

**ROLE OF BIO FERTILIZER IN AGRICULTURE AND ENVIRONMENT WITH
SPECIAL REFERENCE TO *SESBANIA ROSTRATA* (SESBANIA) AND
CROTALARIA JUNCEA (SUNHEMP)**

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Bio-fertilizer is a specific or a group of beneficial microorganisms (bacteria, algae and fungi) for enhancing the productivity of soil either by fixing atmospheric nitrogen or by solubilising soil phosphorus or by stimulating plant growth through synthesis of growth promoting substances. Indiscriminate use of synthetic fertilizers has led to the pollution and contamination of the soil and water, destroyed micro-organisms and friendly insects, making the crops more prone to diseases and reduced soil fertility. Bio-fertilizers are eco-friendly organic agro-input and more cost-effective than chemical fertilizers. Bio fertilizers are well recognized as an important component of integrated plant nutrient management for sustainable agriculture. *Sesbania rostrata* and *Crotalaria juncea* are important bio fertilizers to improve soil fertility and reduce environmental pollution. A research was carried out in laboratory and field from June 2011 to September 2012 to study the role of bio fertilizer in agricultural fields. Random Completely Block Design (RCBD) was used with nine treatments and three replicates. The bio fertilizer (*S. rostrata* and *C. juncea*) were incorporated manually into soil before 14 days of planting. The treatments (T₂ – T₉) plot were fertilized with urea, *S. rostrata* and *C. juncea* and its combinations at the equivalence of 6.21 g total N per m². Onion bulb (Vethalam variety) was planted fourteen days after incorporation of bio fertilizer with spacing of 10 cm x 10 cm in a plot size of 1 m². The soil samples were collected after harvesting of crops to measure the pH, EC, CEC, total Carbon, organic matter content, NO₃⁻ N and NH₄⁻ N. Statistical analysis was carried out using SAS package (version 9.0) and mean separation was done by Duncan's mean separation. Nitrate losses were significantly (P=0.022) different from each treatments and the highest amount of loss was observed in Urea treatment (17.54 mg), compared with *S. rostrata* (15.34 mg), and *C. Juncea* (11.2 mg) from leaching column experiment. Incorporation of bio fertilizer with inorganic fertilizer significantly increased organic matter content, CEC (urea 25.8, *S. rostrata* 32 and *C. juncea* 32.8 C mol), NH₄⁻ N and NO₃⁻ N retention ability in top soil than inorganic fertilizer alone in the field. Nitrate nitrogen in below root zone (15 - 30 cm) was higher in inorganic fertilizer application alone than in combination of inorganic N and bio fertilizer added plots. Hence, bio fertilizer reduced nitrate pollution in ground water and improved soil fertility.

Keywords: Bio fertilizer, *Crotalaria juncea*, Nitrate pollution, *Sesbania rostrata*, Soil fertility