output contains small amounts of ozone and ozone levels were tested in several areas of the condominium at 8 hour intervals using two monitors, an Ecosensor A-21Z ozone monitor and an AFX model

N-2000. At no time did the Ozone levels anywhere in the living area exceed .02 ppm.

After 24 hours of continuous operation of the Biozone 1500, another air quality test was performed following the same methodology as previously described.

SUMMARY OF RESULTS

Based on our experience of indoor environments, the bacteria count exhibited in the ventilating system of the dwelling was typical of the air quality found in such testing. However, microbiological analysis of the specific types of bacteria and mold/fungus colonies were not performed.

Visual examination of the petri dishes' bacterial and mold/fungus colonies indicate a significant reduction in counts after the use of the Biozone 1500. There did not appear to be other environmental events or circumstances that would contribute to the result.

CONCLUSION

Analysis of the results would indicate that very low levels of ozone used in the Biozone 1500 had a very positive effect on reducing the presence of airborne microorganisms in the ventilating system. It has been well established that photoplasma is biocidal in nature. Exposure to photoplasma even for short time periods, such as the 24 hours in this study, further support its effectiveness. It can be further suggested that if the ventilating system had been subjected to these purification methods for longer than 24 hours, further reductions in bacteria and mold counts could be obtained.

Air Quality in Automobiles - The Health Risk Air Resources Board Study and Product Report

AIR RESOURCES BOARD STUDY - There has been strong scientific evidence that air contaminants inside automobiles pose a serious health risk to drivers and passengers. University studies confirm that the air inside vehicles is more hazardous than the air outside. Once polluted air from the outside is sucked into a car, it remains inside for long periods of time and builds up. Common vehicle contaminants include gaseous pollutants, diesel soot and other fine particles. Levels of hydrocarbons and carbon monoxide are often 2 to 10 times higher inside vehicles. Other contaminants found inside vehicles include ethyl benzene, benzene, butadiene, formaldehyde, toluene, xylene, and MTBE, all considered toxic. New cars are even worse. That "new" car smell is actually created by toxic off-gassing of different materials inside the car. These volatile organic compounds (VOC's)

can cause serious health problems ranging from nausea, headaches, eye irritation, dizziness, and central nervous system problems. In addition, a vehicle's air conditioner (AC) can also be hazardous to your health. Fungi (mold) can grow in a car's AC system and trigger nausea, headaches, allergies and asthma attacks. And finally, the risk of airborne disease transmission is very high in a small, confined space. Any infectious person who coughs, sneezes, or laughs will emit infectious droplet nuclei that will circulate throughout a vehicle.

PRODUCT REPORT - It has been determined that a high quality air purification system is the most effective solution to vehicle air contamination. The Biozone Vehicle Air Purifier #50V was tested as its ability to reduce the concentration of selected contaminants inside an automobile in typical "city

traffic" conditions. Specifically, the level of biological contaminants was determined (bacteria and fungi), VOC's, respirable particulates. Standard scientific testing protocols and methodology were followed to ensure validity of conclusions.

CONCLUSIONS - Tests and measurements were taken during 3 separate commutes with and without the Biozone Vehicle Air Purifier. The mean results indicated reductions in the levels of bacteria and mold by as much as 99%. Levels of VOC's were reduced from 25 mg/cm³ to 4 mg/cm³. particles of .015 - 2.5 m size were reduced from 2200/cm³ to 40/cm³.

Tests were performed in several vehicles during several commutes using the Biozone Vehicle Air Purifier. This device utilizes high energy plasma and photochemistry for air purification. The air was tested using Micrology Laboratories Easygel petri dish system with the Standard Plate Count formulation. The air was tested before use of the Biozone and again after 2 hours of use. The petri dishes below were typical of the results.

Extended Shelf Life for Produce

by Bryan Cecchi, John Garrett, B.V. Rajmane, Ph.D.

INTRODUCTION

The preservation of food quality and reduction of spoilage organisms are of paramount importance to the food industry. Economic benefits through extended life can be meaningful at every step along the food process. Figures as high as 30% or more have been used to assess the amount of produce lost to microbial activity between the time of harvest and consumption. Losses occur at every step of handling, including transient time, processing, and storage. The USDA says the effective extension of produce requires an understanding that spoilage can be reduced at numerous points along the food chain. Therefore, it is important to apply risk reduction strategies at each step and process.

