Summary
This research work contributes significantly to our knowledge of the wide occurrence of effective PGPR bacteria associated with sand dune vegetation in the ecosystem. A large number of bacteria are associated with rhizosphere and as endophytes with vegetation growing on coastal sand dunes. Such organisms are envisaged to play a role in promoting growth of plants by making the soils available with nutrients. It was interesting to understand this significance of the isolates obtained through enzymatic activities shown largely by neutrophilic and alkalophiles associated with the sand dune vegetation, *Ipomoea pes-caprae* and *Spinifex littoreus*. The distribution of activities among the different genera reflected that the most predominant isolates belonged to *Bacillus*, *Microbacterium*, *Brochothrix*, *Cellulomonas* and *Brevibacterium* genera. Among the isolates four highly promising isolates were selected for further studies on their plant growth promoting traits and field studies.

This study has also revealed the production of two exopolymers from *Microbacterium arborescens* in the presence of sucrose and glycine. These are composed of mannose as the maximum monosaccharide and uronic acids. These polymers showed emulsifying activity and chelation of the metal, copper. Further they were also found to be aggregating sand particles which shows their potential to improve the moisture holding capacity of sand and indirectly support the plant growth.

Further plant growth promoting characteristics of four promising isolates was studied. Native plant growth promoting microorganisms with properties such as phosphate solubilization, disease control potential, rhizosphere colonization would seem ideal for selection as a suitable bioinoculant. The cultures were found to produce siderophores, solubilize inorganic phosphates, ammonia, hydrogen cyanide
and indole-3-acetic acid. All these metabolites are important for plant growth promotion. They were all found to utilize ACC as a sole source of nitrogen further confirming the presence of ACC deaminase enzyme.

Among the four sand dune bacterial isolates, *B. subtilis*, *K. rosea* and *M. arborescens* were found to have a significant effect on plant growth promotion of eggplant, an agricultural important crop, in neutral soil conditions. Plant growth promoting sand dune rhizobacteria therefore present an alternative to the use of chemicals for plant growth enhancement in many different applications. Our research has demonstrated that sand dune rhizobacteria could have an important role in agriculture and horticulture in improving crop productivity.