CHAPTER VI
CONCLUSION

The present study has demonstrated that the plants widely consumed in Northeast Thailand including seed of *Zea mays* Linn (purple waxy corn), rhizome of aged *Zingiber officinale* Roscoe (ginger), old leaves and ripen fruit of *Morus alba* Linn (mullbery), bulb of *Allium cepa* Linn (red onion) and ripen fruit of *Carica papaya* Linn (papaya) have the potential to be served as the natural resources for developing the novel health recipe against diabetic complications such as diabetic neuropathy, diabetic cataract and diabetic retinopathy. Based on the in vitro data, the novel herbal recipe (PWCG) is formulated from the seeds of purple waxy corn and rhizomes of aged ginger at a ratio of 1:4. The fingerprint chromatogram of the combination extract of purple waxy corn and ginger (PWCG) showed the contents of Quercetin, Gingerol, Anthocyanin and Gallic acid at concentrations of 14.421 mg Quercetin equivalent (QE)/100 mg PWCG extract, 10.701mg Gingerol/100 mg PWCG extract, 0.089 mg Cynanidin-3- glucoside/100 mg PWCG and 0.022 mg Gallic acid/100 mg PWCG, respectively. Acute toxicity study of PWCG has been conducted and the results have shown that it is safe up to 5 g/kg BW.

The beneficial effect of PWCG against diabetic neuropathy has been investigated. It has been shown that the PWCG can improve the recovery of sciatic nerve injury after CCI together with improvement of oxidative stress via decreased of MDA and increased of GPx and SOD. However, no reduction of blood glucose and suppression of aldose reductase activity in polyol pathway were observed. Base on the current data, it has been suggested that PWCG at dose of 200 $mg.kg^{-1}$BW exhibits the optimum beneficial effect to improve diabetic neuropathy.

PWCG also possesses the preventive effect against diabetic cataract and diabetic retinopathy. The results obtained from this study have demonstrated that PWCG can improve lenticular opacification and mitigates the reduction of ganglia in outer nuclear layer (ONL), OUL thickness and total retina thickness. In addition, it can improve the oxidative stress via decreased of MDA and increased of GPx and CAT. Interestingly, the present data also demonstrates that only high dose (200

mg.kg^{-1} BW) of the PWCG can improve cataract both in glucose induced cataractogenesis and in STZ induced diabetic cataract. In addition, the improved diabetic retinopathy is also observed. Therefore, PWCG at dose of 200 mg.kg^{-1} BW is the dose which produces optimum benefit to protect against diabetic cataract and diabetic retinopathy.

In this study, no dose dependent effect of the PWCG was observed. The possible explanation might be related with the masking effect of various ingredients in the extract which could possibly mitigate the effect of active ingredient.

In conclusion, these findings suggest that the PWCG is the potential natural resource for developing the food supplement and adjuvant therapy to improve diabetic neuropathy and protect against diabetic cataract and diabetic retinopathy. Moreover, the PWCG is the alternative choice to decrease the burden from diabetic via the dietary therapy and produce additive value for the agricultural products**.** The dose which should be transferred to human application is 200 mg.kg^{-1} BW. However, numerous further studies are still essential especially subchronic and chronic toxicity, the precise underlying mechanism and clinical trial phase.