One strategy to reduce various spoilage organisms, such as bacteria and mold, as well as the losses from accelerated ripening is through the introduction of gas phase ozone. Hundreds of scientific papers have been published proving ozone kills spoilage organisms and neutralizes the off-gasses that accelerate ripening and spoilage. The FDA has approved the use of ozone for all food storage and preparation, and the USDA has acknowledged ozone's role for improved food production.

While there has been significant research on the use of ozone for extending the shelf life of a variety of foodstuffs, the purpose of Biozone Scientific's research is to define more closely the parameters necessary to maximize the reduction of spoilage, and to apply them to common, everyday food processing and storage applications. Specifically, laboratory testing was performed to quantify the life extension of produce in cold storage, combining variant ozone levels and ultraviolet light. Testing protocol was written by Dr. B.V. Rajmane and followed Good Laboratory Procedures in Biozone Scientific's Analytical Testing Laboratory.

MATERIALS AND METHODS

Produce products were stored in 4 matching coolers. A Biozone Scientific 100FS model UV/ozone unit was placed inside each cooler. The ozone generation rate was adjusted to maintain a relatively constant, predetermined ozone level over the duration of the testing (see graph 1). A recently calibrated INUSA2000-1 gaseous ozone analyzer measured ozone levels. A monitoring probe was installed in each cooler and connected to the analyzer with ozone levels sampled every 13 seconds. Results were fed directly from the monitor to a Dell computer via serial port download using Windows Hyperterminal and importing the data into Excel. In addition, temperature conditions were monitored in each cooler with professional-grade refrigerator thermometers to ensure proper

homogeneous storage conditions in each cooler at 42F. See Figure 1 below. The ozone levels selected for testing were based on previously published research, as well as previously conducted in-house testing.

Cooler "C" control, no ozone
Cooler #1 - 0.06 ppm
Cooler #2 1.0 ppm
Cooler #3 2.0 ppm

The produce selected for testing was purchased at a local produce stand, and all five of the following produce items were consistent in freshness and appearance.

Strawberries	Raspberries
Blueberries	Asparagus
White grapes	

The produce was inspected each day for mold, color, ripeness and firmness. All coolers were opened for the same time intervals each day, and to assume "real world" commercial applications, many days the doors were opened numerous times.

RESULTS

The results of produce exposure to variant ozone levels in a refrigerated environment compare well to results from other investigators and further support ozone's effectiveness in extending produce shelf life. In addition, testing variant levels simultaneously provided indications of optimum ozone levels for maximum effectiveness (see Graph II, III, IV, and Table I).

Delaying the formation of mold on produce was easily accomplished in an ozone environment. Strawberries in the control cooler began forming mold after 2 days (this was on a bruised section), but no mold ever formed (even on bruised berries) in any of the coolers containing ozone for the duration of the 15-day test (see figures II & III). Highly sensitive raspberries experienced mold growth on the 3rd day in the control cooler but showed no mold growth until the 5th day in the 0.6 ppm cooler with no mold growth for the duration of the test at the higher ozone levels of 1.0 ppm and 2.0 ppm. Blueberries, white grapes and asparagus showed no mold growth in the control or ozonated coolers.

Indications as to produce quality and freshness are displayed in the color and firmness of the product. Dramatic improvements in the color retention of all produce stored in ozone environments were observed. Asparagus color remained good throughout. Strawberries held their color 5 days longer than the control group, while raspberry color remained 3 days longer and blueberries 3 to 9 days longer depending on the ozone level. The color and firmness of white grapes lasted 7 days longer at the 2.0 ppm level.

CONCLUSIONS

The results presented here demonstrate that a high degree of improved shelf life of produce products can be achieved with airborne ozone. The shelf life improvements in this study compare well with the best.

results obtained in numerous studies on the effects of ozone in prolonging the life of food-stuffs through inactivation of spoilage organisms and reduction of produce-generated gases that enhance ripening. The use of ozone for inactivation of spoilage organisms to extend the useful life of produce also strongly parallels other studies performed on the reduction of pathogenic and non-pathogenic organisms with ozone. The results would suggest that worthwhile product life extension could easily be accomplished by introducing appropriate amounts of ozone into refrigerated environments.

