Consume-it

Our Vision

Green Solutions to protect our Environment and Saving The Planet's Water
Pioneering the way towards safe clean drinking water, for all people and animals

Putting the good back in water

COMPANY VISION

Consume – it primary objective is the provision of a solution to the problem of unclean water thus eliminating the dangers of using contaminated water and in turn ensuring that water used for domestic and industrial use is free of water borne disease forming bacteria, chlorine and harmful chemicals.

We are pioneering the way towards people and animals having access to safe clean water for consumption, cleaning, bathing and recreation and product quality, accountability, certification, sustainability and market penetration are vitally important to us.

WHY ARE WE HERE?

We at Consume – It have a product that is unique, viable, and in most cases cost effective due to its functionality, that will change the basic principles around water treatment and having water that is free from bacteria and water borne disease.

This will assist the agriculture farmer in more ways than one.

PURESAN

PURE AGRI©

Puresan Pure Agri© is a unique formulation of non-toxic mineral compounds for the control of a broad spectrum bacterial , fungal and viral infestations found in agriculture, horticultural and field crops.

Highly effective to kill off a wide range of bacteria, fungi and viruses in drinking water (Humans and Animals), pack-house water baths, on field crops, vegetables , fruit orchards, and on produce during as well as after packaging to prevent spoilage and extending shelve life.

ECO-FRIENDLY

PURESAN

PURE AGRI©

PRODUCT CHARACTERISTICS

- Odourless and acceptable for certification of products as being organically produced.
- The unique formulation of gold, Zinc, Silver, copper (nitrate) and other elements now provides enhanced benefits at low cost to farmers and food processors.
- Eliminates the need to use synthetic chemical bactericides and fungicides.
- A unique formulation of non-toxic mineral compounds.
- Effective in pH ranges from 6.0 to 7.8
- Results orientated cost effective product
- Wide application:
  - Preservation
  - Fungicide
  - Bactericide
  - Anti Viral

ECO-FRIENDLY

"The product in its mentioned application has no toxic levels" – CSIR (South Africa)

Conforms & exceeds WHO / EPA Standard for human and animal consumption, in correct dosages.

PURESAN

PURE AGRI©

BENEFITS OF USE

What is important for the farmer and based on what crops and what the problems are in the soil and the water is the following.

- Using Pure Agri reduces and or eliminates the use of synthetic fertilisers such as phosphates, nitrates and sulphates that are used to enhance crop growth.
- It will increase the yield of crop per hectare of land.
- Pure Agri continues to work in the soil and in the plant, without the build-up of metals that has a negative effect downstream. Run off from agricultural fields into rivers and dams will enhance the water ways downstream and clean the water of any bacteria algae and phytophthora issues.
- Eliminates the need to use synthetic chemical bactericides and fungicides.
- Yield and quality of the crops have seen an increase with the use of Puresan Pure Agri©.

PURESAN

PURE AGRI©

BENEFITS OF USE

- Using Pure Agri cleans the water of pathogens creating healthy water addition to the crops.
- Pure Agri will provide micro nutrients to the soil which will enhance the nitrification process required enriching the plant with higher levels of protein namely ammonia.
- The main issue is that farmers can get is the reality that clean water is clean healthy crops, and reduces and in some cases will eliminate the use of synthetic fertilisers, and this can be replaced again with manure that can be treated with Pure Agri before application to remove unwanted pathogens.
- Farmers know that our rivers and dams are flooded with issues around e-coli, coli form and phytophthora which has a detrimental effect on crops and the health of the crops, this is controlled and eradicated with Pure Agri.
- Conclusive results on eradication of phytophthora in water sources.

Application of
PURE AGRI©

Application can be done by drenching or dosing equipment.

Dosing Pump

Dosing Pump

Dosing

Drenching

Drenching

"The product in its mentioned application has no toxic levels" – CSIR (South Africa)

Conforms & exceeds WHO / EPA Standard for human and animal consumption, in correct dosages.

