

SUMMARY



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- In order to characterize and classify rhizobia from root nodules of three different leguminous tree species, such as *Pithecellobium dulce* Benth., *Erythrina indica* Lam. and *Sesbania grandiflora* Pers. nodules were collected from these plants at three different localities.
- Nodule characteristics such as morphology, leghaemoglobin content and nitrogenase activity were carried out.
- The results showed that the nodules of *P. dulce*, were elongated, palmately branched and brownish whereas the nodules of *E. indica* and *S. grandiflora* were unbranched, spherical and fluffy white. The leghaemoglobin content and nitrogenase activity were more in the nodules of *P. dulce* than that of *E. indica* and *S. grandiflora*.
- The nodule endosymbionts of three host species were identified and confirmed as the genus *Rhizobium* based on the cultural biochemical characteristics.
- Based on the cross inoculation test and biochemical characteristic studies, the species of *Rhizobium* was identified and confirmed as *Rhizobium* spp. cow pea group.
- To classify the isolates, molecular characteristics such as protein, plasmid and fatty acid profiles were studied.
- Based on the protein profile, the isolates were classified into six groups:
- Plasmid profile showed four different groups of isolates.
- From the fatty acid analysis, the isolates were classified into six groups.
- Numerical analysis was carried out by using 34 unit characters of proteins, plasmids and fatty acids.

- Based on the similarity co-efficient, cluster analysis was carried out and dendrogram was constructed.
- The numerical taxonomic study indicated that the nine isolates were grouped into six clusters of which two clusters had almost 100% similarity with their respective isolates. Hence it is suggested that, these two clusters be treated as two separate new species of *Rhizobium*. The remaining clusters showed less similarity with other clusters and therefore, they were treated as miscellaneous group under *Rhizobium* spp. cow pea group.
- The nodulating response of *Rhizobium* spp. (*P. dulce*, *E. indica* and *S. grandiflora*) were studied in three legumes, *V. mungo*, *V. radiata* and *A. hypogaea*, belonging to the same cross inoculation, cow pea group. The response of leguminous crops to rhizobia of three different leguminous tree species was estimated in terms of height of the plant, nodule number, root biomass, shoot biomass, total number of seeds and seed biomass. *Rhizobium* spp. inoculated plants showed better response than uninoculated. Among the three rhizobia, the *Rhizobium* of *P. dulce* inoculated *V. mungo*, *V. radiata* and *A. hypogaea* showed better response in all the parameters tested. The present investigation revealed that the *Rhizobium* spp. of *P. dulce*, was more effective as biofertilizer and it can be recommended for the improvement of crop yield.