Summary and Conclusion

5.0 SUMMARY AND CONCLUSION

The present study entitled **"Studies on the effect of bacterial antagonist against leaf spot of Stevia caused by *Alternaria alternata*"** was conducted with the following objectives

- Collection and maintenance of antagonistic bacteria and fungal pathogen
- Screening of effective antagonistic bacteria against *A. alternata* under *in vitro* conditions
- Studying the mode of action of antagonists
- Evaluation of the efficacy of antagonists under green house conditions

The results of the present study were summarized as follows

- Among the ten *P. fluorescens* isolates and ten *B. subtilis* isolates tested under *in vitro* conditions for the inhibition of mycelial growth of *A. alternata*, AUPF2, AUPF3, AUB2 and AUB4 isolates significantly recorded maximum reduction in mycelial growth.
- The maximum inhibition zone was recorded with AUPF2 against *A. alternata* followed by AUPF3, AUB2 and AUB4.
- Qualitative assay of HCN production revealed that AUPF2 and AUPF3 recorded moderate HCN production whereas AUB2 and AUB4 showed weak HCN production.
- AUPF3 produced maximum amount of HCN followed by AUPF2, AUB2 and AUB4.

- AUPF2 produced more salicyclic acid followed by AUPF3, AUB2 and AUB4.
- Maximum siderophore production was observed in the isolate AUPF2 followed by AUPF3, AUB2 and AUB4.
- IAA production was high in AUPF2 followed by AUPF3, AUB2 and AUB4.
- In greenhouse condition, foliar application of the biocontrol agents *viz.,* AUPF2, AUPF3, AUB2 and AUB4 challenged against *A. alternata* induced the accumulation of PO, PPO, PAL and phenolics resulting in the suppression of *Alternaria* leaf spot.
- Increased activity of PAL was noticed in plants treated with AUPF2 and challenge inoculated with *A. alternata.*
- Maximum activity of PO was noticed in plants treated with AUPF2 and AUB2 and challenge inoculated with *A. alternata,* respectively.
- PPO activity was maximum in plants treated with AUPF2 and challenge inoculated with *A. alternata.*
- Phenolic content was significantly very high in AUPF2 treated plants challenge inoculated with *A. alternata.*
- Native PAGE analysis revealed that isoforms PO1 and PO2 were induced in all treated plants. Increased intensity of the band was observed in biocontrol agents treated plants and biocontrol agents treated plants challenged with *A. alternata* when compared to the healthy and inoculated control.
- Native PAGE analysis showed no PPO induction.

Thus, the present study reveals that *P. fluorescens* isolate AUPF2 was found to be most effective to produce secondary metabolites such as HCN, salicylic acid, siderophores and indole acetic acid among the other isolates tested. Foliar application of talc based formulation of AUPF2 induced maximum accumulation of PO, PPO, PAL and phenolics in *S. rebaudiana* plants in response to invasion of *A. alternata* under greenhouse condition. Further investigations have to be carried out to find out the efficacy of these isolates for the induction of resistance in various plants against *A. alternata*.