PURESAN

PURE AGRI©

RECOMMENDED DOSAGE

- If the farmer has difficulty with items such as phytophthora then addition at levels of 1 litre to 80 000 litres of water till the problem is eradicated.
- Once control of any disease was achieved continuous use of the product can be applied but at low levels of active ingredients so dilutions of 1 litre Pure Agri to 150 000 litres of water.
- To get rid of weeds that are not wanted dilution of 250ml to 25 litres of water and spray this onto the weeds twice a week for a period of 2 weeks is normally sufficient to remove the weeds, and these will die and also add nutrients to the soil as they decay.
- At the levels prescribed the bacillus subtilis will not be killed off, so it does not kill off the natural bacteria in the soil that enhance nitrification as well as removal of excess nitrates and nitrites.
- Will control and eradicate powdery mildew as well as moss and other yeasts and fungi that could collect at the base of the tree and leaves if sprayed onto the problem areas.
- It should control black and brown spot on fruit and trees if applied in 1 litre to 80 000 litres of water and applied with a sticker at least once per growing season.

PURESAN

PURE AGRI©

RECOMMENDED DOSAGE if Pure Agri is not continuously used

- Fruit Dipping – 100ml per 5000 litres water
- Bacterial control – 100ml per 5000 litres water
- Fungal Disease – 100ml per 5000 litres water

Irrigation Sticker

- a sticker adjuvant for leaf adhesion is according to instruction on different products

Puresan Pure Agri© is available in: 1 litre, 25 litre, 210 litre and 1000 Litre.

Apply Puresan Pure Agri© curatively at the first sign of any disease and repeat every 10-14 days.

KAURI DIEBACK TRIAL

A COLLABORATION IN OUR EFFORT TO KEEP THE KAURI STANDING - AMANDA COLLING

KAURI DIEBACK TRIAL

Table of Contents

PURESAN PRO - KAURI DIEBACK TRIAL

OVERVIEW OF TRADITIONAL CHEMICAL PESTICIDES:

Soil and Pesticides:

Soil can be degraded and the community of organisms living in the soil can be damaged by the misuse
or over use of pesticides. Some pesticides are more toxic to soil organisms than others.
Some pesticides may break down quickly when applied to soils, while others may persist for longer periods.

Plant-Pesticide Interaction:

Pesticides can be absorbed by plants through the leaves and roots. This type of herbicide can take longer
to act, but they can also be more effective because they are working throughout the plant. Other herbicides are meant to kill by contact.

Pesticides can be divided into 3 categories based on half-lives:

NON-PERSISTENT Less than 30 days

MODERATELY PERSISTENT 30 to 100 days

PERSISTENT Greater than 100 days

Because half-life values can vary considerably depending on environmental conditions, they are often reported as a range for each media.

Health Risks:

Pesticides have been linked to a wide range of human health hazards, ranging from short-term impacts
such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption. There is a growing rate of CNS (Central Nervous System) disorders in humans, especially in children. Cholinesterase is one of many important enzymes needed for the proper functioning of the nervous system of humans, other vertebrates and insects. Certain chemical classes of pesticides, such as organophosphates (OPs) and carbamates (CMs) work against undesirable bugs by interfering with, or “inhibiting” cholinesterase. While the effects of cholinesterase inhibiting products are intended for insect pests, these chemicals can also be poisonous, or toxic, to humans in some situations. Human exposure to cholinesterase inhibiting chemicals can result from inhalation, ingestion, or eye or skin contact during the manufacture, mixing, or applications of these pesticides.
Environmental Risks:
Impact on environment. Pesticides can contaminate soil, water, turf, and other vegetation. In addition
to killing insects or weeds, pesticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants. Chemical pesticides are known to pollute the environme

PURESAN PRO:

A saturated ionic complex solution containing:

Name	CAS No.	EC No.	Content
Copper Nitrate	**7440-50-8**	**231-159-6**	**6%**
Zinc Nitrate	**7440-66-6**	**231-175-3**	**2%**
Aluminium Nitrate	**7429-90-5**	**231-072-3**	**<1%**
Silver Nitrate	**7440-22-4**	**231-131-3**	**<1%**
Water	**7732-18-5**	**231-791-2**	**60-80%**
Impuritie			<1%

Function of Copper Nitrate in plants:

Copper activates some enzymes in plants which are involved in lignin synthesis and it is essential in several enzyme systems. It is also required in the process of photosynthesis, is essential in plant respiration and assists in plant metabolism of carbohydrates and proteins.

