CHAPTER-V

SUMMARY AND CONCLUSION

5. SUMMARY AND CONCLUSION

Endophytes of medicinal plants occupy a unique habitat, highly diverse and are important sources of natural metabolites of pharmaceutical importance. *Curcuma longa* L. commonly known as turmeric is known for its medicinal properties. It is a rhizomatous plant belonging to family Zingiberaceae cultivated in all over Assam. The mature dried rhizome is most common ingredient of Assamese kitchen as spice and well known antiseptic, antipyretic since ancient times. The rhizome of turmeric is very remarkable due to its metabolite richness and the physiological processes associated with these tissues. Traditionally, it has been extensively used by the people of Assam in the treatment of swelling caused by injury. In addition, turmeric also possesses antimicrobial and anticancer properties. The medicinal properties are assigned due to the presence of curcuminoid and sesquiterpenoid compounds. Plants interact with diverse communities of microorganisms for various purposes including growth promotion, yield enhancement and disease management. In turn, the endophytic microbes which reside within the healthy tisssues, derive shelter and nutrients from the host plants. *C. longa* is a rich source of endophytes.

During present investigation also we were able to recover a large number of endophytes from healthy and symptomless plant tissues viz. leaves, rhizomes and roots of the medicinal plant. A total of 33 fungal and 55 bacterial isolates were recovered from different parts i. e. leaf, rhizome and root of *C. longa*. Fungal isolates belong to genera *Acremonium, Curvularia, Fusarium, Penicillium* and *Trichoderma*. The fungal strains unable to produce spores were designated as white sterile mycelia (WSM) and black sterile mycelia (BSM). The colonization frequencies of fungal endophytes were 23.3%, 18.3% and 13.4% in leaves, rhizomes and roots respectively. *Penicillium* sp. and White sterile

mycelia were most frequently isolated endophytes. The percentage of isolation of endophytes from leaves was highest (fungi-42.4%, bacteria-47.3%). It was followed by rhizome (fungi-33.3%, bacteria-34.5%), and then root (fungi-24.2%, bacteria-18.2%). Among all the endophytic strains, *Fusarium* sp. and white sterile mycelia (WSM) were the most frequently isolated endophytes. Previously, few reports are available on the isolation of endophytes from *C. longa*.

During our investigation also, fungal endophytes isolated from different parts of *C. longa* were screened for their ability to produce antimicrobial property. We were able to recover fungal endophytes having a good antimicrobial activity. The fungal endophytes were found to have good ability to inhibit the growth of the test organisms like *B. subtilis* and *K. pneumoniae*. The endophytes showed significant activity against the test organisms. Among all the endophytic strains recovered from *C. longa* during our investigation, *Fusarium* sp. PDFL14 was found to exhibit a good activity against both the test organisms.

The results from the study showed that diverse community of endophytic fungi and bacteria are associated with the internal tissues of *C. longa*. The endophytic fungal strains effectively checked the growth of bacterial test organisms. During our investigation, we might not be able to recover all the endophytes associated with the medicinal plant *C. longa* within this short period of time. It was our small effort to recover some endophytes having secondary metabolites with antimicrobial activity. Therefore, to recover all the endophytes associated with the medicinal plant, to identify the secondary metabolites with novel bioactive compounds and to know the structural elucidation of the compounds obtained from the endophytes needs further investigation.