

150000ppm water soluble
nano zinc oxide powder for
aquaculture and livestock

VTC Z-150



high bioavailability
nano zinc oxide for
animal health



Essential Trace Elements For The Human Body

Zinc

Zinc is an essential trace element crucial for both humans and animals. It plays a vital role in numerous biological processes due to its involvement in various enzymatic, structural, and regulatory functions:

1. Immune System Support

Zinc is critical for the development and activation of immune cells. It helps the body fight infections and supports wound healing.

2. Cell Growth and Division

Zinc is vital for cellular growth, repair, and division, making it essential for development and tissue maintenance.

3. Reproductive Health

In humans and animals, zinc is essential for reproductive health, influencing fertility, hormonal balance, and proper functioning of the reproductive organs.

4. Growth and Development:

Zinc deficiency in livestock and poultry can lead to stunted growth and poor weight gain.

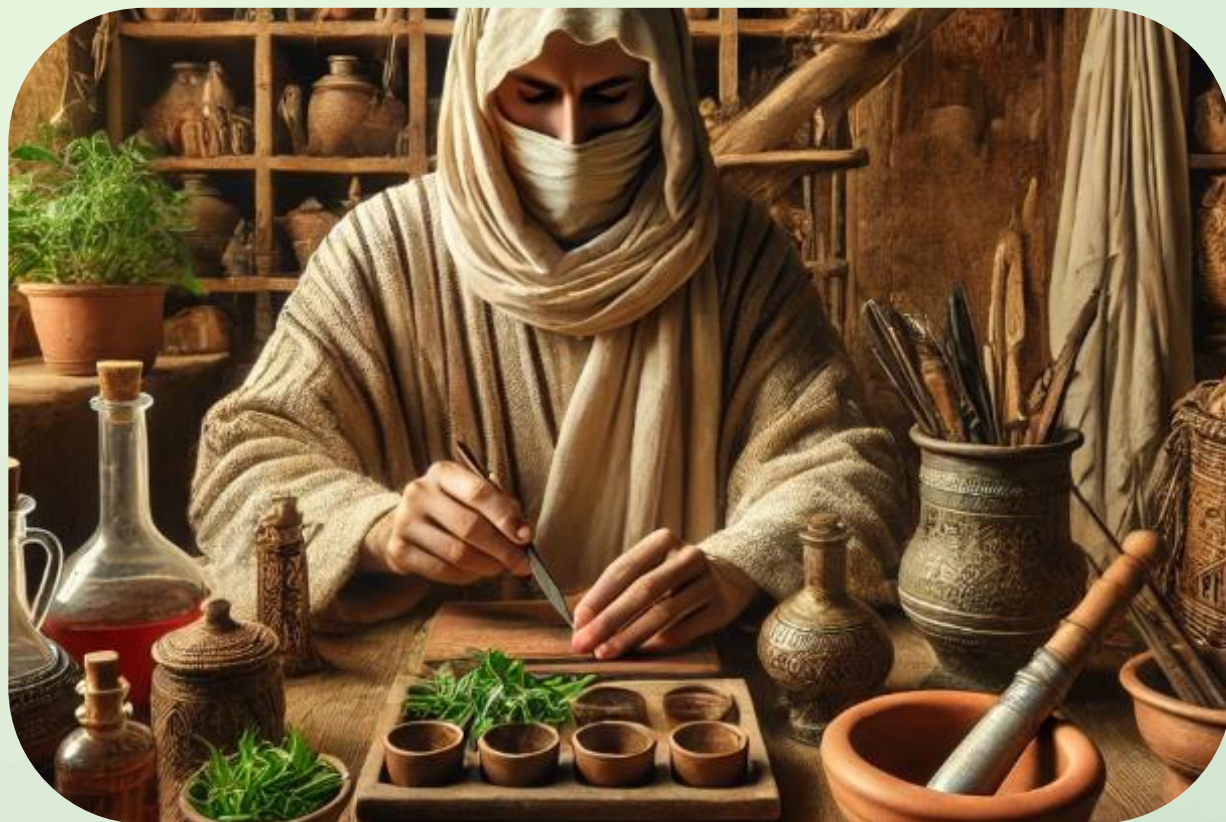
5. Hoof and Skin Health:

For livestock, zinc is critical for maintaining healthy hooves, skin, and fur.

6. Egg and Milk Production:

In poultry and dairy animals, zinc supports high production efficiency.