Function of Zinc Nitrate in plants:

The function of zinc is to help the plant produce chlorophyll. Leaves discolour when the soil is deficient
in zinc and plant growth is stunted. Zinc deficiency causes a type of leaf discoloration called chlorosis,
which causes the tissue between the veins to turn yellow while the veins remain green.

Function of Silver Nitrate in plants:

The influence of exogenously applied silver ions in the form of AgNO3 in plant tissue culture media significantly regulates the ethylene activity in most of the plant systems. We have clearly brought out the major physiological effects of AgNO3 in plant systems viz direct or indirect organogenesis, somatic embryogenesis, in vitro rooting of micro shoots, induction of flowering, early flowering, sex expression, and control of leaf abscission. However, there is a gap in information on the molecular mechanisms of interaction between silver ions and the ethylene receptors. Further research on the regulation of these morphogenesis through the use of metal ions like silver would throw light on an array of functions of relatively simple molecules that play a marvellous role in influencing growth, development, and adaptation of plants to the environment. This opens new dimensions in understanding plant morphogenesis. Hence, it is necessary to elucidate the physiological mechanisms at the gene regulation level to find out the actual role of silver ions in signalling and to see how they influence regulation of ethylene action in plants.

How does Copper Nitrate kill microbes ? :

Copper, through cuprous oxide, kills microbes through three main pathways, with five total kill mechanisms available at any time it comes into contact with cells. Any of these five kill methods can destroy microbes, but overlapping mechanisms can also prevent developing resistance.

The first kill mechanism is this rusting, when the process of creating rust molecules, copper pulls electrons from the membrane of the microbe's cell wall lipids, oxygen or proteins. Oxidizing copper atoms weaken the microbe when they pull these electrons from the atoms that make up the cell wall. Just like pulling bricks from a wall, eventually the cell wall breaks, killing the microbe.

Three kill mechanisms have to do with microbial cellular toxicity. As the oxidizing copper atoms break down the cell wall, the microbes attempt to adapt to the environment by taking in from its surroundings or pushing unneeded elements out. As a result, the copper ions flood into the cell. Copper is quickly toxic to the inside of the cell, which is full of fragile, DNA-making parts. The three mechanisms involve different aspects of these internal mechanisms, from energy production to DNA-writing.

This mechanism is like the story of the Trojan Horse. Outside, the army was working hard to break down the wall. But once the army found a way inside, it quickly destroys the inhabitants. The army has many mechanisms for destroying the enemy: Stop supplies of food (cell energy), disrupt communications
(DNA-writing), or destroy weapons and supplies (displacement flooding).

The third category and fifth kill mechanism is through the pathway of free radicals. Oxidizing copper releases free radicals, atoms of oxygen and hydrogen or oxygen hydroxide. These atoms are highly

Continued

reactive with other substances because they have one or more unpaired electrons; this makes the atoms unstable.

All atoms want to be stable and so they seek out an electron to make a stable pair. As a result, they "steal" an electron from surrounding molecules, setting off a destructive chain reaction in the microbe's cell membrane, rupturing it and ultimately killing the microbes.

How does Silver Nitrate kill microbes ? :

Even though the reaction of Ag+ ions with bacteria has been studied in depth for long periods of time, the inactivation mechanism is not entirely known and the reaction of nanoparticles with these pathogens is even less well understood. Ag+ ions are thought to attack the DNA thiol bases, forming dimers that prevent DNA replication. Silver metal in water solutions release silver in the form of Ag+ ions, which act as antibacterial agents in the same manner as AgNO3. Therefore, the reaction of these three species against bacteria is believed to be essentially the same, although the rate of inactivation may vary widely, most probably owing to the rate of Ag+release. It has also been known, for a rather long time, that Ag+ ions bind to thiol groups containing cell membranes and enzymes, forming stable S–Ag bonds denature them, and thus prevent DNA replication by condensation.

