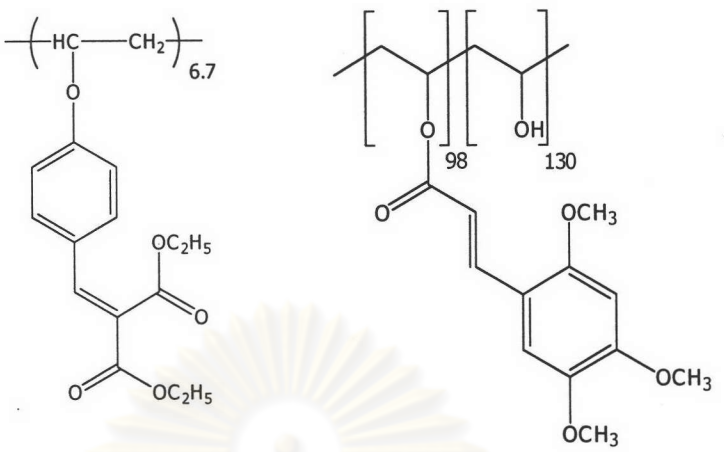
CHAPTER IV

CONCLUSION

During the course of this research, the synthesis of polydiethylbenzal malonate vinyl ether) and grafting of the UV chromophore; *trans*-2,4,5-trimethoxy cinnamic acid onto poly(vinyl alcohol) were carried out with the aim to produce photostable and lower skin-permeation UV-filtering oligomeric/polymeric materials. Synthesis of the poly(diethylbenzalmalonate vinyl ether) (Figure 4.1; **I**) was accomplished by free radical polymerization from diethylbenzalmalonate vinyl ether monomer. The oligomer has absorption band correspond to the UVB region. This oligomeric material was more photostable than OMC and possesses excellent solubility in most organic solvents, applications in cosmetic formation would be very possible. As a result, further study on the correlation between physical properties and molecular weight of the compound should be done. This means syntheses of such compound at various molecular weight. Grafting of the UV chromophore; *trans*-2,4,5-trimethoxycinnamic acid onto poly(vinyl alcohol) was done through N,N'-dicyclo hexyl carbodiimide coupling agent at 90°C. The degree of cinnamoyl substitution in the product, poly[(vinyl 2,4,5-trimethoxycinnamate)(vinyl alcohol)] copolymer, was 43% by mole (Figure 4.1; **II**). This product showed UVA and UVB screening properties with moderate solubility in most organic solvents. Further study on formulation, transdermal absorption and skin irritation of the compound should be done. However, the grafted polymer exhibited *trans* to *cis* photoisomerization upon UVA-B irradiation resulting in the decreased UV absorption property of the material.



(I) **(II)**

Figure 4.1 Structures of poly(diethylbenzalmalonate vinyl ether) (**I**) and poly[(vinyl 2,4,5-trimethoxycinnamate)(vinyl alcohol)] copolymer (**II**).