

Zn Sol B®
Thiobacillus thiooxidans
BioFertilizer

APPROVED FOR USE IN ORGANIC AGRICULTURE

Introducing Zn SOL B®

Zn Sol B® is a biological fertilizer based on a selected strain of naturally-occurring beneficial autotrophic, acidophilic bacteria *Thiobacillus thiooxidans* (NCIM - 5065). *Thiobacillus thiooxidans* is a gram negative , rod shaped , non sporing bacteria. .It is used as an effective soil inoculant.

Zn Sol B® contains vegetative cells of *Thiobacillus thiooxidans* . It is formulated as Wettable Powder with CFU count of 5×10^7 / g. Zn SOL B™ is approved for use in Organic Agriculture.

A Historical Brief

Thiobacillus thiooxidans, was discovered in 1922 by Jacob Jaffe and Selman Waksman.

Mode of Action

Energy metabolism: The bacteria require inorganic molecules as an electron donor and inorganic carbon (such as carbon dioxide) as a source. They obtain nutrients by oxidizing iron and sulfur with O₂.

Thiobacillus thiooxidans grows at pH values of 4.5 to 1.3 in salt medium and derives its biosynthetic requirements by autotrophy i.e it used carbon from atmospheric carbon dioxide. It also fixes Nitrogen in acidophilic habitats. The bacteria derive its metabolic energy by oxidation of reduced inorganic sulfur compounds or ferrous ions. Anaerobic growth happens by using elemental hydrogen or reduced inorganic sulfur compounds as electron donors and ferric ions as electron acceptors.

Enzyme production : *Thiobacillus thiooxidans* oxidizes zinc and secretes organic acids which helps mobilize the fixed zinc and makes it available to the plants. This also brings down the pH of the soil and helps in reclaiming alkaline soils.

Method of Application

Seedling treatment: Mix 100 g. of Zn Sol B® with sufficient quantity of water and organic manure to form a slurry. The seedlings are dipped in this slurry for 30 minutes prior to planting so that the bacteria get attached to the roots.

Soil application: Mix 3-5 Kg/ acre of Zn Sol B® with compost and apply to an acre of soil.

Drip Irrigation : Mix 3 Kg/ acre of Zn Sol B® in drip stream

Target Nutrition

Zinc mobilization

Crops

Zn Sol B® is suitable for application on Cereals , Millets , Pulses, Oilseeds, Fibre Crops , Sugar Crops , Forage Crops , Plantation crops ,Vegetables, Fruits, Spices , Flowers , Medicinal crops , Aromatic Crops , Orchards and Ornamentals.

Compatibility

Zn Sol B® is compatible with BioPesticides and other BioFertilizers.

Shelf Life

Zn Sol B® is stable for a period of 1 year from the date of manufacturing.

Mass Composition

CONSTITUENT	W/W %	FUNCTION
<i>Thiobacillus thioxidans</i>	02.00%	Active
Carrier Powder – Talc/Dextrose/Lignite	q.s.	Inactive

BIOLOGICAL COMPOSITION

CONSTITUENT	CFU/g.	FORMULATION
<i>Thiobacillus thioxidans</i>	5*10 ⁷	Powder

OTHER FORMULATIONS AVAILABLE

<i>Thiobacillus thioxidans</i> CFU/ml	1*10 ⁸	Liquid
<i>Thiobacillus thioxidans</i> CFU/g/ml	1*10 ⁹	Powder/ Liquid
<i>Thiobacillus thioxidans</i> CFU/g	1*10 ¹⁰	Powder
<i>Thiobacillus thioxidans</i>		Lyophilized

Free from Salmonella, Shigella , E.Coli

Cautions for handling and use of product

1. Mixing equipment is to be thoroughly rinsed with water and detergent before using the same equipment for formulating other fertilizers/ pesticides.
2. Surplus product may be disposed in crop lands
3. Do not eat / drink / smoke during application.
5. Direct incidence of Zn Sol B[®] may cause irritation and therefore it is recommended that the operator should use protective gear viz gloves, apron, mask, eye gear and hood.

Antidotes

In the case of ingestion: Symptomatic treatment

In the case of contact with Eyes: Flush with water liberally for 20 minutes.

Citations

There are many citations in public domain on effectiveness of *Thiobacillus thiooxidans* as a BioFertilizer

Commitment to Nature

- Zn Sol B[®] is approved for use in organic agriculture.
- Zn Sol B[®] is safe to use along with bio fertilizer inoculums like Agri Life Nitrofix[™] (Nitrogen Fixing bacteria) ; P Sol B[®] (Phospho bacteria) ; K Sol B[®] (Potash mobilizing bacteria); Zn Sol B[®] (Zinc mobilizing bacteria) :S Sol B[®] (Sulphur solubilizing bacteria) : Si Sol B[™] (Silica solubilizing bacteria) : Fe Sol B[®] (Iron / Ferrous solubilizing bacteria) : Mn Sol B[™] (Manganese solubilizing microbe) and Agri Life Agrivam[®] (Vesicular-arbuscular mycorrhiza)
- Zn Sol B[®] is safe to use along with botanical and microbial bio pesticides.
- Zn Sol B[®] can be used as an effective component in IPM/ INM programmes, thereby leading to a reduction in use of chemical fertilizers and creating a safer environment.
- Zn Sol B[®] does not lead to residue problems and doesn't cause resistance or resurgence problems.

Benefits from Zn Sol B[®]

- Zn Sol B[®] effectively mobilizes unavailable zinc ions and make it assimilable by plants
- Natural Zinc solubilization improves both plant and soil health and also aids in soil remediation.
- The increase in the beneficial microbe population in soil improves soil health.
- Zn Sol B[®] is earthworm friendly , pet friendly , eco friendly and infant friendly