

Note on Classification of *Rhizobium* Bacteria

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DESCRIPTION

Rhizobium is a bacterium that dwells in the root nodules of leguminous plants in a symbiotic relationship. On its own, nitrogen fixation is impossible. For this reason, *Rhizobium* requires a plant host. *Rhizobium* is an important supplier of nitrogen for agricultural soils, especially in dry areas. Dinitrogen is converted to ammonia by them. Because ammonia is harmful in nature, it is quickly absorbed by organic substances.

Increased soil production and fertility are aided by nitrogen fixing. Drought stress, nutritional deficit, salt stress, fertilisers, insecticides, and nitrogen-fixing system nitrogen-fixing systems are all discussed. *Rhizobium* is a soil bacterium that helps leguminous plants fix nitrogen. By attaching itself to the roots of leguminous plants, it produces nodules. These nodules fix nitrogen from the air and convert it to ammonia, which the plant may use for growth and development.

Rhizobium bacteria classification

Rhizobium can be categorised based on the plant kinds with which it is connected, as well as the rate at which it grows. *Rhizobium* bacteria come in a variety of forms, they are *Leguminosarum Rhizobium*, *Rhizobium Alamii*, *Rhizobium lantis*, *Rhizobium japonicum* is a kind of *rhizobium* found in Japan. *Rhizobium trifolii*, *Rhizobium phaseolii* is a kind of *Rhizobium*. *Rhizobium smilacinae* is a kind of *Rhizobium*.

The biological process of nitrogen fixation is the first step in the nitrogen cycle. In this process, some bacterial species such as *Rhizobium*, *Azotobacter*, and others transform free nitrogen in the atmosphere into ammonia (another type of nitrogen), and the entire process is carried out by natural processes. Rhizobia are prokaryotes whose major job is to convert stable nitrogen gas in

the atmosphere to a physiologically usable form. Nitrogenase is a set of enzymes that converts dinitrogen to ammonia. The nitrogen fixation process consumes a lot of energy, and oxygen inactivates the nitrogenase enzymes permanently. The nitrogenase activity is measured using an acetylene reduction test. Only a small percentage of organisms are capable of nitrogen fixing. That's around two archaea genera, twenty cyanobacteria genera, and a lot more. Even though a considerable amount of nitrogen is eliminated during grain harvesting, a symbolic amount of nitrogen remains after harvesting. It is mostly taken into account when nitrogen fertilisers are not used. It is very common in less developed nations. Nitrogen is one of the most abundant plant nutrients, yet it is also one of the most prevalent soil deficiencies. Several environmental issues have been raised about nitrogen delivery to the soil.

Leguminous plants' roots are infected by *Rhizobium*. They normally live in the soil and create nodules after infecting leguminous plants' roots. As a result, nitrogen gas in the atmosphere is fixed. This nitrogen is made available to the plants, which aids in their development and growth. There will be a disintegration of nodules as the legume dies. *Rhizobium* is then returned to the cell, where it can infect a new host. To carry out the procedure, certain *Rhizobium* strains are necessary to make the nodules functional. Crop yields are increased as a result of this. Legume inoculation has been used in agriculture for many years and has become better over time.

Rhizobium bacteria induced diseases. *Rhizobium* is a pathogenic and non-pathogenic bacterium. Among the harmful *Rhizobium* bacteria are *Rhizobium rhizogenes*, commonly known as *Agrobacterium rhizogenes*, causes dicotyledonous plants to develop infected hairy roots. Crown gall disease is caused by *Rhizobium radiobacter*, also known as *Agrobacterium tumefaciens*.

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