

SOME IMPORTANT BIOCHEMICAL PROPERTIES OF A DIAZOTROPH  
ISOLATED FROM THE RHIZOSPHERE OF  
RICE GROWN IN A LOCAL FIELD

M. Gunatilaka

An experiment to evaluate the metabolic processes which determine the survival ability of a diazotroph in a wet land soil was simulated in the laboratory. The significant metabolic processes chosen for investigation are listed below:

1. Assimilatory reduction of nitrate
2. Dissimilatory reduction of nitrate or the ability to use nitrate as an electron acceptor
3. Ability to use ammonium as a source of nitrogen for growth

These investigations showed that this organism is an alkali producer capable of utilizing ammonium as the only source of nitrogen and capable of utilizing nitrate in both assimilatory and dissimilatory pathways. However, the dissimilatory nitrate reduction occurs only under anaerobic conditions producing nitrite. Nitrite thus formed is not reduced further even under anaerobic conditions. Hence this organism could be performing nitrate respiration.

The assimilatory nitrate reductase in this organism could be a constitutive enzyme while the dissimilatory nitrate reductase could be an inducible enzyme.

The association of this organism at several selected cell concentrations with the rhizosphere or rice was

observed microscopically under sterile conditions. This diazotroph was seen to concentrate in large numbers, embedded within the mucilagenous sheath around the rice roots. Inoculation tends to increase the secretion of mucilage by the rice roots and induce a characteristic curvature of root primordia.