CHAPTER VI

CONCLUSION AND RECOMMENDATION

6.0 Conclusion

From this study; we have encountered eight types of extracts from the leaves and flowers of *A. paniculata*, which are APLHE, APLDE, APLAE, APLME, APFHE, APFDE, APFAE and APFME had been successfully etracted. However, from the screening of the disc diffusion assay, only 2 types of leaves and flower extracts showed antibacterial activity towards *S. mutans*, which are APLHE, APLME, APFHE and APFDE. Therefore, those 4 extracts have been chosen for further analysis in the MIC, MBC, antibiofilm assay and time kill assay. The finding then shows that flower extracts (APFHE and APFDE) are much more potent than the leaves extracts (APLHE and APLME). As for that, APFHE and APFDE acted as the representatives in further observation on SEM, TEM and GC-MS analyses. Under SEM and TEM, morphological changes occur, such as the bacteria becoming elongated, shrinking, and then lysing after treatments. The cytoplasm content also dropped as the cell wall ruptured. From the GC-MS results, we can say that fatty acids such as palmitic, oleic, linoleic, and linolenic acids are the main bioactive component group discovered in *A. paniculata* and they are believed to disrupt bacterial membranes and limit fatty acid synthesis in the microorganisms. Lastly, according to gene expression analysis, APFDE did suppress and interfere with the genes of biofilm formation (*gtfB, gtfC, brpA*), quorum sensing (*ComD, ComE*), peptidoglycan synthesis (*murC, murD*), DNA replication (*ssb, dnaG*) and the glycolysis pathway (SmuNN2025) of *S. mutans.*

6.1 Recommendations

Further investigation can be done into the potential toxicity of the extracts. Cytotoxicity assays need to be conducted using various cell lines to determine their safety for use in humans. Additionally, investigation on the mechanism of action of the extracts can be conducted by performing proteomic analysis or analysing gene expression data. Another possibility is to test the efficacy of the extracts in vivo using animal models. This would provide valuable information about their potential use as therapeutic agents. Besides that, in the future, can use an aqueous solution to reduce the polar compounds.

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