Ancient Use of Zinc Compounds



- As early as 2000 BCE, civilizations like the Egyptians and Indians used zinc-containing compounds, such as calamine (zinc carbonate) and **zinc oxide**, for medicinal purposes. These compounds were applied to wounds, burns, and skin infections due to their soothing and healing properties, though people at the time were unaware of the specific antibacterial effects.
- The Greeks and Romans used zinc-based ointments to treat skin conditions. Galen, a Roman physician in the 2nd century CE, is said to have used **zinc compounds** as part of his remedies for wounds and ulcers.
- The explicit recognition of zinc's antibacterial properties began in the 19th and early 20th centuries, as microbiology developed as a field.



Water Soluble nZnO- new concept for animal health

Application of new nanomaterials

The ultra-high water-soluble nano-zinc oxide produced through a new process greatly improves the bioavailability of nano-zinc oxide. Compared with traditional zinc oxide, VTC Z-150 can effectively be utilized and quickly absorbed by animals, enhancing the health .

Due to its stable nanoparticle size, VTC Z-150 has a huge surface area and can rapidly interact with cells.

Adding it to feed or water can improve meat quality and quantity and reduce the difficulty of breeding. Suitable for non-antibiotic breeding, improve health and reduce disease and death.

Mechanism for health improvement

Vital zinc oxide nanoparticles can promote cells to produce antioxidant reactions and increase superoxide Dismutase SOD, glutathione peroxidase (GPx) and other antioxidant enzymes active.

Helps support cells in the balance of oxidative stress and antioxidant enzyme activity tolerance.

Vital zinc oxide nanoparticles : involved in maintaining cell health and nerve impulse propagation and normal functioning of muscles to adapt to temperature changes and maintain appetite.










Minimum Inhibitory Concentration of Various Metals Against Salmonella

Item of bacteria	Metal ion	MIC (mol/l)	Metal ion	MIC (mol/l)
Salmonella typhii References: Antimicrobial Products Technology Council	Na ⁺	1	Fe ⁺⁺	0.001
	K ⁺	1	H ⁺	0.001
	NH ₄ ⁺	1	Pb ⁺⁺	0.0005
	Li ⁺	0.5	Ni ⁺⁺	0.00012
	Sr ⁺⁺	0.5	Au ⁺	0.00012
	Ca ⁺⁺	0.5	Co ⁺⁺	0.00012
	Mg ⁺⁺	0.25	Cd ⁺⁺	0.00006
	Ba ⁺⁺	0.25	Cu ⁺⁺	0.000015
	Mn ⁺⁺	0.12		
	Zn ⁺⁺	0.001		
Al ⁺⁺⁺	0.001			



Antimicrobial Properties of Zinc Surfaces

	Effective against	Mechanism
Bacteria	<p>Gram-positive: <i>Staphylococcus aureus</i> (MRSA), <i>Streptococcus pneumoniae</i>, <i>Enterococcus faecalis</i></p> <p>Gram-negative: <i>E. coli</i>, <i>Pseudomonas aeruginosa</i>, <i>Klebsiella pneumoniae</i>, <i>Salmonella</i>, <i>Acinetobacter baumannii</i></p>	<ul style="list-style-type: none"> Disrupts membranes Inhibits enzymes Generates ROS
Fungi	<p><i>Candida albicans</i>, <i>Aspergillus niger</i>, <i>Trichophyton rubrum</i></p>	<ul style="list-style-type: none"> Damages cell membranes Disrupts ion transport
Viruses	<p>Enveloped Viruses: <i>SARS-CoV-2</i>, <i>Influenza virus</i>, <i>Herpes simplex virus</i></p> <p>Non-enveloped Viruses: <i>Norovirus</i></p>	<ul style="list-style-type: none"> Damages viral proteins/envelopes Inhibits replication and binding