Silver is also involved in catalytic oxidation reactions that form R–S–S–R disulfides, which are achieved by silver catalyzing the reaction between the oxygen dissolved in the cell and the hydrogen of the S–H thiol group.

Continued

Ag+ ions, in concentration of parts per billion, have has been known to react with maltose transporter and fructose bisphosphate aldolase protein, causing expression decrease. Treatment with Ag+ has been found to degrade several proteins and associate with the bacterial DNA after it penetrates the cell wall. To that effect, we find that Ag+enters the bacterial cell and intercalates between the base pair of purine and pyrimidine, thus disrupting H bonding between antiparallel strands, causing the denaturation of DNA and the subsequent inactivation of bacterial. Our data suggest, as most investigators believe, that Ag should be in its ionic form, Ag+, to be an effective antibacterial agent and that silver in its metallic noniron form is rather inert. Silver ions penetrate bacterial cells through their hydrophobic membrane to access the cytoplasm. One such pathway is the transmembrane protein that normally transports ions other than Ag+.

However, Enterococcus hirae proteins are known to transport silver ions. Experiments in vivo and in vitro suggested that Ag+ disrupts disulfide bond formation in proteins, which is expected to contribute to protein misfolding and aggregation. Ag+ also interacts with bacteria and disrupts Fe–S clusters. In addition, it generates superoxide formations, which cause Fe2+ leakage. These alterations in cellular morphology increase outer-membrane permeability, which allows ROS (reactive oxygen species) to penetrate through the membrane wall and cause bacterial inactivation. Ag+ was found previously to have a synergistic effect against bacteria when used in combination with β-lactam, enhancing the ability of Ag+ to induce permeability in the bacterial outer membrane.

Will the Biome Integrity of the soil be compromised if Puresan Pro is used ?:

Continued

Neither Copper, Silver or Zink is toxic and plants require these minerals for growth and health. In all the trials conducted with Puresan Pro, we have never found that the soil biome is compromised, as the plants flourished with continuous dosing of Puresan Pro during their productive cycles.
The use of any anti-biotic, pesticide or herbicide will have a level of toxicity to the detriment of the beneficial soil bacteria, whereas with Puresan we have no evidence that it leaves the soil compromised when we use our metal ions. If any of the beneficial microbes are killed when the plant is flooded to treat the Phytophthora agathidicida or Phytophthora cinnamomi, the biome integrity should not be affected for more than 48 hours, where after the biome will be restored to normality.
Effectiveness of Copper on Phytophthora Agathidicida and Phytophora Cinnamomi:
It is a known fact that the management options for these two pathogens are limited. The clinical trial screened over 100 compounds for their anti-oomycete activity, as a potential first step toward identifying new control strategies. The screening identified eight compounds that showed activity against both Phytophthora species. The included five antibiotics, two copper compounds and a quaternary ammonium cation.
These compounds were tested for their inhibitory action against three stages of the Phytophthora life
cycle:

- Mycelial growth
- Zoospore germination

The findings:

Table 1. EC50 values for inhibition of mycelial growth.

	P. agathidicida EC_{50} (μg/ml)	*P. cinnamomi* EC_{50} (μg/ml)
Benzethonium chloride	3.2 (2.3 – 3.5)	7.3 (6.5 – 8.3)
Chlortetracycline hydrochloride	0.79 (0.69 – 0.90)	1.1 (1.0 – 1.2)
Copper (II) chloride	6.8 (6.5 – 7.2)	3.2 (2.9 – 3.6)
Copper (II) sulfate	9.0 (8.4 – 9.6)	5.0 (4.5 – 5.5)
D-cycloserine	190 (150 – 240)	43 (37 – 49)
Kanamycin sulfate	28 (22 – 35)	52 (48 – 57)
Neomycin trisulfate	180 (170 – 190)	160 (140 – 170)
Paromomycin sulfate	4.3 (4.0 – 4.6)	8.5 (8.2 – 8.9)

Numbers in parentheses are 95% confidence intervals, determined from three independent experiments.

