



CC Technologies Pty Ltd

SILVER ION TECHNOLOGY



Best Water

Best Health

Best Life



Products Information Book

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Company Profile

CC Technologies Pty Ltd (CCT) is an Australian owned company that is dedicated in its offering unique water treatment and purification technologies to the municipal, industrial, medical and leisure markets.

Since 1993 CCT has been actively researching and developing an electrolytic mineral ion process which has proven to be effective in the treatment of water against bacterial, mould and fungi. This process is known as *Silver Ion Technology* or *Silver Ion Antibacterial Unit*.

CCT is also involved in providing turnkey solutions for water treatment plant, these solutions include consulting, design, fabrication and commissioning; making CCT is a one stop water treatment company providing total solutions for any water treatment requirements.

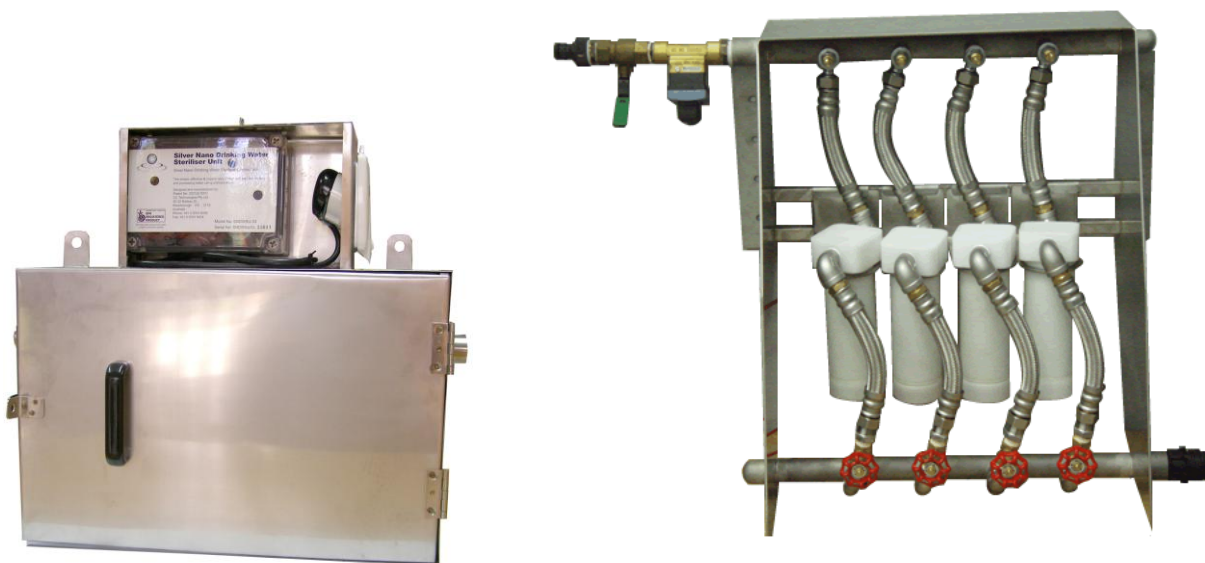
General

The use of silver for sterilizing drinking water with silver is a very old method and has been adopted frequently in many parts of the world throughout time.

CCT has revisited and improved this process, by using the bactericidal properties of silver and introducing microscopic silver ions into the water at precisely calculated amounts, being held in suspension by a tiny positive electric charge applied to each atom. Whilst the viruses and bacteria's possess a negative charge this causes a mutual attraction between the organisms and the silver ions, at this point the silver ions interferes with the DNA production, preventing reproduction and accelerating the death phase of the organism.

Although it is lethal to bacteria and fungus, silver ions are completely safe to humans, animals and plant life. It is odourless unlike most antimicrobials. The amount of silver ions in the disinfected water is well below the maximum amount stated by the directives issued by the World Health Organization (WHO) and complies with the Australian drinking standards.

Silver ions do not change the taste, smell or colour of the water. CCT *Silver Antibacterial Water System* was formerly known as Anti Bacterial Washdown Unit (ABWU).



How does the Silver Antibacterial Water System work? (Standard Unit Water Treatment System)

Connect the *Silver Antibacterial Water System* at the inlet water pipe. The water will flow through the infiltration process of the filtration system removing chlorine, colours, unpleasant odour & taste suspended solids, particles and turbidity.

A flow sensor is installed to detect the continually filtered water prior flowing through Silver Electrode Device which is the core of the *Silver Antibacterial water system*. The flow sensor will be transmitting the flow information to the CPU which ensures the water flow through Silver Electrode Device. In turn, the CPU of Silver Electrode Device will release a precisely calculated amount of silver ion from the electrode into the water to restrain bacteria such as Ecoli, Pseudomonas aeruginosa, etc... if it is present in the water.

