

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

Conclusively, curcumin based sensors were successfully produced using LbL deposition and electrospinning to produce curcumin thin films and fibers, respectively. First, curcumin was loaded on PDADMAC/PSS and CHI/ALG thin films which confirmed that the curcumin content loaded on PEMUs are controlled by the following parameters: solvent composition, loading time, curcumin concentration and thin film thickness. In addition, the PEMU produced showed that there is electrostatic interaction between the negative curcumin and cationic PDADMAC and CHI; therefore produces higher curcumin loading on the odd layers of the PEMU. Unlike the polycations, the polyanions i.e. PSS and ALG has less curcumin loaded on the thin films due to the charge repulsion. In addition, the top layered polyelectrolyte has influence towards the pH sensitivity of curcumin where PDADMAC top layers induce the color change at pH 8 where PSS top layer and CHI/ALG thin films changes color at pH 10 and 8 respectively. Unlike PDADMAC/PSS thin films, the curcumin loaded on CHI/ALG thin films changed from yellow to colorless due to the thin layers of CHI/ALG films which only allows curcumin to deposit on top and not diffused in the PEMU bulk. This concludes that the PEMU top layer can tune the pH sensitivity of curcumin.

The second technique involves electrospinning of curcumin with PVA. PVA/curcumin fibers were successfully produced. The fibers swell can change color when interact with 100ppm ammonia vapor or higher. Crosslinking with boric acid and glutaraldehyde was suggested to maintain fibers morphology; however, was not successfully enhanced and swells faster than non-crosslinked fibers.

For recommendations in this topic, we would like to suggest that further study should be conducted with curcumin loaded on CHI/ALG. Secondly, other types of polymers that have less water absorbing properties should be used to incorporate with curcumin to produce fibers instead of PVA. In addition, the crosslinking of PVA should be further studied.