While this research examined the results of three levels of ozone, precise ozone levels

necessary for optimum results have not been determined. However, if exact levels were established, their practicality would be suspect in actual application due to the nature of produce processing and storage. As a result, an optimum or preferred ozone range could be determined that would achieve desirable results for each produce product or for a "mix" of stored produce. This research indicates the following levels are most effective for achieving overall improved quality (mold, color, firmness):

Strawberries	1.0 ppm
Raspberries	1.0 ppm
Blueberries	1.0 ppm
Asparagus	0.6 ppm
White Grapes	2.0 ppm

A recommendation as to a level for storing a mixture of produce in an environment that would indicate significant improvements in shelf life would be 1 & 2ppm. It should be noted that previous studies have indicated life extension benefits from levels as low as .3 -.5ppm, and such levels, while perhaps not optimal, should be considered when integrating storage with worker exposure times. In addition, this study did not directly determine the microbial reduction benefits of the use of ultraviolet light as the ozone generation source. In spite of this unknown, the results, as well as previous studies on the subject, would indicate that ultraviolet light would encourage the reduction of organic contaminants and further enhance an environment for extended product shelf life.

The results presented here continue to support

The benefits of ozone in cold storage and the obvious economic benefits to everyday food storage and processing applications. Additionally, the tests confirm the effectiveness of Biozone Scientific's products to substantially extend the shelf life of the tested produce.

ADDITIONAL BENEFITS

While the primary purpose of this research was investigation of shelf life extension, tests were also conducted to ascertain the reduction of odors, and, in particular, odor contamination between products. It is well documented that ozone neutralizes most odors. The application of gas phase ozone into refrigerated containers substantially reduced foodstuff odors. Specifically, it eliminated "cross-odor" contamination, i.e., the absorption of one product's odor by another product. For example, strawberries stored next to onions did not absorb the onion smell (or taste) as they did in the control cooler (no ozone).

CASE STUDY - APPLICATION OF RESEARCH RESULTS

A commercial retailer of produce was selected as a test site to demonstrate the effectiveness of ozone in prolonging shelf life in a real world environment. A Biozone Scientific ozone/UV unit was placed in his 713 cubic ft. Cooler.

During a 30-day test, the owner compared shelf life with previous experiences. His records verifies a reduction in product waste of 66%. Examples from

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his data included:

- Strawberries remain in saleable condition 12 to 14 days longer
- Raspberries that normally last only a few days now last as long as 13 days
- Lettuce life was extended 4 to 5 extra days
- Absolutely no mold growth on any produce product

The reduction in spoilage was significant and resulted in favorable economic benefits and dramatic improvement in product quality.

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**China Academy of Military Medical Sciences
Institute of Microbiology and Epidemiology
Summaries**

Test #1

Description: Test the efficacy of Biozone Scientific Air Purifier Model #500 to clean contaminated air of E. coli and Serratia marcesens

Results: Killed 100% of E. coli after 10 minutes
Killed 100% of Serratia marcesens after 10 minutes

Test #2

Description: Test the efficacy of Biozone Scientific Air Purifier Model #500 to clean contaminated surface of E. coli and Serratia marcesens

Results: Killed 97.49% of E. coli after 2 hours
Killed 98.39 of Serratia marcesens after 2 hours

Complete Test Results on Following Pages

Academy of Military Medical Sciences
Institute of Microbiology and Epidemiology
No. 20, Dong Da Jie Road, Feng Tai District, Beijing, China

Device of Test: Biozone Air Purifier (Biozone, Model #500)

Date of Report: May 29, 2003

Date of Test: May 16 - May 29, 2003

Test Institute: Academy of Military Medical Sciences, Institute of Microbiology and Epidemiology

Address: No. 20, Dong Da Jie Road, Feng Tai District, Beijing, China

- I. Test Purpose:
 1. The efficacy of Biozone Scientific air purifier to clean or kill the bacteria in contaminated air.
 2. The efficacy of Biozone air purifier to clean or kill bacteria on contaminated surface.

- II. Bacteria used in Test:
 1. Escherichia coli (8099)
 2. Serratia marcescens

- III. Methods
 1. Test cleaning effectiveness for contaminated air by Biozone purifier:
 - a. Contaminate air artificially with above bacteria inside special sealed cabinets separately. Wait for certain period of time to allow bacteria spread evenly in air.
 - b. Collect air sample from outlet of the cabinet before the purifier operated.
 - c. Turn on the purifier and collect the air samples again with same procedure in different time periods and under different speeds of the purifier.
 - d. Examine the bacteria growth

 2. Test cleaning effectiveness for contaminated surface by Biozone purifier:
 - a. Place certain numbers of bacteria culture plates of each bacteria strain in the seal air cabinet.
 - b. Turn on the purifier
 - c. Move out the bacteria culture plates from the cabinet in different time periods and under different speeds of the purifier.
 - d. Examine the bacteria growth.

