CHAPTER V

CONCLUSIONS

This chapter is aimed to conclude on the fermentation of L(+)lactic acid by using immobilized *L. salivarius* on agricultural supports and the effect of $CaCO_3$ percentages and initial glucose concentration in order to find the suitable conditions and best material.

5.1 Conclusions

1. *L. salivarius* has 2-h lag phase and logarithmic phase hour 2 – 8 and no stationary phase in batch system.
2. The $CaCO_3$ percentage suitable to produce L(+)lactic acid was 5%. $CaCO_3$ was a slow reaction pH adjusting agent.
3. Using $CaCO_3$ to neutralize lactic acid in fermentation broth produced less lactic acid than using NaOH due to lower pH maintained by using $CaCO_3$.
4. The optimum initial glucose concentration in $CaCO_3$ system was 50 g/L.
5. Tamarind fruit fibre was not selected for further study due to labour-and-time consuming preparation process.
6. For untreated fibres, cells could well adhere on loofa sponge and sugarcane bagasse but not well on coconut fibre.
7. H_2O_2 could increase the roughness of loofa sponge fibre, as confirmed in SEM micrographs, but only few cells could adhere on its surface due to chemical change on the treated suface.
8. Molecular weight of chitosan had insignificant effects on substrate consumption and product formation.
9. Considering product yield and productivity, cell-immobilized loofa sponge has stability for 5 repeated batches and cell-immobilized sugarcane bagasse has stability for 3 repeated batches.

10. Using loofa sponge for cell immobilization provided higher lactic acid concentration, higher productivity and more number of repeated batches than sugarcane bagasse.
11. Cell immobilization has advantages over suspended cell culture on prolonged fermentation time and cell reusability.

5.2 Recommendation

Due to the promising result of using loofa sponge and sugarcane bagassse as immobilization carrier, continuous culture should be applied for further research.