CHAPTER V
CONCLUSIONS

In the present contribution, solvent casting and particulate leaching technique, was used to fabricate bone scaffolding materials from polycaprolactone filled with hydroxyapatite particles (HAp) and ipriflavone (IP). The pores created by the solvent casting and particulate leaching process were uniformly distributed and interconnected with average pore diameters in the range of 400-500 μm. The pores interconnectivity of the scaffold was found to increase with the amount of sucrose. The higher porosity corresponded to the lower compressive modulus, which was consistent with the inverse tendency between porosity and mechanical properties. When certain HAp particles disperse in the PCL matrix, it impedes the movement of molecular chains in the matrix. In the application, bone tissue engineering needed the hydrophilic polymer to form the scaffold. One possible approach to improve hydrophilicity to PCL was hydrolysis reaction by alkali treated PCL. When the NaOH concentrations were increased, the PCL porous scaffolds with higher water absorption were obtained. This evidence can be explained by the increased in NaOH concentrations caused the polymer chain disturbed which increased the density of hydrophilic terminal groups carboxyl and hydroxyl groups. High NaOH concentrations caused the formation of cracks and pores on the porous scaffolds, which induced dramatic decrease in its mechanical properties and increase in its weight loss. The PCL scaffolds containing HAp can be increased the biological properties by adding the ipriflavone into the porous scaffolds. Mouse osteoblasts (MC3T3-E1) on the PCL were scattering and spindle shape. PCL scaffold containing 40%wt HAp and PCL scaffold containing both HAp and IP, the cells became well expanded because from HAp and IP that incorporated of PCL can improved cell behavior or ability of cell attachment. And the hydrolysis times were the parameters which effect to cells behavior on the porous scaffold. The scaffold with high hydrophilicity can improve the adhesion and proliferation of the osteoblast cells on the porous scaffold. The in *vitro* degradation of PCL scaffolds containing HAp were assessed in two different environments under PBS and *Pseudomonas* lipase

conditions. The presence of lipase enhanced the degradation rate of the polymer more as compared with degradation in PBS alone.