TABLE 2. Minimum concentrations of anti-oomycete compounds (in µg/ml) required to cause zoospores to become immotile within 5 min of treatment

	P. agathidicida	***P. cinnamomi***
Benzethonium chloride	0.1	0.1
Chlortetracycline hydrochloride	16	8
Copper (II) chloride	0.025	0.05
Copper (II) sulfate	0.025	0.05
D-cycloserine	256	–
Kanamycin sulfate	–	–
Neomycin trisulfate	0.25*	4
Paromomycin sulfate	0.8	1.6

**This was the lowest concentration tested, therefore the minimum concentration required for immediate motility loss may be lower.*

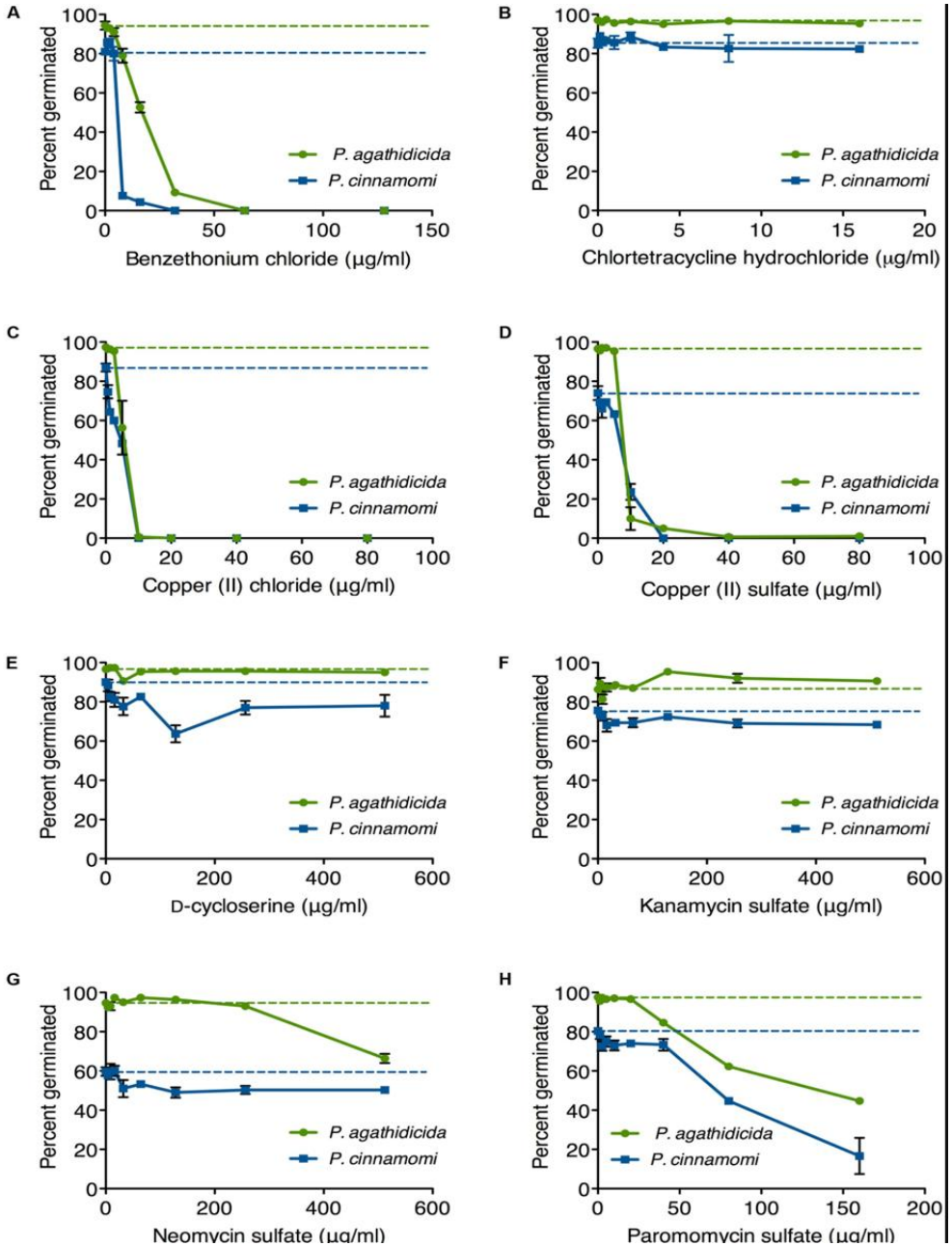
A
Percent germinated
Benzethonium chloride (µg/ml)
P. agathidicida
P. cinnamomi
B
Chlortetracycline hydrochloride (µg/ml)
C
Copper (II) chloride (µg/ml)
D
Copper (II) sulfate (µg/ml)
E
D-cycloserine (µg/ml)
F
Kanamycin sulfate (µg/ml)
G
Neomycin sulfate (µg/ml)
H
Paromomycin sulfate (µg/ml)

