CHAPTER V
CONCLUSIONS

The brittleness of PLA was the starting point to use the catalytic extrusion for generating ring-opening polymerization of lactide and grafting from EVOH backbone in only single step. It was possible to synthesize PLA by grafting from method on EVOH via catalytic extrusion with stannous octoate as a catalyst which could be confirmed by the spectra of FTIR and NMR. The LA/EVOH content, extruder screw speed, and catalyst content are the important parameters which affected to the yield of graft copolymer, degree of grafting, molecular weight, and molecular weight distribution. The optimized LA/EVOH content, screw speed, and catalyst content were 60/40 wt%, 40 rpm, and 0.1wt%, respectively which based on the degree of grafting, monomer conversion, and their mechanical properties.

The glass-transition temperature of graft copolymers was lower in comparison with pure PLA and EVOH which both DSC and DMA gave the results in the same trend. From DSC curves and XRD patterns, all graft copolymers showed no crystal structure. It meant that high efficiency of grafting obstructed the crystallization. In addition, from DMA results, T_g of the graft copolymers was lower than that of pure PLA and EVOH. This decreased the rigidity and improved the processibility of PLA.

The grafting of PLA on EVOH backbone is to improve the elongation at break. The tradeoff includes reduced tensile strength. The mechanical properties related to the molecular weight of the graft copolymers. The graft copolymers which gave higher molecular weight showed better mechanical properties. The processibility was improved compared to that of pure PLA due to the high MWD.