With the addition of Silver ion, the anti microbial water is ready to be distributed throughout the building with the effect that eliminates a range of bacteria, mould and fungi. The treated water from *Silver Antibacterial Water System* complies with Australian Drinking Water Standards. It is completely safe to drink and use in any application.



Some of the benefits of silver ion treated water are:

- Water can be treated directly in the pipeline with antimicrobial
- Restrain bacteria, mould and fungi proven to cause diseases
- Continuous reduce of unpleasant odours
- Reduction in the risk of bacterial food contamination
- Restrain bacteria in any surfaces kept in contact with antimicrobial water
- Ability to restrain microbes at a steady and controlled rate
- Harmless to all materials as the treated water is safe to use everywhere
- No risk in relation to occupational health and safety of workers
- Assurance of bacterial free to any surface washed by antimicrobial water
- Long lasting residual disinfection
- No change to taste, smell or colour of water



Incorporating Silver Ion Antibacterial Unit with any of the existing the water filtration system, apart filters the microbes from the water, it enhances mineral, the treated water has been developed the ability to prevent the re-growth of new microbes on any surface or area that the water comes in contact with.

Features of Silver Ion Antibacterial Unit

- Non Chemical.
- Non flammable.
- Non Hazardous.
- Non Toxic.
- Environmental friendly



Some samples of applications

- Municipal Water Treatment Plants
- Domestic Drinking Water
- Household application such as washing vegetable, washing dishes, washing floor, washing clothes, shower, daily drinking water, cooking etc.....
- Industrial Cooling Towers
- Domestic and industrial evaporative coolers
- Commercial Buildings
- Aged Care Facilities
- Vet Clinics
- Hospitals
- Agriculture
- Horticulture
- Any area requiring the eliminate of the growth or to kill bacteria
- Hotels
- Kitchens
- Food Processing Plants
- Processing Equipment
- Food Preparation Areas
- Fish and Seafood Retailers
- Metal cutting machines using water based cutting oils

How does the silver ion interfere in bacterial growth?

Silver has at least three ways to inactivate micro organisms:

- Attracting to the negative charge of the -S.H. (Sulfidal) group and remove the hydrogen atoms surrounding the surface of bacteria or viruses to inhibit respiration, thus inactivating with the micro organisms.
- Binding with D.N.A. in micro organisms to prevent unwinding and replication and control bacteria growth.
- Reacting with the surface of bacteria and impairing cell membranes, thus silver ion attach respiration site to cause death by suffocation.

The basic background of Silver

The principal of using metals for water purification and prevent disease goes back hundreds of years, history is full of examples

Silver's effectiveness dates right back to the Middle Ages where the ancient Greeks lined their eating and drinking vessels, as did many other cultures throughout the world.

Silverware becomes popular 1900 years ago when physicians advised their patients to only eat with silverware if they wanted to stay healthy.

During 14th century, about 25% of people in Europe died from the Bubonic plague. Wealthy parents gave their children silver spoons to suck on to battle the plague. This leads to the saying "born with a silver spoon in your mouth".

In 1884, Dr Crede, a German obstetrician, discovered that a mild silver solution put in babies eyes at birth, would prevent eye infections. This practice rapidly became mandated and is still practiced today in hospitals throughout the world.

According to Russell (1994), Aristotle advised Alexander the great to boil water and store in silver vessels to prevent waterborne diseases. Pioneers of the American West would put a silver dollar in a jug of milk to keep it fresh without refrigeration, barrels of water also contained silver coins. The Vikings would line their ships with strings of silver and copper for the same purpose (Laubush 1971).

Although most civilizations did not fully comprehend the antibacterial properties of silver, it was widely understood that adding silver to water increased clarity, reduced odours and improved taste. Until recently, silver water purification techniques had fallen out of favour for more fastidious methods such as chlorination.

Silver electrochemistry methods were re-examined in the 1960s when NASA developed an electrolytic silver ionizer to purify the drinking water on the Apollo spacecraft. NASA now uses silver for the CO₂ chemisorption process on board the Challenger space shuttles and the international space station (NASA 2004).

Today silver is used to prevent infections in burnt patients, preventing blindness in newborns, bacteria-free cosmetics, disinfecting water storage containers including swimming pools, controlling Legionella bacteria in hospitals and to improve the performance of drinking water filters. Recent research has also shown that silver may be used as an alternative to conventional municipal and wastewater treatment processes and even the possibility the cure for the common cold.