About Drug-Resistant Bacteria

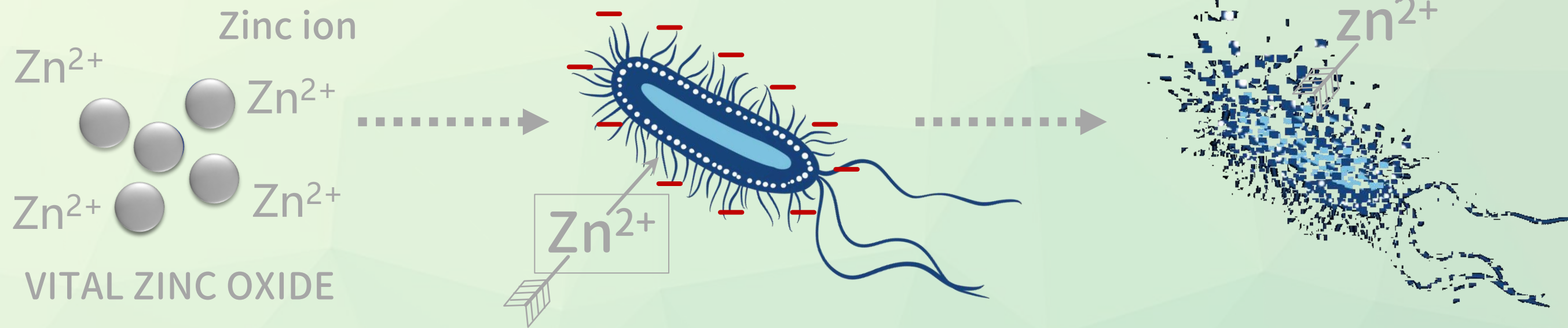
Every year, about 2 million people in the United States are infected with drug-resistant bacteria, of which 20,000 die, resulting in economic losses of up to 5 billion US dollars. In the European Union, the death toll is 25,000, with economic losses of 1.5 billion euros. Drug resistance has such a big impact in this era because there are not enough antibiotics on the market to subdue these bacteria. There was also a problem of drug resistance before the 1980s, so why was there no panic at that time? Because various new antibiotics were booming at that time, as long as bacteria with drug resistance were encountered, the medical community always had many other antibiotics to fight them. But after 1980, fewer and fewer pharmaceutical companies were willing to invest in new antibiotics. After 2010, the medical community was exhausted and could only watch bacteria become less and less afraid of drugs.



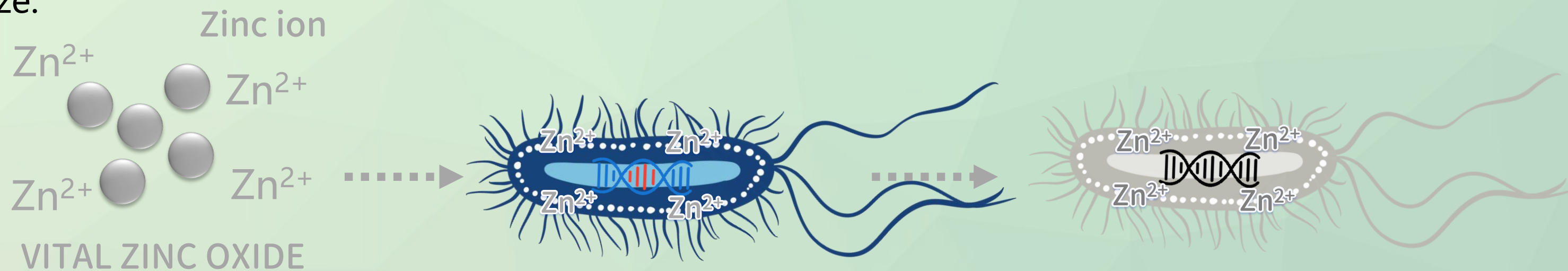


Mechanism Of Anti-Bacteria

1. VTC Z-150 releases zinc with positive charge, the cell membrane of bacteria and fungus bring negative charge, zinc will attach on the membrane to cause the charges not balanced then it will be broken.