 3. Repeat test procedures three times for each experiment.

IV. Test Results: (The final results are based on average numbers from triplicate tests)

1. The cleaning effectiveness for contaminated air by Biozone purifier:
 - a. To clean contaminated air by *E. coli* (8099)

	0.5 min	5 min	10 min	30 min	60 min
Low Fan	44.59	94.20	100	100	100
Med Fan	83.69	97.46	100	100	100
High Fan	7.08	96.03	100	100	100

- b. To clean contaminated air by *Serratia marcesens*

	0.5 min	5 min	10 min	30 min	60 min
Low Fan	89.55	100	100	100	100
Med Fan	90.13	100	100	100	100
High Fan	10.99	67.16	100	100	100

2. The cleaning effectiveness for contaminated surface by Biozone purifier:
 - a. To clean contaminated surface by *E. coli* (8099)

	5 min	60 min	120 min
Low Fan	---	20.75	93.41
Med Fan	1.33	38.05	97.35
High Fan	25.29	58.22	97.49

- b. To clean contaminated surface by *Serratia marcesens*

	5 min	60 min	120 min
Low Fan	---	31.35	94.89
Med Fan	5.23	43.45	96.75
High Fan	27.93	67.82	98.39

V. conclusion

Con-

Based on our test results, Biozone Scientific air purifier can effectively kill 100% of *E. coli* and *Serratia marcesens* in air within 10 minutes, and can effectively clean 97.49% of *E. coli* and 98.39% of *Serratia marcesens* within 2 hours.

Environmental Industries Summaries

Test - House

Description: Demonstrate the reduction of airborne biological contaminants in actual residential setting utilizing a Biozone Air Purifier Model #2000

Results: Demonstrated positive reduction in airborne microorganisms

Test - Condominium

Description: Demonstrate the reduction of airborne biological contaminants in actual residential setting utilizing a Biozone Air Purifier Model #1000

Results: Demonstrated positive reduction in airborne microorganisms

Complete Test Results on Following Pages

SECTION 2

BIOZONE'S TEST RESULTS & REPORTS

Company EPA Certificate

SECTION 2

BIOZONE'S TEST RESULTS & REPORTS

Environmental Award

SECTION 2

BIOZONE'S TEST RESULTS & REPORTS

Summary Statements from
Clinical Evaluations

Summary Statements from Clinical Evaluations

"After extensive research including physical trials of various air cleaning devices, we now endorse the Biozone Air Purifiers and highly recommend them to everyone. They are the only products evaluated that provided consistent relief to all our patients who suffered from illness directly related to indoor air contaminants from hydrocarbons, mold, dust mites, etc."
Dr. Kimberly Crawford, M.D., F.A.C.P.M.

"I was recently introduced to the Biozone Air Purification unit and was pleasantly surprised with its effectiveness. Using petri dishes, two biological tests were performed in my hospital, one before the use of the Biozone and one incorporating the Biozone unit. The dramatic reduction of bacteria in the petri dishes when the Biozone was used was truly amazing!"
Susan A. Wilson, D.V.M.

"Aquanique has saved thousands of dollars in reduced electrical bills while the Biozone Induct Air Purification systems have prevented and or eliminated mold in the common areas of the building."
John P. Donnely, Ph.d

"A progress report on the equipment itself is very encouraging. We have been running the unit on medium and I am extremely happy with the decrease in the dust levels."
Walter Stone, Jr., D.M.D.

"The most efficient air purification systems will use a combination of technologies to enhance their overall decontamination abilities. Our clinical investigations have concluded that the Biozone Air Purifiers have demonstrated great efficacy for removal of all three categories of pollutants."
Dr. Howard Fisher

"After evaluation of the decontaminating results of the Biozone, our company has instituted the use of the product for improved sanitation methods."
Dr. C.L. Deshmukh

"I encounter some of the most environmentally sensitive patients who react to the smallest airborne allergens. For the last ten years I have been researching and investigating the air purifying industry. As a Doctor with an environmental health practice, I have had to research and investigate the answers to these questions for many of my patients. I found none of them being more effective at clearing cigarette and cigar smoke from a room, removing allergens from the air, removing smoke from a public place like a bar. The only others capable of killing germs are substantially more expensive!"
Dr. Craig Donnelly

STATEMENT OF EFFECTIVENESS AND SAFETY

Biozone Scientific produces a vast array of purifying products. Most are designed to be used for general air purification purposes in inhabited spaces. Some, however, are designed for purposes of biological and chemical decontamination as well as odor removal and are not appropriate for inhabited spaces. Biozone's products and methods have been tested for effectiveness by certifies independent laboratories, government agencies, many of the Company's customers, and WITL, the Company's in-house testing laboratory.