Figure 3. Inhibition of zoospore germination in P.agathidicida (green) and P. cinnamomic (blue). Each panel (A-H) shows
the inhibition curves for a single compound, as identified in the label on the x-axis. Dashed lines represent the
germination rates on unamended agar. Data points are mean values for triplicate germination assays. Error bars are +-
standard error of the mean. Where error bars are not visible, they are smaller than the symbol.

Conclusions:

Most Potential Treatment Solution:

The most effective compounds across all three life cycle stages that we identified were **copper salts and**
the quaternary ammonium salt benzethonium chloride. The identification of copper in our screens is
unsurprising, as copper-based fungicides have traditionally been a mainstay of *Phytophthora control.*

Most Unlikely Treatment Solution:

Overall, given the limited efficacy of these antibiotics against the different life cycle stages of Phytophthora as the potential for resistance to spread within and between species, the data suggest
there is little potential for exploring these antibiotics as treatments for Phytophthora diseases, except
perhaps as a last resort.

Consume - It cc

YOUR ECO 2 ECO WATER TREATMENT SOLUTION

HELPING TO PUT THE GOOD BACK IN WATER

YOUR PARTNER IN PROVIDING BETTER SOLUTIONS TO CLEAN WATER AND FARMING ENVIRONMENT

ECO-FRIENDLY

Consume - It cc

Our Vision Green Solutions to protect our Environment

Robert Brown

Cell: +27 (0) 72 144 2221

Email: robert@consume-it.co.za

And

Chris de Lange.

Cell: +27 (0) 84 505 2026

Email: chris@consume-it.co.za

Dedicated to Service

Thank You

Saving the planet's water & environment

Your partner in providing green solutions to clean water and sanitation

PURE AGRI TRIAL

FIRST STEP

•Purchased apples from Spar on 24 October 2014

•Half filled two sinks with tap water and added three drops of One Drop™ into one of the sinks

•Took half the apples and placed in one sink and half in the other.

•Removed and wiped them and put them in the fridge

CONTINUED STEPS

- Continually checked them and only removed from the fridge when taking a photos

After 7 days

After 9 days

After 12 days

After period of
24 October 2014 to 22 November 2014

SHELF LIFE EXTENSION AND BACTRIA CONTROL

•Apple rinsed in Pure Drop™ - after five and a half months



NOTES

•Apples purchased were commercially available.
•Granny Smith variant was used for the trial.
•All apples used were trialled under the same storage conditions for the same period of time.
•Storage temperature was 3^0 C .
•Further trials on Cherry and Rosa tomatoes yielded similar results.
•Further trials on cucumbers yielded similar results.

Tomatoes

SHELF LIFE EXTENSION AND BACTRIA CONTROL

SHELF LIFE EXTENSION AND BACTRIA CONTROL

Plums

SHELF LIFE EXTENSION AND BACTRIA CONTROL

Both fruits after twenty six days