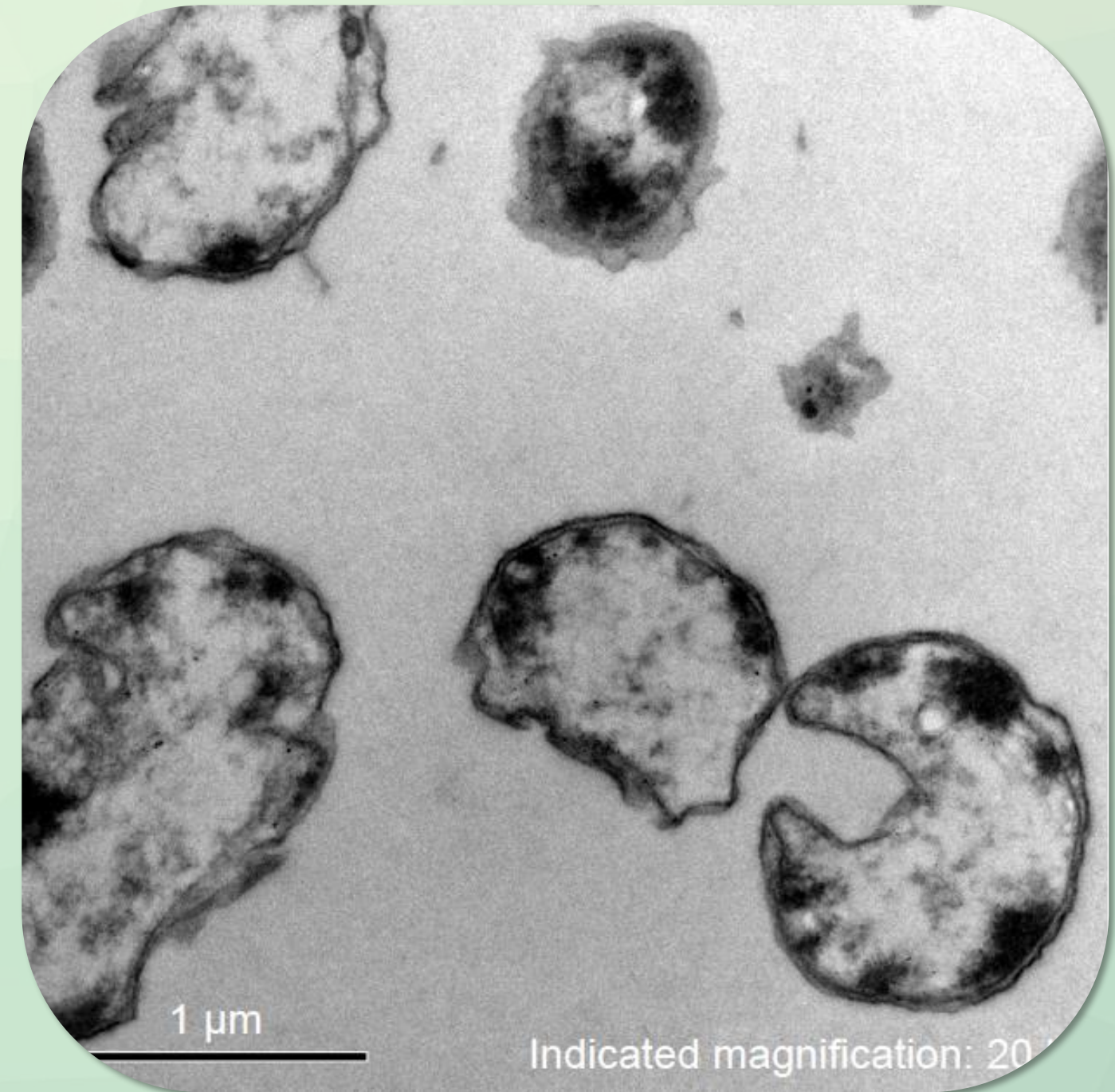
2. The zinc ion released from VTC Z-150 penetrates into molds; combine with biological molecular, stop them converting nutrients to energy then disrupt bacterial metabolism, Inhibits the ability of bacteria to survive, multiply and colonize.



Nanometal Contacts Bacteria SEM Electron Microscope Photo



Normal bacteria



Bacteria which is contacted by nanometal



20% of Super Bacteria Origin From Animal and Food

The battlefield where humans fight against super bacteria extends from medical institutions to farms and ranches.

The use of antibiotics in animals has become a black hole that humans cannot ignore when facing the problem of super bacteria.

Improper use or excessive use of antibiotics will breed super bacteria in animals, and these super bacteria in animals can also be transmitted to humans through animals, animal-made food or the environment.

The US Centers for Disease Control and Prevention pointed out in 2013 that about one-fifth of the drug-resistant bacteria infected in humans come from animals or food. This includes: direct contact with drug-resistant bacteria in animals, or contact with uncooked and improperly handled food.

This is a huge risk that has attracted global attention. In July this year, the European Union decided to strictly restrict the use of colistin antibiotics in animal husbandry, with the goal of reducing its use by 65%.



