6. SUMMARY

The present study was undertaken to develop a suitable consortium of plant growth promoting rhizobacterial to enhance the growth and yield of tomato and the findings of the study are summarized below.

- Forty four different locations from Cuddalore and Nagapattinam districts of Tamil Nadu, India were selected and tomato rhizosphere soil samples were collected. The collected soil samples were analyzed for their physico-chemical properties and relative occurrence of PGPR.

- Fortyfour isolates of *Azospirillum*, *Azotobacter*, *Pseudomonas*, *Bacillus* were isolated, characterized and identified (tentatively) by their morphological and biochemical characters upto species level.

- Among the PGPR isolates, *Azospirillum lipoferum*, *Azotobacter chroococcum*, *Pseudomonas fluorescens* and *Bacillus megaterium* were observed to be a dominating species in the rhizosphere soil samples of tomato.

- All the PGPR isolates were screened for their PGPR traits such as nitrogen fixation, phytohormone production, phosphorus solubilization, siderophore production and antifungal activity. Based on the efficiency of their PGPR traits three different species viz., *Azospirillum lipoferum* (TMAzs-13), *Azotobacter chroococcum* (TMAzt-7), *Pseudomonas fluorescens* (TMPs-19) and *Bacillus megaterium* (TMB-3) were selected for the development of bioinoculant. All the *Azotobacter* isolates were dropped from further studies since they showed poor PGPR traits.
The selected efficient PGPR isolates were tested for their survival for a period of six months on different carrier materials. Among the different carrier materials lignite supported maximum survival of PGPR isolates, either as single, dual or as consortium of inoculants.

To improve the shelf life of PGPR inoculants, different chemical amendments such as sodium glutamate, Poly vinyl pyrrolidone, skim milk and Trehalose were added to the carrier lignite. It was observed that the higher surviving population was recorded by the addition of Poly vinyl pyrrolidone followed by sodium glutamate, skim milk and Trehalose.

The improved shelf life of the PGPR isolates as single, dual and consortium in lignite amended with Poly vinyl pyrrolidone (PVP) was confirmed by the dehydrogenase activity of PGPR inoculants up to twelve months of storage.

The effect of inoculation of efficient PGPR isolates as single, dual and as consortium on the growth and yield of tomato var. PKM-1 was investigated at graded levels of N & P under pot culture experiment and under the field condition also.

The results of both the *in vitro* and *in vivo* studies revealed that, the inoculation of consortium of PGPR *viz.* *Azospirillum lipoferum* TMAzs-13+ *Pseudomonas fluorescens* TMPs-19 + *Bacillus megaterium* TMB-3 at 50% N&P increased the plant growth, dry matter production, yield, nutrient content and the fruit quality of tomato to higher level compared with the other single or dual inoculums.
Based on the findings of the present study, it was concluded that, the PGPR strains viz., *Azospirillum lipoferum* TMAzs-13, *Pseudomonas fluorescens* TMPs-19 and *Bacillus megaterium* TMB-3 can be developed as a suitable consortium of bioinoculant in the lignite amended with Poly vinyl pyrroldone (PVP) (1%) to enhance the growth, yield and quality of tomato var. PKM-1, with the saving of 50% recommended dose of nitrogen and phosphorus and can be recommended to the farming community, as a low cost technology.