Experiment Test- Report 1
Bacteriological Analysis

Bacteriological Analysis report by INDO FISHERIES, Rajiv Gandhi Nagar, Harekala-574 181, Mangalore, India

Remark : Sample No.1 – 7 drawn on 25-07-2006

| Sample No. | Type | Untreated Water (Total Bacterial count) | Treated water (Total bacterial count) | Coliform Bacterie (In untreated water) | Coliform Bacterie (In treated water) |
|------------|-----------------|--|--|--|---------------------------------------|
| 1 | Squid whole | After 24 hrs 3,90,000 TPC/gm at 37 Degree C. | After 24 hrs 36,000 TPC/gm at 37 Degree C. | 10 | Nil |
| 2 | Mackeral Whole | After 24 hrs 190,000 TPC/gm at 37 Degree C | After 24 hrs 7,500 | | |
| 3 | Swa 13/cm SQW | After 24 hrs Crowded TPC/cm2 at 37 Degree C. | After 24 hrs 252 | | |
| 4 | Mackeral | After 24 hrs 576 TPC/cm2 at 37 degree C | After 24 hrs 40 | | |
| 5 | Drainage | Before wash 664 TPC/cm2 at 37 degree C | After wash 2 hr later 36 | | |
| 6 | Cooker Conveyor | Before wash 80 TPC/cm2 at 37 degree C | After wash 2 hrs later Nil | | |
| 7 | Water | 24/ml at 37 degree C | Nil | | |
| 8 | Ice | 34/ml at 37 degree C | 18 | | |