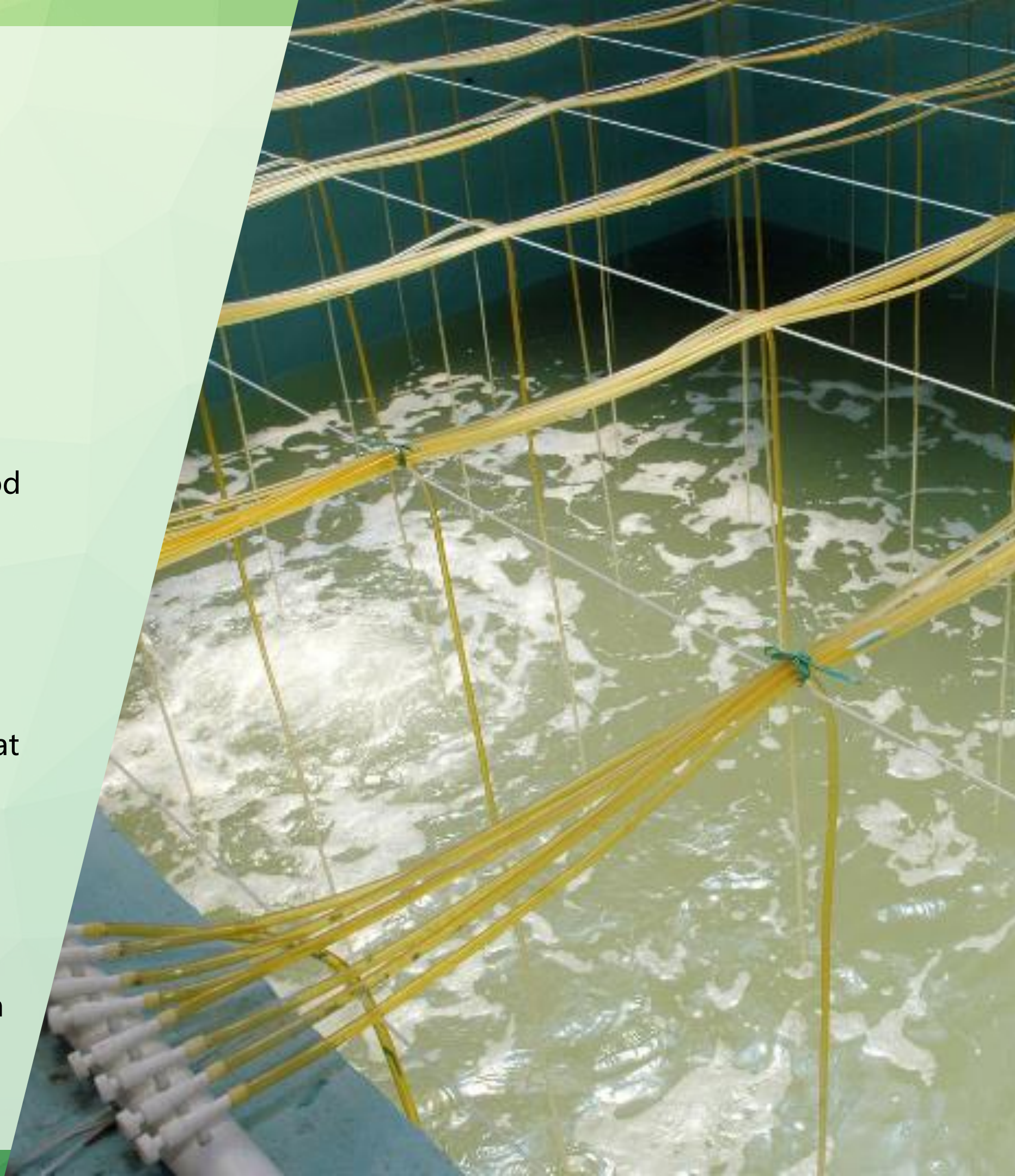


Aquaculture In China Has The Highest Antibiotic Resistance In The World

According to UN data, the \$90 billion aquaculture trade accounts for almost half of all seafood harvests, and China's seafood supply accounts for almost 60% of the global supply, making it the world's largest exporter. The US food regulatory authorities have known about China's antibiotic problem for more than 10 years.

Abuse of antibiotics in China, coupled with the symbiotic farming method of pig farming and fish farming, has caused extremely serious antibiotic residues in the water, making it a big nutrient for cultivating drug-resistant bacteria. Chinese farmers feed pigs with large amounts of antibiotics, even abusing colistin, which is called the "the last drug" because of its hepatotoxicity and neurotoxicity. Until November 2016 that the Chinese government finally banned it. However, pig farmers still abuse other antibiotics

Research has shown that 90% of the antibiotics fed to pigs come from wastewater from pig farms in China that flows into fish ponds. In the fish ponds, other antibiotics are added to prevent the growth of bacteria in the water.





