CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusion

Poly (L-lactide-co-glycolide) (PLLGA) was synthesized by ring-opening polymerization. L-lactide was synthesized from ring formation by decomposition of low molecular weight PLLA. Via polycondensation and ring formation, white needle-like crystal L-lactide was obtained at the yield percentage of 30.33.

The effect of catalyst, polymerization time and temperature were observed. It was found that the copolymer properties obtained when using $Sn(Oct)_2$ as catalyst was different from those obtained when using Zn dust as catalyst. The highest yield and $\overline{M}_w$ were obtained under 120°C, 24 hours using 0.3% (mole) $Sn(Oct)_2$. The $\overline{M}_w$ of those polymers (85/15 L-lactide to glycolide and 62/38 L-lactide to glycolide) were 4,231 and 3,915, respectively.

Due to low molecular weight of copolymer obtained, copolymer alone could not be used to prepare the film. Therefore poly (vinyl alcohol), PVA was blended with the copolymer and PLLGA/PVA film was prepared using different ratios of PLLGA/PVA (0.5/2, 1/2, 1.5/2, and 2/2). It was found that the larger pore size on the film and the higher swelling capacity were observed in the films containing 70/30 PLLGA to PVA and 90/10 PLLGA to PVA. The controlled releases of nicotine from PLLGA/PVA films were investigated in PBS solution. The results indicated the ratio of 0.5PLLGA/2PVA and 1.5PLLGA/2PVA at the copolymer ratio of 70/30 provided the minimum and maximum nicotine release of 738 and 5,072 $\mu gcm^{-2}h^{-1}$, respectively. The minimum of nicotine release is appropriated for person who would like to use this film to quit smoking.

5.2 Suggestion for Future Work

The results in this study indicated that the molecular weight somewhat controlled nicotine release rate. Therefore increasing molecular weight of PLLGA using chain extender may help control nicotine release rate in PLLGA film. In addition, biodegradation of PLLGA/PVA film should be investigated so that the shelf life of PLLGA/PVA film containing nicotine can be manipulated prior to commercialization.