Sample No. 8 drawn on 26-07-2006

Sample No.1 & 2 raw material sample

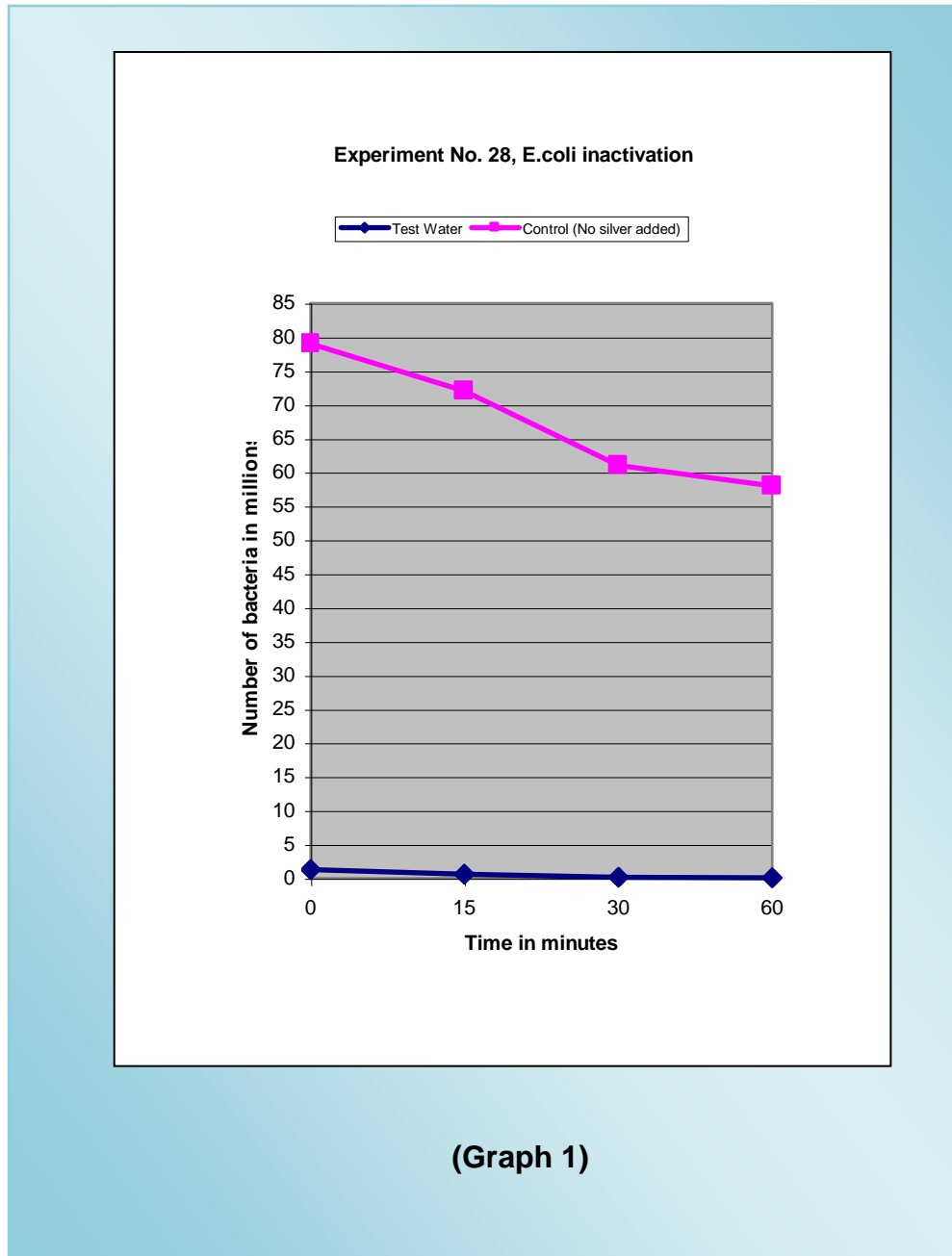
Sample NO.3 & 6 swab Sample

Experiment Test- Report 2

Experiment 28

Australian Water Technologies (AWT) fully accredited laboratory in Australia, has carried out extensive testing (Experiment 28 & Experiment 33-36) as to the effectiveness of silver antibacterial water as a biocide on behalf of CC Technologies Pty. Ltd.

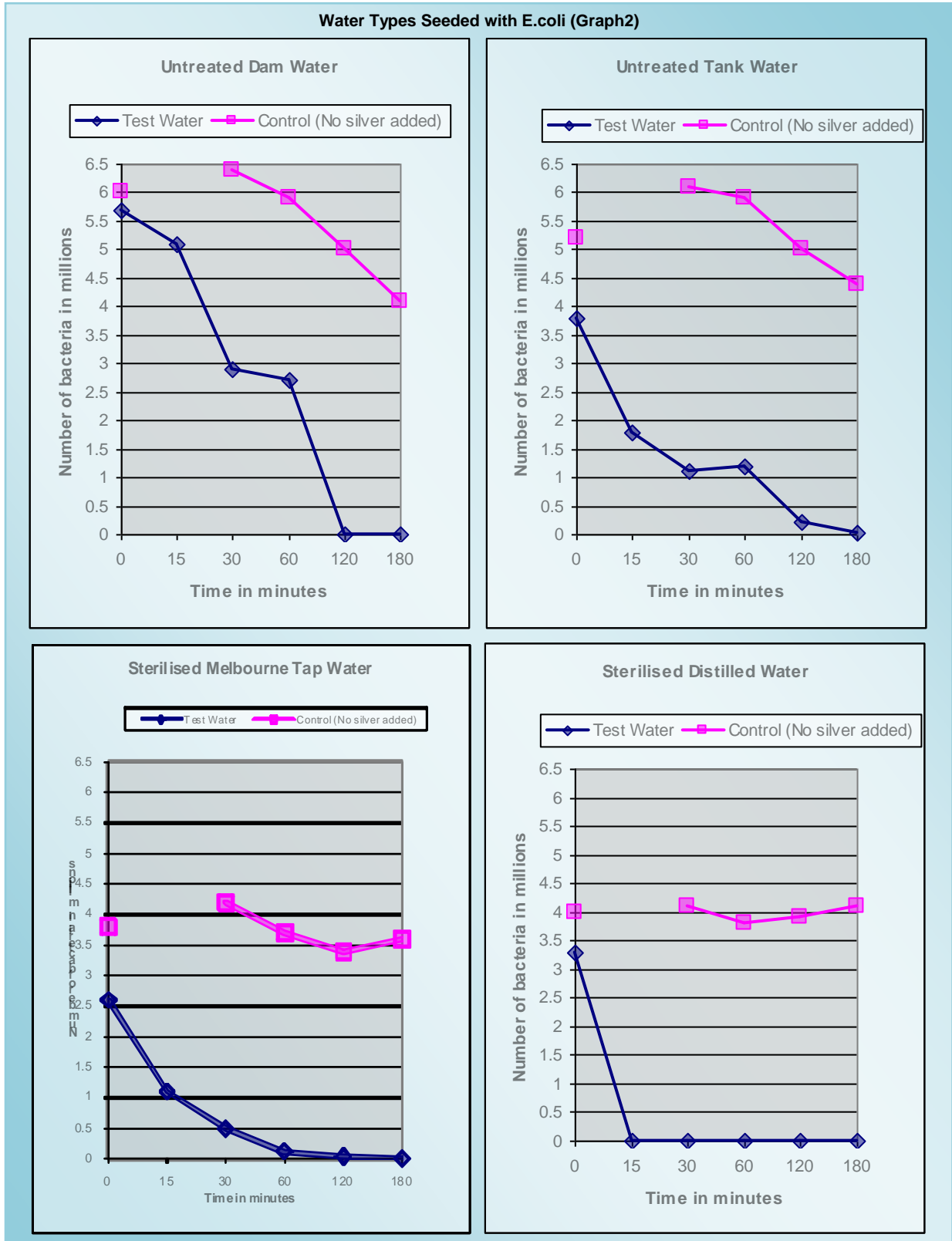
Experiment 28 has been carried out to indicate the effectiveness of treatment of silver antibacterial water on bacteria, *E.coli*, over various contact times. (Graph 1)