Revolutionary Water Soluble Nano Zinc Oxide Powder

VTC Z-150 is effective in zinc contribution, anti-mildew and anti-fungi, mainly due to its unique physical and chemical properties, which can improve immunity of the animals and help to grow weight. It can also inhibit many kinds of bacteria, molds, and fungi without causing biological resistance.

Due to its stable nano particle size and very high water solubility, the bioavailability of zinc has been improved to the top level for animal' s health care and immunity support.



VTC Z-150

Origin	Taiwan
Material	Nano zinc oxide
Carrier	Potassium Citrate
pH value	7
Concentration of zinc oxide	150,000 ppm
Water solubility	Very high
Average particle size	5.3nm
Appearance	White Powder
Packing	20 KG / bag



Features of Water Soluble Nano Zinc Oxide Powder



VTC Z-150

- Cost effective
- Disease prevention and immunity support
- Working at low concentration to comply zinc content restriction
- 150,000ppm super high concentration powder with low transportation cost
- Use against various of fungi, bacteria and molds
- Long lasting efficacy
- pH=7 excellent compatibility with general animal feed and supplement
- Increase animal' s health by super effective contribution of zinc element
- Comply with ECHA REACH SVHC 242 restricted material list



Bioavailability

Type	pH value	Bioavailability	Safety	Note
VTC Z-150 nano zinc oxide	7	High	High	Stable in nano scale, high water soluble, high compatibility as an additive
General zinc oxide	-	Very Low	High	Not water soluble
Yeast Zinc	-	High	High	Natural ingredient, expensive
Nano Zinc Liquid	3-5	Low-Medium	Medium	React with oxygen and convert to zinc oxide micro particle, normal performance, need high dosage
Zinc gluconate (Zinc ion)	<7	Low-Medium	Medium	Need higher dosage
Zinc acetate (Zinc ion)	<7	Low-Medium	Medium	Need higher dosage
Zinc citrate (Zinc ion)	<7	Low-Medium	Medium	Need higher dosage
Zinc sulfate (Zinc ion)	<7	Low	Low	Has irritation

Aquaculture







Water Soluble nZnO- Aquaculture Usage Instruction

	VTC Z-150 (with tiny average particle size 5.3nm and high water soluble)	normal nano zinc oxide	conventional zinc sources
suggested zinc content in shrimp/fish feed	1-3mg/kg	15-30mg/kg	100- 300mg/kg
bioavailability	high	medium	low

NOTE:

When adding VTC Z-150, it needs to be mixed and diluted with 5-10 liters of water, and then sprinkled into the pool at three points to make VTC Z-150 evenly dispersed in the pond.

There are two ways for adding VTC Z-150.

1) Dose in feed

2) Dose in water

It is normally based on pond size, cost budget and intensiveness of culture.



Water Soluble nZnO- Shrimp hatchery in China

Location	China Fujian Province
Number of shrimp feeds	300,000 each pond
Pond volume	2,200 tons water
Test date	2024/OCT
Concentration	1ppm zinc for 3 doses
Test method	1 st dose for new water: 6.5 ~ 7(g)/ton of water 2 nd dose for peak feeding: 6.5 ~ 7(g)/ton of water 3 rd dose before harvest: 6.5 ~ 7(g)/ton of water
Note :The shrimp feeds in pond with VTC Z-150 dose are very energetic and they have good appetite, survival rate increases 100% and the blank group is poor of energy. It is because the effective zinc contribution from VTC Z-150.	



Pond with VTC Z-150
Shrimps are energetic
(Experimental group)
Watch the video on PPT



Pond without VTC Z-150
Shrimps are lack of energy
(Blank group)
Watch the video on PPT

Livestock





Water Soluble nZnO- Livestock Usage Instruction



Intestinal disease control

Pig and chicken plague prevention and control

Disinfection of the livestock house environment reduces the breeding of pathogens

protection for livestock raising and transportation

Prevent wound infection and inflammation





Water Soluble nZnO- Livestock Usage Instruction

Chicken/Duck/Goose

Disease prevention and health improvement

66.67g /ton of water or feed (10ppm)

Pig/Lamb/Cattle

Disease prevention and health improvement

200g/ton of water or feed (30ppm)

