CHAPTER IV

CONCLUSION

In summary, the chemical constituents of the rhizomes of *Zingiber rubens* Roxb. have been isolated by steam-distillation and solvent extraction. Then, they were separated and purified by chromatographic separation to give an essential oil and five substances: two substances were obtained from hexane crude extract and three substances were obtained from acetone crude extract. Their structures were determined by means of their physical properties and spectroscopic data.

The results are as follows:

Essential oil : a mixture of essential oils containing 22 components which can be identified by comparison of their mass spectra to those. In the NIST database. Elemol is the major constituent of the essential oil (23.37%).

Mixture 1 : was a mixture of three steroids: campesterol, stigmasterol and β-sitosterol

Mixture 2 : was a mixture of three steroidglycosides:

campesteryl-3-*O*-β-D-glucopyranoside,

stigmasteryl-3-*O*-β-D-glucopyranoside and

β-sitosteryl-3-*O*-β-D-glucopyranoside

Compound 2: was elemol which was found both in the essential oil and the hexane crude extract.

Compound 4 : 3',5-dihydroxy-4',7-dimethoxyflavonol

Compound 5 : 5-hydroxy-4',7-dimethoxyflavonol

From the literature survey, compounds 3 and 4 were known flavonol compounds which were also found in other plants.[28-29, 31-32] It has been reported that compound 4 exhibits mutagenic activity in *Salmonella typhimurium* TA 98 and antioxidative activity for protection against the rancidity of fats and oils in food. Compound 5 was a flavonol derivative which was reported to show inhibition of TPA-induced inflammation in mouse skin but less effective than kaempferol and was inactive in antimicrobial activity. The present study provides more complete spectroscopic data including ^{1}H and ^{13}C-NMR and two dimension NMR, NOE spectroscopy of compound 3, 4 and 5.

Zingiber rubens Roxb. is a medicinal plant that has potential for drug development. Compound 4 which was a derivative of flavonol, was the major constituent in *Zingiber rubens* Roxb. and was simple to isolate. The pharmacological activities of compound 4 have not been broadly studied. Further studies in this area should be conducted.