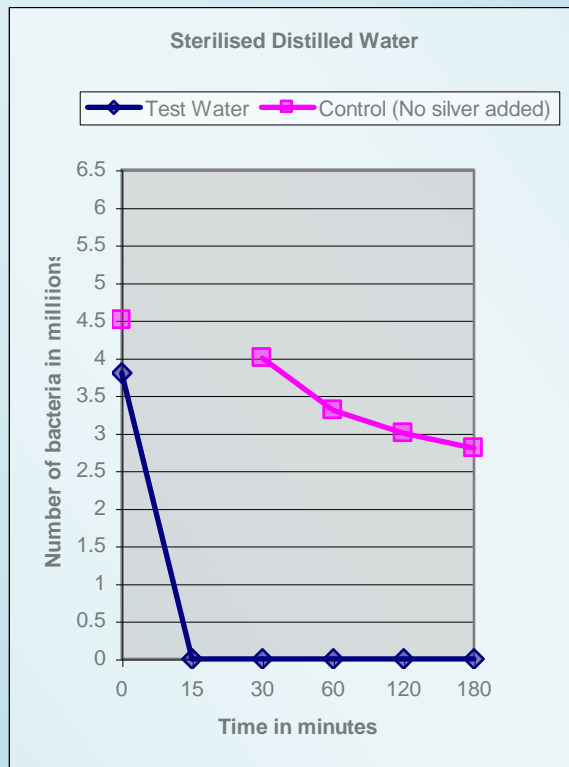
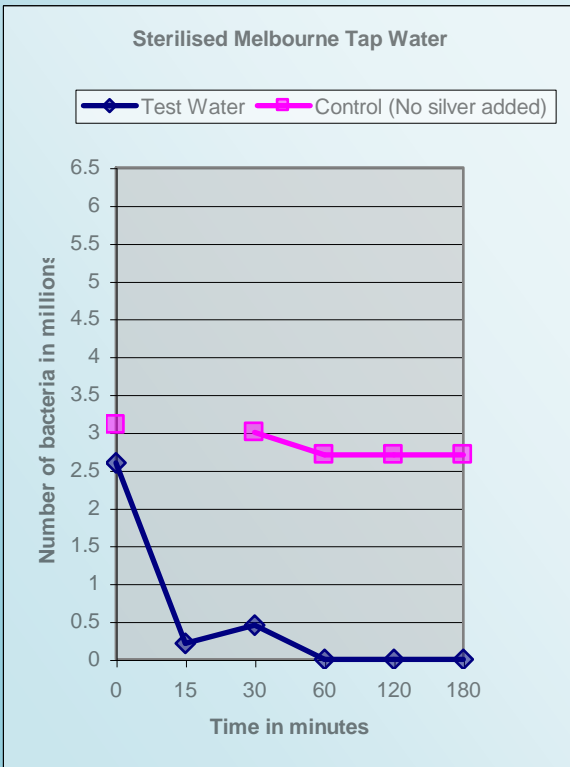
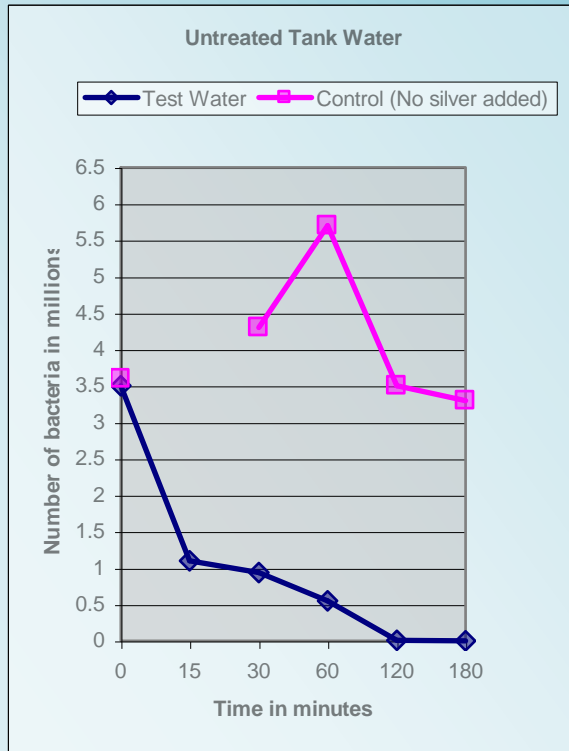
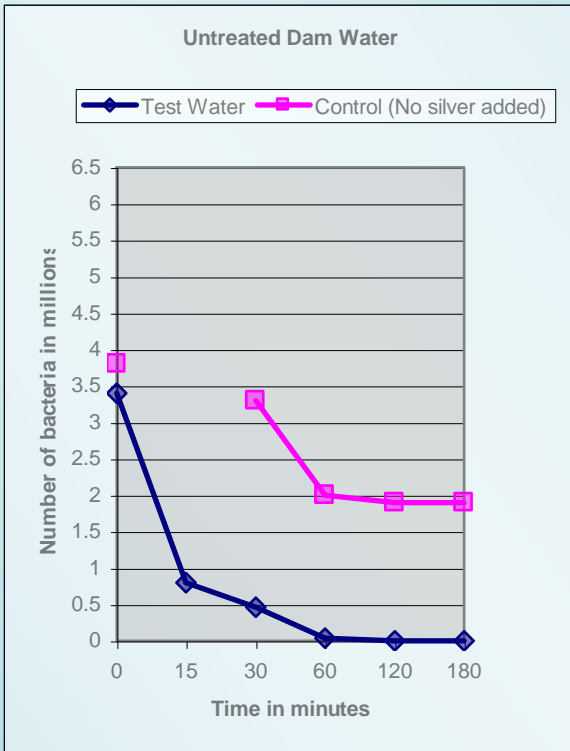
Experiment Test- Report 3
Experiment 33-36