Biozone's purifying system combines the methods of ultraviolet light, photocatalytic oxidation and photoplasma. Whenever a purifying plasma is created using air or oxygen a certain amount of ozone will also be created. This minute amount of ozone is very helpful in the total effort of contaminant reduction. However, too much ozone is not desirable in inhabited spaces. Biozone has years of experience in recommending the proper unit to meet customer purifying requirements and **GUARANTEES** the ozone level in the plasma will not rise above safe limits as prescribed by the FDA, EPA, and OSHA.

SECTION 2

BIOZONE'S TEST RESULTS & REPORTS

A Few of Biozone's Customers

A FEW OF BIOZONE'S CUSTOMERS

Government Organizations

The White House
Department of Defense
FBI
US Air Force - Kabul
US Attorney's Office
US Geological Survey
US Coast Guard
Chatom Police Department
Shaker Heights Police Dept.
Alaska State Troopers
Southeastern Ohio Reg. Jail
Orange County Corrections Dept.
Tactical Support Equipment
Talent City Public Works
Lansing City Council
NY City Transit Authority
Virginia Dept. of Transportation
Lodi Housing Authority
California Coastal Comm.
UCLA Police Department
Fire Training Center

Healthcare Facilities

Walter Reed Army Med. Ctr.
Air Medic
Chiropractic Ctr. Annapolis
Advanced WellCare Group
Twin Rivers Rehab
Glen Park Clinic
Aids Volunteers of Cincin.
Boston Spine Clinics
Center for Teeth and Feet
Rhode Island Hospital
Kindred Hospital
Larned State Hospital
VA Med. Ctr. West Haven
Milroy Optical
Dr. Meyers Dental Clinic
Cardin Chiropractic
Allergy and Asthma Center
Biolife Plasma Services
Chiropractic Kinesiology
University Chiropractic
Sickels Clinic of Chrpctic.
Lung Guard Foundation
Twin Lakes Vision Clinic
Family Healthcare Network
In Focus Optometry
Fine Arts Dental Lab
United Dental
Accent Dental
Jasper Cty. Emergency
Securicor EMS
Trinity Healthcare

Educational Institutions

MIT Lincoln Labs
University of California
University of California (Davis)
North Iowa Area Community Col.
Princeton University
Chesterfield Day School
Indiana University
Julliard School
Sunflower School House
Magical Years Day Care Ctr.
Alamo Heights HS
Tomorrow Montessori

Residential/Comm. Services

American Residential Service
Commercial Grease
Advanced Cleaning Systems
Restoration Experts
New Air Technologies
Environmental Services
Applied Building Sciences
Whitehall - Professional
Home Maintenance
Avalon Property Mgmt.
Tim's Carpet Cleaning
CRC Service Company
Standing Watch Home Maint.
Techclean Industries
The Hill Group Home Maint.
Real Estate Innovations

Smoky Places

Bellagio Hotel and Casino Resort
Trump's Casino
BelTerra Casino and Resort
Creek Nation Casino
Parkview Tavern
Phieves Tavern
In Between Tavern
Gateway Bay & Grill
Cleats Sports Bar
Quarterdeck Bar & Grill
Norton's Grill & Pub
Max Doogans
Canton Cove Saloon
The Oasis
Blue Moon Cabaret
Diamond's Cabaret
Million Dollar Cabaret
Lockerbie Pub
Port Side Pub
Boomer's Pub
Corkscrew's Lounge

Mangos Tropical Café
The Blue Marlin
Phoenix Food and Spirits
New Britain Quartette Club
Oaks Golf Club
Brews & Cues
Sons of Italy Lodge
Italian Social Club, Taunton
American Legion Post 131
American Legion Post #4
Howard Porter VFW

