CHAPTER V

CONCLUSIONS and RECOMMENDATIONS

5.1 Conclusions

This research was divided into two main parts: the fabrication and characterization of Thai silk fibroin/type B gelatin electrospun fiber mats and *in vitro* biodegradation and controlled release. The applied voltage and the amount of silk fibroin were found to affect the morphology of blended fiber mats. A decrease in average fiber diameter resulted from increasing in applied voltage and decreasing in silk fibroin content. The round and smooth fiber could be obtained when silk fibroin was less than 60wt%. Among three treatment methods, soaking and spraying with EDC/NHS in ethanol was an effective method for treatment because weight loss of the fiber mats was less than the other two treatment methods and morphology of the fiber mats after treatment was closed to their origin. The blended fiber mats with high silk fibroin content was easily handled due to good mechanical strength.

From *in vitro* biodegradation, the weight of SF/GB fiber mats at 10/90 decreased rapidly after exposed in phosphate buffer saline and collagenase solution because gelatin was highly hydrophilic and specificly digested by collagenase.

From *in vitro* release of model compound, SF/GB fiber mats could not control the release of azo-casein because of repulsion force occurred from the same charge of azo-casein and SF/GB fiber mats. In contrast, SF/GB electrospun fiber mats could be able to sustain the release of methylene blue and nerve growth factor due to an attractive interaction of the opposite charge of the compounds and fiber mats. An attractive interaction between silk fibroin and methylene blue was stronger than that of type B gelatin and methylene blue due to highly negative charge of silk fibroin. However, the difference in release behavior of NGF from three blended SF/GB fiber mats with various blending ratios was not observed.

5.2 Recommendations

From the result of *in vitro* release of NGF from SF/GB electrospun fiber mats in phosphate buffer saline, the release behavior of NGF from the blended fiber mats in collagenase solution should be investigated to assess the release of NGF in enzymatic environment.