Experiment 33 – 36 validates the effectiveness of treatments of silver antibacterial water against populations of both bacteria, *E.coli* and *Ps.aeruginosa*, in differing water types. (Graph 2 & 3)

The graphs illustrate the microbe population killed from the treatment produced by the Silver Antibacterial Water Unit. A significant reduction in the number of bacteria was attained after 60 minutes for the test water compares to control water (no silver added). If the experiments had been further examined at 2 or 3 hours duration, the killed rate would be significant.



Water Types Seeded with Pseudomonas Aeruginosa (Graph3)



Experiment Test-Report 4
Experiment 45

A unique experiment involves the manufacture of sausages utilising water from Silver Antibacterial Water System. (Table 1)

The preparation work and manufacture of the sausages used in this experiment was performed in a retail butcher’s premises in between normal day-to-day activities. This was done to try and present an unbiased report and also to minimise disruption to business activities.

It is very important for the reader to understand that the Silver Antibacterial Water System was not used in this instance, in its designed role of assisting in the sanitising the plant and equipment associated with the production of the sausages.

Table 1: Results of Sausages Made Using Four Different Formulae and Stored at 4 – 5°C

| | | Tap Water with Preservative | Ionised Water with Preservative | Tap Water No Preservative | Ionised Water No Preservative |
|--------------|----------------------|---|---|--|--|
| Day 1 | SPC cfu per g @ 25°C | 1,400,000 | 1,100,000 | ~5,000,000 | 2,900,000 |
| | Visual Appearance | pink | pink | beige-pink | beige-pink |
| Day 3 | SPC cfu per g @ 25°C | 860,000 | 490,000 | 58,000,000 | 29,000,000 |
| | Visual Appearance | pink | pink | brown, wet | brown, wet |
| Day 6 | SPC cfu per g @ 25°C | 10,000,000 | 12,000,000 | 110,000,000 | 76,000,000 |
| | Visual Appearance | pink | pink | brown, wet, pink at contact areas of adjoining sausages, slight malodour | brown, wet, pink at contact areas of adjoining sausages, slight malodour |
| Day 9 | SPC cfu per g @ 25°C | 110,000,000 | 62,000,000 | 160,000,000 | 120,000,000 |
| | Visual Appearance | beige-pink, pink at contact areas of adjoining sausages | beige-pink, pink at contact areas of adjoining sausages | green-brown, wet, pink at contact areas of adjoining sausages, malodour | green-brown, wet, pink at contact areas of adjoining sausages, malodour |

Experiment Test-Report 5
ATP Hygiene Result

Hygiene Result for Sdirekha Ventures Sdn. Bhd., 39, Jalan Sultan Ismail, Kuala Lumpur 50250 Kuala Lumpur, West Malaysia using instrument/Bacterial Meter (1).

Test carry out by Mr. Brian Tee Guan Fui, AMIC , Assistant Manager, Health & Safety/Healthcare Service Support of Rentokil Initial (M) Sdn. Bhd., (12889-M), Suite 10.02, 10th Floor, Menara Yayasan Selangor, No. 184, Jalan Persiaran Barat, 46000 petaling Jaya, Selangor Darul Ehsan, Malaysia and witness by Mr. Anbu Durai the owner of Sdirekha Ventures SDN. Bhd. on 2nd Nov. 2006

| Time | Sampling point | Before | After treated by ABWU water |
|-------|----------------|--------|-----------------------------|
| 09.30 | Drainage | 184 | 84 |
| 10.30 | Toilet Bowl | 2,450 | 159 |

11.30 (one hour later) conduct the test.