Food Processing/Storage

Hershey Foods
Coca Cola
Two Bills Seafood
Kosher Fish Market
Independent Sea Food
Clem-Becker Wholesale Meat
Protein Products
Watchtower
Tasty Fries
Italian Rose
McFarling Foods
Northern Wisconsin Produce
Distribution Florale
New Zealand Institute for Crop
and
Food Research
Lopez Foods

Food Service

Rex's Family Restaurant
Black Pearl Restaurants
Schooners Restaurant
Henry's Seafood Restaurant
Café on Pine
Restaurant By The Beach
Loggers Restaurant & Bar
Café Vienna
Country Kitchen
St. Tropez
Gourmet Wine Shop
Don Cuco's
Formosa Garden Restaurant

Animal/Pet Care

American Canine Association
World Parrot Refuge
Avian Technology International
Kay's Aviary
Keshlyn Kennels
Englewood Animal Hospital
Dana Capistrano Animal Hospital
Aloha Kennels

The Cat Hospital of Auburn
A-1 Vet Care
All Creatures Great & Small
Dog Days
Sonshine Acres Kennels
Animal Welfare Society of
Waukesha
Pin Oak Kennels
Bloomingdale Animal Shelter
Colorado Reptile Shelter
Peacock Bridge Kennels
Langford Animal Health Clinic
Pocono Wildlife Rehabilitation
Canine Cuties
Merryfield Kennels

Agriculture

Poland Farms
Nagel Farms
Crescent Ranch
Otter Fork Swine Farm
Sumrow Ranch
Appell Pork Farms
Beumer Farm
McArthur Farms
Fuernot Farms
Lee Ranch
AgriGulf
H & H Farms
Saville Poultry
Marco Pork
Indigo Farm
Spirit River Farm

Hospitality

Holiday Express
Pocmont Resort
The Marsielle
Islander Inn
Wildernes Inn
Broadmoor Hotel
Garrett's Desert Inn
Baha Cabana Beach Resort
Promus Hotels
Best Western, Frdsbrg. TX

Industrial/Commercial

Boehringer Laboratories
Virginia Telecommunications
Greater Cleveland RTA
Conoco/Phillips Oil
NY Organic Fertilizer Company

Florida Fertilizer Company
Choice Steel Company
Meridian Metalform
Dupont Teijin Films
National Hydrolics
Hastings Hide
Hanna Semiconductor
Badger Sheet Metal
Don Bell Sign Company
Name Plate and Panel
Brockway Mechanical & Roofing

Offices

Philippine Embassy, Tokyo
Booz Allen Hamilton
Bank of America
Innovari
Davol, Inc.
B.M. Hesse Advertising
Geneva Companies
Schommer Properties
Czarnowski Exhibit Services
Nextgen Computers
Eastern American Data
Ollila Industries
Bell, Boyd & Lloyd

Misc. Bus./Orgs.

Goodwill Industries
Flowers by Carol
Sullivan Jewelers
Anderson Printing
Allan's Bicycle Shop
Town & Country Cigars
Birchgrove Fine Arts
Fatty's Custom Tatooz
East Coast Marine
PhotoConcepts
Midland Bowl
Fellowship Bible Church
Saint Dismas Church
Sunset Canyon Baptist Church
Church of the Apostle
Grayslake YMCA
Mary Baker Eddy Library
Warsaw Comm. Library
Orange Blossom RV

Vehicle Dealers/Services

Delbalso Ford Dealer
Acura of Valencia
Owens Motors

Ken Puttick Cadillac
Markers European Auto
Auto World
Peak Nissan
Don Massey Pontiac-Buick
Ernie Patti Pontiac-GmC
Woodhall Auto Repair
Tony's Auto Center
Galpin Ford

Salons and Spas

Body Network Salon
Great Cuts
Sigfrid of Germany Day Spa
Tips & Toes
Haircuts, Etc.
The Hair Resort
Nefer Nails
Bear Valley Beauty Salon
House of Huber
Gallery of Salons
Mario Tricoci Salons and Spas
Hair Works Salon and Spa
Colonia Nail
Nail Xpo
Galleria Nails and Spa
J & S Hair Company
Top Nails
Salon Vie
Holistic Wellness and Day Spas
Kathe Heide Skin Care Clinic

Clubs/Teams

Country Club of Plainesville
John's Island Club
Bath & Tennis Club (Palm Beach)
Boca West Country Club
Fitness Connection Athletic Club
West County Health & Fitness
Jazzercise
Angell's Aerobics
Club Management Services
Ottawa Senators Hockey Team
Hart's Sporting Center