CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

From all of the experimental results can be concluded as follows;

7.1 Conclusion

It could be clearly seen that a three-phase fluidized bed with agitator could be successfully employed for disrupting various microalgal cells with synergetic effect of introduction of superficial gas and liquid velocity and agitation, more 93% of cell disruption could be achieved. An increase in superficial gas velocity could provide a decrease in cell disruption performance due to the enhanced expansion of solid bed, which in turn resulted in lower possibility of collision between solid particles (glass bead) and cells. Similarly, an increase in superficial liquid velocity could result in a decrease in cell disruption percentage because it led to shorter circulating time of cells in the column. On the other hand an increase in agitating speed could significantly enhance the cell disruption performance. Finally, it could be clearly observed that morphology of cells has significant effect on the cell disruption performance. Microalgal cells with unicellulars shape and single cell wall like *Chlorella ellipsidea* could be disrupted more easily.

7.2 Recommendation for further study

7.2.1 Develop the more efficient cooling system to control the disruption temperature and prevent the disintegration of advantage substance.

7.2.2 Consideration of the bead loading to maximize the grinding.

7.2.3 Modify the reactor design to examine hydrodynamic in real operating condition.

7.2.4 From this experiment, continuous flow reactor is suitable for adaptation in industrial. Because simultaneity of all parameters in the operating conditions give high performance, can only work on continuous flow reactor. Moreover, continuous flow reactor can apply for much condition, for example it can be adapted for variation of superficial gas and liquid velocities while batch reactor can be used for only superficial gas velocities variation.