(1) Instrument/Bacterial meter used : System SURE II from Hygiemo : Made in U.K.

Experiment Test-Report 6

Test on Cooling Towers and Evaporator Condenser

Monthly total bacteria and quarterly *Legionella* testing on Cooling Towers and Evaporator Condenser of Makmur Enterprises Pty Ltd

Makmur Enterprises is a frozen food manufacturer. The company has installed and been using the Silver Antibacterial Water System for Cooling Towers and Evaporator Condensers.

Samples from cooling towers and evaporator condensers are collected every month to test for the monthly total bacteria, HCC (EML) and TPC (Amdel), and the quarterly *Legionella*. The summary of monthly total bacteria and quarterly *Legionella* testing results are attached.

From March 2004 to Jan 2005, the total bacterial count was *rarely* reached over the maximum level of 100,000 HCC/mL and *Legionella* totals always stayed below 10 cfu/mL. These have demonstrated the effectiveness of using Silver Antibacterial Water System killing bacteria and preventing the growth of microbes in the cooling tower. As stated by Carl Greenaway, Makmur Enterprises (pg.13&14), “monthly total bacteria (HCC) and quarterly *Legionella* testing results reflect the effectiveness of the new treatment. Since the commencement of the Silver Antibacterial Water System the cooling tower bacterial counts are the lower ever recorded and the appearance of the cooling tower water is clear and free of particulate matter.”

Monthly Total Bacteria (HCC/mL) Testing Results of Makmur Enterprises' Cooling Towers (C/T) and Evaporator Condensers (E/C) from March 2004 to September 2004

| Samples | March | April | May | June | July | August | September |
|---------|-------|--------|--------|--------|------|--------|-----------|
| C/T 1 | 24000 | 2000 | < 2000 | 2000 | 2000 | 38000 | 30000 |
| C/T 2 | 22000 | 4000 | 2000 | 8000 | 2000 | 48000 | 34000 |
| E/C 1 | 64000 | < 2000 | < 2000 | 12000 | 4000 | 380000 | 34000 |
| E/C 2 | N/A | 2000 | 2000 | < 2000 | 2000 | 170000 | 24000 |

Quarterly *Legionella* (cfu/mL) Testing Results of Makmur Enterprises' Cooling Towers (C/T) and Evaporator Condensers (E/C) from April 2004 to September 2004

| Samples | April | | | June | | | August | | | September | | |
|---------|---------------------------|----------|---------|---------------------------|----------|---------|---------------------------|----------|---------|---------------------------|----------|---------|
| | Legionella Species cfu/mL | | | Legionella Species cfu/mL | | | Legionella Species cfu/mL | | | Legionella Species cfu/mL | | |
| | LpneSG1 | LpneSG2+ | L other | LpneSG1 | LpneSG2+ | L other | LpneSG1 | LpneSG2+ | L other | LpneSG1 | LpneSG2+ | L other |
| C/T 1 | <10 | <10 | <10 | <10 | <10 | <10 | Pending | | | <10 | <10 | <10 |
| C/T 2 | <10 | <10 | <10 | <10 | <10 | <10 | Pending | | | <10 | <10 | <10 |
| E/C 1 | <10 | <10 | <10 | <10 | <10 | <10 | Pending | | | <10 | <10 | <10 |
| E/C 2 | <10 | <10 | <10 | <10 | <10 | <10 | Pending | | | <10 | <10 | <10 |

< = Less than ~ = Estimated spp = Species Y = Yeast

HCC = Heterotrophic Colony Count Lpne = Legionella

SG = Scrogroup N/D = Not detected - = Not tested N/A = Not Available

Above samples are tested by EML Consulting Services Pty Ltd.

Monthly Total Bacteria (TPC) Testing Results of Cooling Towers (C/T) and Evaporator Condensers (E/C) from Oct 2004 to Feb 2005

| | Oct 04 | Nov 04 | Dec 04 | Jan 05 |
|---------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Samples | Total Plate Count (TPC) CFU/mL | Total Plate Count (TPC) CFU/mL | Total Plate Count (TPC) CFU/mL | Total Plate Count (TPC) CFU/mL |
| C/T 1 | 55000 | 28000 | ~17000 | ~22000 |
| C/T 2 | 80000 | ~ 14000 | ~ 4600 | 56000 |
| E/C 1 | 78000 | ~ 20000 | ~ 7800 | 55000 |
| E/C 2 | 390 | 2500 | ~ 16000 | 51000 |