Advanced health care

500g/ton of water or feed (75ppm)



Animal	General epidemic disease
Piglet	Porcine epidemic diarrhea virus, PEDv
Chicken	Avian influenza, AI Infectious bronchitis, IB Infectious Laryngotracheitis, ILT Egg drop syndrome, EDS Marek's disease, MD Newcastle disease, ND
Duck	Duck plague New Duck Disease
Goose	Goslings viral enteritis Infectious serositis Paratyphoid infection Staphylocosis
Lamb	Peste des petits ruminants
Cattle	bovine ephemeral fever, BEF



Water Soluble nZnO- Dealing PEDv

- Porcine epidemic diarrhea virus (PEDv) is mainly transmitted through feces or mouth
- It has a long incubation period and is highly contagious and can infect pigs of all ages
- One-week-old suckling piglets have a mortality rate of 80-100%
- There is currently no effective treatment for PED
- There is no commercial vaccine available in Taiwan, Europe and the United States



Water Soluble nZnO- Dealing PEDv

Test 1

Test unit	Livestock Division of Taiwan Sugar Corporation
Test virus	Porcine epidemic diarrhea virus (PEDv)
Tested substance	with zinc content 45 PPM
Experimental animals	suckling piglets exposed to poison during lactation (body weight 3-5 Kg)
Number of tests	11 infected pigs
Test process	Take 2 ml orally once a day until the symptoms of diarrhea stop
Test date	2022/9/5~9/8

Result: Five lactating piglets developed diarrhea and were confirmed to be infected with PEDv, the suckling piglets stopped to have diarrhea after 3days, and the treatment success rate was 100%





Water Soluble nZnO- Dealing PEDv

Test 2

Test unit	Veterinary Research Institute
Test virus	Porcine epidemic diarrhea virus (PEDv)
Tested substance	with zinc content 45 PPM
Experimental animals	suckling piglets exposed to poison during lactation (body weight 8Kg)
Phenomenon	Weaned piglets had diarrhea and were treated with antibiotics for more than ten days, but the treatment was ineffective
Test process	Take 2 ml orally once a day until the symptoms of diarrhea stop
Test date	2023/5/4~5/6

Result: Six lactating piglets developed diarrhea and were confirmed to be infected with PEDv, the suckling piglets stopped to have diarrhea after 2days, the treatment success rate was 100%





Water Soluble nZnO- Chicken farm test

Location	Taiwan chicken farm
Number of chickens	38,000 each
Test date	2023/DEC. to 2024/MAR
Concentration	10ppm zinc
Test method	VTC Z-150 taken in by drinking water throughout the day, and the chickens were treated for 3 consecutive weeks.
Note : No other antibiotic or drugs used It is also recommended to spray VTC Z-150 through an atomizer to directly reduce the virus content, and administer it to the lungs through free breathing to improve the immunity of the chickens.	





Water Soluble nZnO- Chicken farm test

Farm feeding results (Experimental group) with VITAL ZINC OXIDE				Farm feeding results (blank group)			
Date of entry: 2024.01.31		Chicken release date: 2024.03.04		Date of entry: 2023.12.01		Chicken release date: 2024.01.02	
Number of fledglings:	38,000	Dermatitis(%)	0	Number of fledglings:	38,000	Dermatitis(%)	5
Number of adult chickens caught:	37,840	Smelly breasts(%)	0	Number of adult chickens caught:	37,670	Smelly breasts(%)	0
Breeding rate (%):	99.58%	Number of dead chickens on the truck	96	Breeding rate (%):	99.13%	Number of dead chickens on the truck	184
Average feed intake per feather (KG):	3.21	Number of chickens removed before slaughter	73	Average feed intake per feather (KG):	2.94	Number of chickens removed before slaughter	110
Average weight (KG):	2.29			Average weight (KG):	2.08		
Production Index:	506			Production Index:	454		

After using VTC Z-150, the production index increases 11.4% from 454 to 506, more chickens survive.

*Production index: It bases on the evaluation standards of number of days of raising, weight of caught chickens, feed efficiency, and growth rate. The higher the index, the more it is in line with commercial benefits.



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Vital Chemical Co., Ltd.

www.vitalecochem.com

Contact person : Richard Chu (director)

Wechat : vitalchem1988

Whatsapp:+886 9887519111

LINE : chubibo0101

Email : info@vitalecochem.com