

## ***Rhizobium***

### **Silica based, water dispersible carrier formulation**

*Rhizobium* is the symbiotic nitrogen fixer which assimilates atmospheric nitrogen and fixes in the root nodule, formed in the roots of leguminous plants.. The bacteria infect the legume root and form root nodules within which they reduce molecular nitrogen to ammonia which is readily utilized by the plant to produce valuable proteins, vitamins and other nitrogen containing compounds. The site of symbiosis is within the root nodules.

**Suitable for:** Ground nut, Black gram, Green gram, Red gram, Cow pea, Bengal gram, Mustard, Soy bean, French bean, Cluster bean, Lab-Lab, Sesbania sp, leguminous trees etc.,

### **Features**

***Rhizobium* is a carrier based formulation containing the strain of *Rhizobium*. The product contains  $1 \times 10^{12}$  cells per g of the product. These bacteria are in their dormant forms and are suspended in carrier based formulation.**

### **Benefits**

- Nitrogen fixation in the root & Stem nodules through the action of nitrogenase enzyme.
- It adheres on the surface of root and enters through the root hair. Inside the cortical cells it forms symbionts and fix nitrogen.
- The enzyme will reduce the molecular nitrogen to ammonia which is readily utilized by the plant.
- Rhizobium can fix 50-200 kgs N/ha in one crop season and can leave behind substantial quantities of about 20-30 kgs Na/ha for the succeeding crops.
- It can increase yield up to 10-35%.
- Due to rhizobial activities, the root hairs and nodules secrete a mucous substance which enhances the soil fertility and growth of the plant.

- By means of seed treatment, the germination of seeds gets stimulated and in turn increase crops yield potential

## RECOMMENDATION ON THE MODE OF APPLICATION AND USAGE

<b>Fertigation Tank</b>	250 gms of microbial consortia in 60lts of water and apply through fertigation tank for one acre.
<b>Soil application</b>	Mix 250-500 gms with 10 kg of FYM and apply basally as soil application.
<b>Seedling root dipping</b>	Dissolve 250 gms in 100 lts of water and dip the seedlings.
<b>Foliar application</b>	Mix 250 gms in 100 lts of water Mix 250-500 gms of <i>Rhizobium</i> and treat one kg of seeds

## PRODUCT SPECIFICATION

### Rhizobium

Base	Silica based water dispersible carrier
Viable cell count	CFU minimum $10^{12}$ cell/g for carrier material.
PH	6.5 – 7.5
Particle size in case for carrier based material	All material shall pass through 0.15-0.212 mm IS Sieve

## MATERIAL SAFETY DATA SHEET

Section	Category	Details
Section - 1	Processed & Packed by	Ecots Bio Products [P] Ltd 90A, Sethumadi Rd, Vettaikaranpudur, Coimbatore, India 642129
Section - 2	Mfg License No	PR-173/RS-CBE/2008-2011
Section - 3	Composition	<i>Rhizobium</i> and Dispersible powder
Section - 4	First aid measures	Eyes : Mildly irritating to eyes. Skin : Mildly irritating to skin. Frequent and prolonged contact may cause dermatitis. No effect should occur, If promptly washed off. Inhalation: If present as high concentration of air borne dust prolonged contact may cause irritation to nose and throat, May cause coughing and shortness of breath. Ingestion : May cause diarrhea, Nausea, Vomiting and cramps, weakness and circulatory problems.
Section - 5	Measures & fighting against fire	Fire extinguishing media :CO <sub>2</sub> , Dry chemicals
Section - 6	Measures in case of leak or unforeseen release	<ol style="list-style-type: none"> <li>1. Remove persons not wearing protective clothing from spill area.</li> <li>2. Contain and ventilate spill area</li> <li>3. Avoid contamination of stream and sewers</li> <li>4. Absorb on to clay, absorbent material.</li> </ol>
Section - 7	Storage and handling	Handling : Avoid dropping the container from the top. Storage : Store in a well ventilated place. Keep can closed when not in use. Away from food, direct sunlight . Away from high temperature
Section - 8	Exposure control and personal protection	Not applicable
Section - 9	Physical and chemical properties	Nature : White Powdery Odour : Characteristic odour Solubility in Water: Dispersible in water Boiling Point : Not applicable Melting point : Not applicable
Section - 10	Stability and reactivity	Not applicable
Section - 11	Toxicological information	Non Toxic and Non - Virulent
Section - 12	Ecological information	Empty containers : Not Applicable Waste Disposal Method : Not Applicable
Section - 13	Elimination considerations	Not Applicable

Section -14	Transport information	Shipping Name : Rhizobium Shipping containers Marking : Rhizobium Shipping Containers Lables : Rhizobium Flammability : Not Flammable
Section -15	Regulations information	Designation : Eco- friendly Origin : Non Hazardous Material
Section -16	Protection information	<ul style="list-style-type: none"> <li>• Chemical safety goggles.</li> <li>• Use protective clothing, gloves and mask.</li> <li>• Mechanical exhaust required.</li> <li>• Safety shower and Eye bath.</li> <li>• Avoid contact with eyes.</li> <li>• Wash thoroughly after handling.</li> <li>• Keep Tightly closed. Store in a cool dry place.</li> </ul>
Section -17	Emergency and first aid procedure	<ul style="list-style-type: none"> <li>• In case of Contact, immediately flush eyes or skin with copious amount of water for atleast 15 min while removing contaminated clothing and shoes.</li> <li>• If Inhaled, Move to fresh air, If not breathing give artificial respiration. If breathing is difficult give oxygen.</li> <li>• If swallowed, Wash mouth with water, provided person is conscious.</li> </ul>
Section -18	Handling and storage conditions	Normal House Keeping Procedures
Section -19	Spill or leak procedures special	Not Applicable
Section -20	USE	Agriculture purpose



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