Quarterly Legionella (cfu/mL) Testing Results of Makmur Enterprises' Cooling Towers (C/T) and Evaporator Condensers (E/C) from Oct 2004 to Dec 2004

| | Oct 2004 | Dec 2004 |
|---------|---------------------------|---------------------------|
| Samples | Legionella Species cfu/mL | Legionella Species cfu/mL |
| C/T 1 | <10 | <10 |
| C/T 2 | <10 | <10 |
| E/C 1 | <10 | <10 |
| E/C 2 | <10 | <10 |

Sample Storage: - Refrigeration at 2 – 8 degrees C; unless specified otherwise in sample comments, analysis commenced within 24 hours of sampling; ND = Not Detected; NR = No Result; spr = Spreaders Present. Incubation conditions: 37 degrees C/48 hours.

Above samples are tested by Amdel.



Demonstration Test -Report 7

Date: 10 June 2010

Company / Name: NORTHERN MEAT &POULTRY SUPPLIERS P/L & Magic Taste Foods

Tests were carried out on site: 64-66 Chifley Drive, Preston VIC 3072 Australia

| No | Sampling Site | Test No# | Count of Microorganism | | | | |
|----|-------------------------|----------|--|--|---|----------|--|
| | | | Result of before Washing | Time of Washing with Silver Antibacterial Wash down unit | Time of taking sample after washing | Test No# | Result of after washing with Silver Antibacterial wash down unit |
| 1 | Steamer | #40 | 9999+ | 4:49 PM | 5:21 PM | #49 | 360 |
| 2 | Tumbler | #42 | 8 | | | | |
| 3 | Tumbler | #43 | 898 | 4:45 PM | 5:22 PM | #50 | 136 |
| 4 | Wastage Drum | #44 | 1291 | 4:47 PM | 5:25 PM | #51 | 1200 |
| | | | | | 5:26 PM | #52 | 38 |
| No | Sampling Site | Test No# | Result of before passing through Silver Antibacterial Wash down unit | Test No# | Result of after passing through Silver Antibacterial Wash down unit | | |
| 5 | Recycle Water (running) | #45 | 254 | #47 | 109 | | |
| 6 | Recycle Water (cup) | #46 | 184 | #48 | 77 | | |

Notice:

- 1 Operating Instrument used: Hygiena, systemSURE II and Ultrasnap.
- 2 Tests were conducted by CC Technologies Pty Ltd staff with Mr. Evan Tsioukis and Mr. Suresh Gowda.
- 3 9999+ is the maximum reading obtainable from measuring device.
- 4 Test No#42 process was incorrectly followed therefore test terminated and reported with No#43.
- 5 Test No#49, the result obtained has to be questioned, due to the sampling site was washed down with detergent after washing with Silver Antibacterial Wash down unit.
- 6 Test No#51. A larger sample area was taken compared to initial sample in test No.#44 and was therefore repeated using correct sample size in the No.#52.

Australian Authority

- Developed and manufactured in Australia.
- Australian patent.
- Accepted by Biological Farmers of Australia to be used in organic production process.
- Member of AWA (Australian Water Association)
- Trade Mark registered with IP Australia

The Trade Mark is registered for the following goods and services:

Anti microbial apparatus used in and for water supply and water treatment; anti microbial apparatus used in and for heating, cooking, drying and sanitary purposes; anti microbial apparatus used in and for refrigeration and ventilation being goods in class 11.

Anti bacterial / anti microbial silver colloid preparation / treatment for disinfections and preservation of liquids, food stuffs; for use in agriculture and horticulture and drinking water and science being class 1.

Anti bacterial / anti microbial silver colloid preparation / treatment for laundry use, cleaning, sanitizing, personal care products including soaps, shampoos, hair lotions, skin lotions, dentifrices; cleaning, sanitizing and protection treatments for application to surfaces for removal of odors and inhibition of bacteria, mould, fungi, mildew being goods in class 3.

Anti bacterial / anti microbial silver colloid used in pharmaceutical, veterinary and sanitary preparations; preparation used for materials for dressings and lotions in the treatment of wounds and burns; disinfectant for destroying bacteria, mould, mildew, fungi and similar microbes; preparation for inclusion in equipment used for pharmaceutical, veterinary and sanitary purposes being goods in class 5.

Anti bacterial / anti microbial silver colloid (a chemical preparation) used in pharmaceutical, veterinary and sanitary preparations; preparation used for materials for dressings and lotions in the treatment of wounds and burns; disinfectant for destroying bacteria, mould, mildew, fungi and similar microbes; preparation for the inclusion in equipment used for pharmaceutical, veterinary and sanitary purposes being goods in class 5.