

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATION

Injectable material as bone glue can be produced by using chitin as a starting material to modify as chitosan nanoscaffold, CN, epoxy-chitosan nanoscaffold, ECN, and carboxymethylchitosan nanoscaffold, CMCN, (a water-soluble chitosan). All chitosan derivatives can be created three types of injectable gel for bone glue material. From this work, it shows efficiency of all injectable gels which can be a good potential material for bone glue. All injectable gels perform non-toxicity, biocompatibility, gelation below body temperature and injection to specific position. Moreover, it can cooperate with hydroxyapatite up to 60%. Hydroxyapatite is a main inorganic composition in human bone (~69%). This thesis also showed that CN and ECN containing in matrix of CMCN gel were able to increase properties of injectable gel such as gel strength, percent cell growth, and cooperation with hydroxyapatite.

The recommendations for the related work are; (i) identify the optimum condition for gel strength by using rheological measurements, (ii) clarifying the cell viability and toxicity with other cells, (iii) testing biodegradability of gel, (iv) testing mixing hydroxyapatite at the beginning to form injectable gel.